Project Manual

Outingdale Raw Water Pump Station (RWPS) Upgrade

Project No. 16048.01
Contract No. E20-17

October 2020

Prepared for
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

Prepared by
Luhdorff & Scalmanini Consulting Engineers
500 First Street
Woodland, CA 95695

In accordance with the Americans with Disabilities Act and California law, it is the policy of the El Dorado Irrigation District to offer its public programs, services and meetings in a manner that is readily accessible to everyone, including individuals with disabilities. If you are a person with a disability and require information or materials in an appropriate alternative format; or if you require any other accommodation, please contact the ADA Coordinator at the number or address below at least 72 hours prior to the meeting or when you desire to receive services. Advance notification within this guideline will enable the District to make reasonable arrangements to ensure accessibility. The District ADA Coordinator can be reached at: Phone: (530) 642-4045; e-mail: adacoordinator@eid.org
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ADVERTISEMENT TO BID

NOTICE. THE EL DORADO IRRIGATION DISTRICT, an irrigation special district organized and existing under the California Irrigation District Law (Water Code §20500, et seq.) and authorizing statutes (Water Code §22975, et seq.) (“District”), hereby gives notice that it will accept Bids for construction of the following public work:

OUTINGDALE RAW WATER PUMP STATION UPGRADE
PROJECT NO. 16048.01
CONTRACT NO. E20-17

BID SUBMISSION. District will receive sealed Bids no later than 3:00 PM local time on November 24, 2020 at the District’s Customer Service Building located at 2890 Mosquito Rd., Placerville, CA 95667. The Bid opening will be in accordance with procedures set forth in SECTION 00200 (Instructions to Bidders).

STATEMENT OF QUALIFICATIONS. Each Bidder shall be required to submit, in accordance with SECTION 00200 (Instructions to Bidders) and SECTION 00450 (Statement of Qualifications for Construction Work), a Statement of Qualifications.

DESCRIPTION OF THE WORK. The Work consists of: Complete replacement of the existing Raw Water Pump Station for the Outingdale Water Treatment Plant. This includes installation of new pumps, inlet, tank, and access. Bidding Documents contain the full description of the Work.

CONTRACT TIME. Work shall be finally completed within 160 calendar Days from the date when Contract Time commences to run.

REQUIRED CONTRACTOR’S LICENSE(S). A California class A contractor’s license is required to Bid this Contract. Joint ventures must secure a joint venture license prior to award of this Contract. Removal, handling, and/or disposal of hazardous materials may by law require hazardous substance removal certification by the Contractor’s State License Board.

PREVAILING WAGE LAWS. The successful Bidder must comply with all prevailing wage laws applicable to the Project, and related requirements contained in the Contract Documents.

INSTRUCTIONS. Bidders shall refer to SECTION 00200 (Instructions to Bidders) for required documents and items to be submitted in sealed envelopes for deposit at front desk, located at District’s main office, and applicable times for submission.

SUBSTITUTION OF SECURITIES. District will permit successful Bidder to substitute securities for retention monies withheld to ensure performance of Contract, as set forth in SECTION 00680 (Escrow Agreement for Security Deposits in Lieu of Retention), in
accordance with California Public Contract Code, Section 22300. By this reference, SECTION 00680 (Escrow Agreement for Security Deposits in Lieu of Retention) is incorporated in full in this SECTION 00100.

RESTRICTIONS ON SUBSTITUTIONS. As a limitation on Bidder's privilege to substitute “or equal” items, District has found that certain items are designed as District standards and certain items are designed to match existing items in use on a particular public improvements either completed or in the course of completion. As to such items, District will not permit substitution. Such items are: none. As a further limitation on Bidder’s privilege to substitute items, District has found that certain necessary items are only available from one source. As to such items, District will not permit substitution. Such items are: none. The findings described herein are available upon request.

MANDATORY PRE-BID MEETING AND SITE VISIT. District will conduct a Mandatory Pre-Bid Meeting and Site Visit at 9:00 AM on November 6, 2020. The Meeting will commence at the Outingdale Water Treatment Plant, 6008 Outingdale Road, Somerset, CA 95684. Each Bidder must be represented and attend the entire Meeting and Site Visit. Each representative shall sign an attendance sheet identifying the Bidder represented. Any Bidder wishing to investigate subsurface conditions at the Site must schedule such a visit with the District in accordance with SECTION 00200 (Instructions to Bidders). A sign-in sheet will be available from 9:00 a.m. to 9:15 a.m. only. Attendees will be expected to tour the job site during the pre-bid meeting. Please advise the Project Manager well in advance of the meeting if you need special accommodations. Reasonable efforts will be made to accommodate your needs.

PROCUREMENT OF BIDDING DOCUMENTS. Contract Documents and drawings are available electronically only. Electronic copies of Contract Documents may be obtained on the District’s website located at http://www.eid.org/doing-business-with-eid/procurement-and-contracts. The Bidder’s attention is drawn to the Instructions to Bidders for complete instructions regarding submission of a bid. All addenda will be posted on the District’s website. Each Bidder is solely responsible for obtaining all addenda posted on the District’s website.

The following plan room services may have sets of Bidding Documents for the Work contemplated herein:

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<td>El Dorado Builders’ Exchange</td>
<td>3430 Robin Lane #7, Cameron Park, CA 95682</td>
<td>Tel: (530) 672-2955</td>
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<tr>
<td></td>
<td>Tel: (530) 672-2985</td>
<td>Fax: (530) 672-2985</td>
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<tr>
<td>Placer County Contractors Association</td>
<td>10656 Industrial Ave., Suite 160, Roseville, CA 95678</td>
<td>Tel: (916) 771-7229</td>
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<tr>
<td>Sacramento Builders’ Exchange</td>
<td>1331 T Street, Sacramento, CA 95811</td>
<td>Tel: (916) 442-8991</td>
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<td></td>
<td>Tel: (916) 446-3117</td>
<td>Fax: (916) 446-3117</td>
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<tr>
<td>McGraw-Hill Construction Dodge</td>
<td>4300 Beltway Place, Suite 180, Arlington, TX 76018</td>
<td>Tel: (626) 932-6136</td>
</tr>
<tr>
<td></td>
<td>Tel: (800) 360-6397</td>
<td>Fax: (800) 360-6397</td>
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**BID PREPARATION COST.** Bidders are solely responsible for the cost of preparing their Bids.

**RESERVATION OF RIGHTS.** District specifically reserves the right, in its sole discretion, to reject any or all Bids, or re-Bid, or to waive inconsequential deviations from Bid requirements not involving time, price, or quality of the Work.

Dated this 16th day of October, 2020

By: ______________________________
Name: Elizabeth Dawson P.E.
Title: Engineering Manager

END OF SECTION
SECTION 00200

INSTRUCTIONS TO BIDDERS

Bids are requested for a general construction contract, or work described in general, as follows:

OUTINGDALE RAW WATER PUMP STATION UPGRADE
PROJECT NO. 16048.01
CONTRACT NO. E20-17

1. RECEIPT OF BIDS. Sealed bids will be received by the District at District’s office (see paragraph 2 below) no later than 3:00 PM, local time, on November 24, 2020. District will receive Bids in two opaque sealed envelopes or other packages labeled Envelope “A” and Envelope “B,” each containing the respective items described in paragraphs 4 and 5 below. All Bid envelopes will be time stamped to reflect their submittal time. Envelope “A” shall be due by 3:00 PM, local time, November 24, 2020, and Envelope “B” shall be due by 3:00 PM, local time, November 24, 2020, as determined by the computer clock located at the front desk of the 1st floor lobby of the District’s Customer Service Building located at 2890 Mosquito Rd., Placerville, CA 95667. District will reject all Bids received after the specified time and will return such Bids to Bidders unopened. Bidders must submit Bids in accordance with this SECTION 00200.

2. CONTACT INFORMATION.

Bidding Documents are only available electronically on the EID website at:


For information concerning the proposed work, contact in writing:

PATRICK WILSON, P.E.
SENIOR CIVIL ENGINEER
EL DORADO IRRIGATION DISTRICT

Email: pwilson@eid.org

3. BID SUBMISSION. Bidder should mark its Bid envelopes as “BID FOR THE DISTRICT, PROJECT NO. 16048.01, CONTRACT NUMBER E20-17, OUTINGDALE RWPS UPGRADE PROJECT”, Envelope “A” or “Envelope “B,” as appropriate. Bids shall be deemed to include the written responses of the Bidder to any questions or requests for information of District made as part of Bid evaluation process after submission of Bid. Bidder’s failure to submit all required documents strictly as required entitles District to reject the bid as non-responsive.
4. CONTENTS OF ENVELOPE “A” - BID PRICE. Envelope “A” shall include:
   a. SECTION 00400 (Bid Form) completed in accordance with paragraph 6 of this SECTION 00200.
   b. Bid security supplied and completed in accordance with paragraph 7 of this SECTION 00200.
   c. Acknowledge addendum on SECTION 00400 (Bid Form).
   d. SECTION 00430 (Subcontractors List) in accordance with paragraph 8 of this SECTION 00200 and SECTION 00430 (Subcontractors List).
   e. SECTION 00481 (Non-Collusion Declaration).
   f. SECTION 00482 (Bidder Certifications). Bidder must complete this form as indicated.

5. CONTENTS OF ENVELOPE “B” - BIDDER QUALIFICATIONS. Envelope “B” shall include:
   a. Statement of Qualifications submitted in accordance with paragraph 9 of this SECTION 00200 and SECTION 00450 (Statement of Qualifications for Construction Work).
   b. SECTION 00420 (Bidder Registration and Safety Experience Form). Bidder must complete this form and include comprehensive answers to all questions.
   c. A separate sealed envelope (labeled “CONFIDENTIAL INFORMATION FOR BID FOR THE DISTRICT” with the project name and number, contract number, and Bidder’s name) containing all proprietary, trade secret and otherwise confidential information of Bidder contained in or submitted in connection with its Bid, submitted in accordance with paragraph 29 of this SECTION 00200.

6. REQUIRED BID FORMS. All Bidders must submit Bids using, where applicable, documents supplied in this Project Manual, including without limitation SECTION 00400 (Bid Form), SECTION 00430 (Subcontractors List), SECTION 00481 (Non-Collusion Declaration) and SECTION 00482 (Bidder Certifications). District will reject as non-responsive any Bid not submitted on the required forms. Bids must be full and complete and legible. Bidders must complete all Bid items and supply all information required by Bidding Documents. District reserves the right in its sole discretion to reject any Bid as non-responsive as a result of any error or omission in the bid. Bidders may not modify the Bid Form or qualify their Bids. Bidders must submit clearly and distinctly written Bids. Bidders must clearly make any changes in their Bids by crossing out original entries, entering new entries, and initialing new entries. District reserves the right to reject any Bid not clearly written.

7. REQUIRED BID SECURITY. Bidders must submit with their Bids either cash, a cashier’s check, or certified check from a responsible bank in the United States, or corporate surety bond furnished by a surety authorized to do business in the State of California, of not less than ten percent (10%) of the total amount of Bid (excluding alternates, if any), payable to District. All Bidders choosing to submit a surety bond must submit it on the required form, SECTION 00411 (Bond
Accompanying Bid). District will reject as non-responsive any Bid submitted without the necessary Bid security.

The District may retain Bid securities and Bid bonds of other than the Apparent Low Bidder for a period of 90 Days after award or full execution of the Contract, whichever first occurs. Upon full execution of the Contract, and upon request by Bidder, District will return to the respective unsuccessful Bidders their Bid securities and Bid bonds.

8. **REQUIRED SUBCONTRACTORS LIST.** All Bidders must submit with their Bids the required information on all Subcontractors in SECTION 00430 (Subcontractors List) for those Subcontractors who will perform any portion of Work, including labor, rendering of service, or specially fabricating and installing a portion of the Work of improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (1/2 of 1%) of total Bid. Violation of this requirement may result in Bid being deemed non-responsive and not being considered.

9. **REQUIRED STATEMENT OF QUALIFICATIONS.** In order for a Bidder to be eligible to Bid on this Contract, it must submit a Statement of Qualifications responsive to the requirements identified in SECTION 00450 (Statement of Qualification for Construction Work) (“SOQ”), including without limitation qualification information for Subcontractors and schedulers identified in SECTION 00450, if any. Except as otherwise provided in paragraphs 20 and 21 of this SECTION 00200 or in SECTION 00450, District will make final determinations regarding Bidder responsibility based solely upon the SOQ submitted as part of Envelope “B”. Information in the SOQ shall be current.

10. **MANDATORY PRE-BID MEETING AND SITE VISIT.** District will conduct a mandatory Pre-Bid Meeting and Site Visit at 9:00 AM, local time, on November 6, 2020. The Meeting will commence at the Project Site, Outingdale Water Treatment Plant, 6008 Outingdale Road, Somerset, CA 95684. Each Bidder must be represented and attend the entire Meeting and Site Visit. Each representative shall sign an attendance sheet identifying the Bidder represented. A sign-in sheet will be available from the designated meeting start time to 15 minutes after the designated meeting start time only. Attendees will be expected to tour the job site during the pre-bid meeting. In accordance with the Americans with Disabilities Act and California law, please advise the Project Manager at least 72 hours prior to the meeting if you need special accommodations. Reasonable efforts will be made to accommodate your needs.

a. District reserves the right to schedule and organize the Site Visit to minimize disruption to surrounding facilities and congestion. Any Bidder wishing to investigate subsurface conditions or otherwise conduct invasive investigations, explorations, test, or studies at this Site, shall schedule such examinations with the District by filing the District at least seven (7) day written notice. Additionally,
any such Bidder must deliver an executed SECTION 00210 (Access, Indemnity and Release Agreement) and provide an insurance certificate as described therein by noon of the Day prior to the site examination. Bidders who intend only to observe Site conditions and not conduct such examinations are not required to provide an executed SECTION 00210 or an insurance certificate.

b. Bidders must submit written questions in connection with the Meeting and Site Visit. District will post online such Addenda as District in its discretion considers necessary in response to written questions. Bidders shall not rely on oral statements. Oral statements will not be binding or legally effective.

11. OTHER REQUIREMENTS PRIOR TO BIDDING. Submission of Bid signifies Bidder’s careful examination of Bidding Documents and complete understanding of the nature, extent, and location of Work to be performed. As a condition to Bidding, Bidder must complete tasks listed in SECTION 00520 (Agreement), Article 5. Submission of Bid shall constitute Bidder’s express representation to the District that Bidder has fully completed these tasks.

Pursuant to Labor Code sections 1771.1(a) and 1725.5, no contractor or subcontractor may be listed on a bid proposal unless registered with the Department of Industrial Relations. The District will not accept any bid, nor award any contract or subcontract, without proof of the contractor or subcontractor’s current registration with the Department of Industrial Relations. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

12. EXISTING DRAWINGS AND GEOTECHNICAL DATA. Bidders may examine any available existing conditions information (eg. record documents, specifications, studies, drawings of previous work on site) by giving District reasonable advance notice, as well as applicable environmental assessment information (if any) regarding the Project. SECTION 00320 (Geotechnical Data and Existing Conditions) applies to all supplied existing conditions information and geotechnical reports and all other information supplied regarding existing conditions either above ground or below ground, including without limitation any applicable reports pertaining to naturally occurring asbestos. District will make copies available for a fee of printing and handling. A Bidder must give two (2) days advanced notice if copies are desired.

13. ADDENDA. All addenda will be posted on the District’s website. Each bidder is solely responsible for obtaining all addenda posted on the District’s website. District may not answer questions received after 3:00 PM on November 12, 2020. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. However, District and/or Engineer may, upon inquiry by Bidder, orally direct Bidder’s attention to specific provisions of the Contract Documents which cover the subject of the inquiry. In addition:
14. **SUBSTITUTIONS.** Bidders must base their Bids on products and systems specified in Contract Documents or listed by name in Addenda.

a. Except as provided in paragraph 14c below, District will consider substitution requests only for "or equal items". Bidders wanting to use "or equal" item(s) may submit SECTION 00660 (Substitution Request Form) no later than **30 Days after the due date for District receiving bids or 30 Days after the issuance of the Notice to Proceed.** After that date, the District will not accept "or equal" substitution requests. To assess "or equal" acceptability of product or system, submittals of substitutions shall contain the information required in SECTION 00660 and set for in Section 01600 (Product Requirements). Insufficient information will be grounds for rejection of substitution. District shall, within a reasonable period of time after having received a request for substitution, issue in writing its decision as to whether the proposed substitute item is an "or equal" item for compatibility to District systems, durability, or quality. District's decision shall be conclusive on all Bidders.

b. Approved substitutions shall be listed in Addenda and become part of Contract Documents.

c. Substitutions may be requested after submitting Bids and Award of Contract only in accordance with Section 01600 (Product Requirements).

d. As a limitation on Bidder's privilege to substitute "or equal" items, District has found that certain items are designed as District standards and certain items are designed to match existing items in use on a particular public improvement either completed or in the course of completion. As to such items, District will not permit substitution. Such items are: **none.** As a further limitation on Bidder's privilege to substitute items, District has found that certain necessary items are only available from one source. As to such items, District will not permit substitution. Such items are: **none.**

15. **WAGE RATES.** Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are on file at District’s office and are deemed included in the Bidding Documents. Upon request, District will make available copies to any interested party. Also, Contractor shall post the applicable prevailing wage rates at the Site. The California Department of Industrial Relations website is www.dir.ca.gov

16. **EQUAL EMPLOYMENT OPPORTUNITY.** Contractor shall comply with all applicable federal, state, and local laws, rules, and regulations in regard to nondiscrimination in employment because of race, color, ancestry, national origin, religion, sex, marital status, age, medical conditions, disability, or any other reason.
17. **PLANS.** Complete sets of Bidding Documents must be used in preparing Bids. Neither District nor Engineer assume any responsibility for errors or misinterpretations resulting from use of incomplete sets of Bidding Documents. One set of plans will be provided with the Bid Documents. No return of full-size Drawings is required, and no refund will be made.

18. **BID OPENING.** District will open all Bidders’ Envelopes “A” at 3:00 PM on the specified date, initially evaluate them for responsiveness, and determine an Apparent Low Bidder as specified herein. District will not open Envelopes “B” except for the Apparent Low Bidder’s Envelope “B” (or as otherwise provided in this SECTION 00200). No bid envelopes will be opened publically.

19. **DETERMINATION OF APPARENT LOW BIDDER (Envelope “A”).** Apparent Low Bid will be determined as provided in SECTION 00400 (Bid Form). All Bidders are required to submit Bids on all Bid items including any alternates.

20. **EVALUATION OF BIDDER RESPONSIBILITY (Envelope “B”).**
   a. District will open Apparent Low Bidder’s Envelope “B” and check its contents for compliance with paragraph 5 above and this paragraph 20. District will notify Apparent Low Bidder in writing of any deficiencies found and will provide Bidder the opportunity to respond in writing with reasonable clarifications but will not allow any changes in the nature of Bidder as a business entity.
   b. If any Apparent Low Bidder is determined to be non-responsive or non-responsible, District may open the next Apparent Low Bidder’s Envelope “B” pursuant to any procedures determined in its reasonable discretion, and proceed for all purposes as if this Apparent Low Bidder were the original Apparent Low Bidder. District shall use reasonable efforts to make the responsive responsible Apparent Low Bidder’s Envelope “B” public on the fifth Day following opening of the Bidders’ Envelope “A”s, subject to paragraph 28 below.
   c. SECTION 00450 sets forth certain minimum criteria for a Bidder to be found responsible. Bidder’s attention is called to the following minimum requirements for a Bidder to be found responsible to perform the Work:

   1) **Financial Strength.** Sufficient financial strength, stability and resources as measured by Bidder’s equity, debt-to-assets ratio, and capability to finance the Work to be performed.

   2) **Building Capacity.** Ability to secure, in accordance with the Contract Documents, the required forms of Construction Performance Bond and Construction Labor and Material Payment Bond. Ability to obtain required insurance with coverage values that meet minimum requirements.

   3) **Subcontracting Prior Experience.** Satisfactory experience on public works, including without limitation no history of default termination, excessively delayed completion or excessive defective work.
4) Projects Public Experience. Evidence that Bidder and its team, including without limitation its Subcontractors (hereafter, including Bidder if Bidder performs such Work itself, “designated Subcontractor(s)”), have the human and physical resources of sufficient quantity and quality to perform the Work under Contract Documents in a timely and Specification-compliant manner, to include:

i. Construction and management organizations with sufficient personnel and requisite disciplines, licenses, skills, experience, and equipment for the Project.

ii. Minimum licensing requirements including evidence of a valid California Class A contractor’s license for the Bidder and evidence of requisite licenses for Key Personnel of Bidder or any designated Subcontractor(s).

iii. Sufficiency of proposed quality assurance plan to meet the requirements of the Contract Documents.

iv. Bidder’s safety record.

v. Minimum experience requirements of the prime contractor including the completion of 5 projects of similar nature and complexity involving with contract dollar amounts of at least $500,000 each, or with an aggregate value of $5,000,000, within the past 5 years.

vi. A field organization with skills, experience, and equipment sufficient to perform all on-Site work and necessary scheduling.

vii. Expertise of Key Personnel to accomplish the duties and responsibilities required to perform the Work under Contract Documents. Minimum experience requirements of Key Personnel including the completion of 5 projects of similar nature and complexity and having 5 years of experience on projects of similar nature and complexity.

Bidder shall expressly indicate which, if any, of the foregoing designated Subcontractor(s)’ functions it will perform itself.

5) The following are minimum requirements for the designated Subcontractor(s) to be found responsible to perform the Work. (Unless the designated Subcontractor(s) is found responsible, Bidder will be found non-responsible.)

i. Evidence that Bidder’s named Subcontractor has the human and physical resources of sufficient quantity and quality to perform those aspects of the Contract in a timely and Specification-compliant manner, to include:

ii. Construction and management organizations with sufficient personnel and requisite disciplines, licenses, skills, experience, and equipment for the Project.
iii. A field organization with skills, experience, and equipment sufficient to perform all on-Site work and necessary scheduling.

iv. Successful experience on a minimum of 5 projects over the past 5 years for projects similar in nature and complexity to this Project.

v. The project superintendent shall have worked in a similar capacity on at least 3 projects similar in nature and complexity to this Project.

21. **BID EVALUATION.** District may reject any or all bids and waive any informalities or minor irregularities in the Bids. District also reserves the right, in its discretion, to reject any or all Bids and to re-Bid the Project. District reserves the right to reject any or all nonconforming, non-responsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder if District believes that it would not be in the best interest of Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by District. For purposes of this paragraph, an “unbalanced Bid” is one having nominal prices for some work items and enhanced prices for other work items.

a. In evaluating Bids, District will consider Bidders’ qualification, whether or not the Bids comply with the prescribed requirements, unit prices and other data, as may be requested in SECTION 00400 (Bid Form) or prior to the Notice of Award.

b. Subject to any pre-qualification process for the Bidders, the District may otherwise conduct reasonable investigations and reference checks of Bidder, proposed Subcontractors, suppliers and other persons and organizations as District deems necessary to assist in the evaluation of any Bid. District shall also have the right to communicate directly with Bidder’s surety regarding Bidder’s bonds.

c. Quantities between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum or any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between written words and figures will be resolved in favor of the words.

d. Quantities stated in the Bidding Documents are approximate only and are subject to correction upon final measurement of the Work, and are subject further to the rights reserved by the District to increase or diminish the amount of work under any classification as advantages to design or construction needs require.

e. District may determine whether a Bidder is qualified in its sole discretionary judgment.
22. **AWARD.** If the Contract is to be awarded, it will be awarded to the lowest responsive, responsible Bidder. Following completion of all required District procedures and receipt of all District approvals, District will issue SECTION 00510 (Notice of Award) to successful Bidder.

23. **BID PROTEST.** Any Bid protest must be submitted in writing to the District’s offices (Attention: Office of the General Counsel), before 3:00 p.m. of the fifth calendar Day following posting in the glass case outside District’s main office and District’s web site of SECTION 00505 (Notice of Intent to Award for Construction). Time will be as determined by the computer clock located at the front desk of the 1st floor of the District’s Customer Service Building located at 2890 Mosquito Rd., Placerville, CA 95667.
   a. The initial protest must contain a complete statement of the basis for the protest.
   b. The protest must refer to the specific portion of the document that forms the basis for the protest.
   c. The protest must include the name, address, and telephone number of the person representing the protesting party.
   d. The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest that may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
   e. The procedure and time limits set forth in this paragraph are mandatory and are Bidder’s sole and exclusive remedy in the event of a Bid protest. Bidder’s failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted by another Bidder, but must timely pursue its own protest.

24. **POST-NOTICE OF AWARD REQUIREMENTS.** After Notice of Award, the successful Bidder must execute and submit the following documents as indicated below:
   a. Submit the following documents to District by 3:00 p.m. of the tenth (10) Day following Notice of Award. Execution of Contract by District depends upon approval of these documents, and any other document identified in District’s Notice of Award:
      1. SECTION 00520 (Agreement): To be executed by successful Bidder. Submit three originals, each bearing an original signature.
      2. SECTION 00610 (Construction Performance Bond): To be executed by successful Bidder and surety, in the amount set forth in SECTION 00610 (Construction Performance Bond). Submit one original.
      3. SECTION 00620 (Construction Labor and Material Payment Bond): To be executed by successful Bidder and surety, in the amount set forth in
SECTION 00620 (Construction Labor and Materials Payment Bond). Submit one original.

4. Insurance certificates and endorsements required by SECTION 00700 (General Conditions) Article 4. Submit one original set.

5. The Guaranty in the form set forth in SECTION 00630 (Guaranty). Submit three originals, each bearing an original signature.

6. Any other item described in SECTION 00510 (Notice of Award) (if any).

b. District shall have the right to communicate directly with Apparent Low Bidder’s proposed performance bond surety, to confirm the performance bond. District may elect to extend the time to receive faithful performance and labor and material payment bonds.

c. Successful Bidder’s failure to submit the documents required herein, in a proper and timely manner, entitles District to rescind its award, and to cause Bidder’s Bid security to be forfeited as provided herein.

25. FAILURE TO EXECUTE AND DELIVER DOCUMENTS. If Bidder to whom Contract is awarded shall, within the period described in paragraph 24 of this SECTION 00200, fail or neglect to execute and deliver all required Contract Documents and file all required bonds, insurance certificates, and other documents, District may, in its sole discretion, foreclose on Bidder’s deposit surety bond, or deposit Bidder’s cashier’s check or certified check for collection, and retain the proceeds thereof as liquidated damages for Bidder’s failure to enter into the Contract Documents. Bidder agrees that calculating the damages District may suffer as a result of Bidder’s failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of Bidder’s required Bid security shall be the agreed and presumed amount of District’s damages. In addition, upon such failure District may determine the next Apparent Low Bidder and proceed accordingly.

26. MODIFICATION OF COMMENCEMENT OF WORK. District expressly reserves the right to modify the date for the Commencement of Work under the Contract and to independently perform and complete work related to the Project. District accepts no responsibility to Contractor for any delays attributed to its need to complete independent work at the Site.

27. WITHDRAWAL OF BIDS. Bidders may withdraw their Bids at any time prior to the Bid opening time fixed in this SECTION 00200, only by written request for the withdrawal of Bid filed with the District at the District’s office. Bidder or its duly authorized representative shall execute request to withdraw Bid. The submission of a Bid does not commit the District to award a contract for the Project, to pay costs incurred in the preparation of a Bid, or to procure or contract for any goods or services.
28. **INELIGIBLE CONTRACTORS AND SUBCONTRACTORS.** District shall not accept a Bid from a Bidder who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code section 1777.1 or 1777.7. Bidders and the Contractor who is awarded the project contract shall not utilize, or allow work by, any subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code section 1777.1 or 1777.7. (See California Public Contract Code section 6109.) The California Division of Labor Standards Enforcement publishes a list of debarred contractors and subcontractors on the Internet at www.dir.ca.gov/DLSE/debar.html.

29. **PUBLIC RECORDS ACT REQUESTS / PROPRIETARY INFORMATION.** As a public agency, the District is subject to the requirements of the California Public Records Act found at Government Code § 6250, et seq.; therefore, any information contained in or submitted in connection with a Bid could be subject to public inspection. If Bidder believes any information contained in or submitted in connection with its Bid should be exempt from public disclosure because it is proprietary, a trade secret, or otherwise confidential (such as, for example, financial statements), Bidder must:

   a. Clearly mark the specific sentence(s), paragraph(s), page(s), or document(s) as “proprietary,” “trade secret,” or “confidential” – Bidder should only mark as “proprietary,” “trade secret,” or “confidential” the specific information Bidder believes should be exempt from public disclosure;

   b. Submit that marked information to District in a separate sealed envelope (inserted inside Envelope B) labeled “CONFIDENTIAL INFORMATION FOR BID FOR THE DISTRICT” with the project name and number, contract number, and Bidder’s name, submitted in accordance with the bid submittal instructions and before the Bid submission deadline described herein;

   c. Include a table of contents inside said envelope labeled “Confidential” identifying the information contained therein with cross-references to the sections of Bidder’s Bid to which said information pertains. All financial statements should be stapled or otherwise bound and clearly labeled “Financial Statements.”

Thus, Bidder will submit two (2) separate, sealed envelopes for its Bid:

1. Envelope A;
2. Envelope B; and
3. A separate sealed envelope within Envelope B containing all proprietary, trade secret, and otherwise confidential information of Bidder, labeled in the manner described above.

Except as otherwise required by law, District will use its best efforts to avoid public disclosure of any information marked “proprietary,” “trade secret,” or “confidential” contained in the separate sealed envelope labeled “Confidential” submitted by
Bidder. In exchange, Bidder agrees to indemnify, defend and hold harmless District, and its officials, employees, representatives, and agents, from any and all claims or actions related to nondisclosure of said information.

All Envelopes A will be retained by District if the project is awarded. If District rejects all bids, Envelope A will be returned to all bidders. With regard to Envelope B (and the envelope labeled “Confidential” contained therein):

a. Any sealed Envelopes B not opened by District will remain sealed and eventually be returned to Bidder;

b. As for Envelopes B opened by District:
   i. The bound, labeled financial statements contained in the envelope labeled “Confidential” inside Envelope B will be returned to unsuccessful Bidders ninety (90) calendar days from the award of the contract or decision to reject all bids.
   ii. If the contract is awarded, the bound, labeled financial statements contained in the envelope labeled “Confidential” inside Envelope B of the successful Bidder will be returned to the successful Bidder after final completion of the Project.
   iii. All other information contained in Envelope B (i.e. everything contained in Envelope B excluding the bound, labeled financial statements inside the envelope labeled “Confidential” contained therein) will, upon written request from Bidder to District, be returned to unsuccessful Bidders after three (3) years from the award of the contract or decision to reject all bids.
   iv. All other information contained in the successful Bidder’s Envelope B (i.e. everything contained in Envelope B solely excluding the bound, labeled financial statements inside the envelope labeled “Confidential” contained therein) will be retained by District.

Information disclosed in the SOQ and the attendant submissions are the property of District unless Bidder makes specific reference to data that is considered proprietary. Subject to the requirements in the Public Records Act, reasonable efforts will be made to prevent the disclosure of information except on a need-to-know basis during the evaluation process.

30. CONSTRUCTION PAYMENT BOND AND CONSTRUCTION LABOR AND MATERIALS BOND SURETY. SECTION 00610 (Construction Payment Bond) and SECTION 00620 (Construction Labor and Materials Bond) shall be executed by a surety insurer admitted in the State of California by the Department of Insurance. District shall verify Surety’s admission by either: (1) printing out information from the website of the Department of Insurance confirming that Surety is an admitted surety insurer; or, (2) obtaining a certificate from the County Clerk confirming that Surety is an admitted insurer. District shall attach such verification to SECTION 00610 and SECTION 00620.
31. **CONFORMED CONSTRUCTION DOCUMENTS.** Following Award of Contract, District may prepare a conformed set of Contract Documents reflecting Addenda issued during bidding, which will, failing objection, constitute the approved set of Contract Documents.

32. **DEFINITIONS.** All abbreviations and definitions of terms used in this SECTION 00200 are set forth in Section 01420 (References and Definitions).

END OF SECTION
SECTION 00210
ACCESS, INDEMNITY AND RELEASE AGREEMENT

Dated _____________________

POTENTIAL BIDDER:

__________________________________

DISTRICT: El Dorado Irrigation District

SITE: Outingdale Water Treatment Plant, 6008 Outingdale Road, Somerset, CA 95684

PROJECT: Outingdale Raw Water Pump Station Upgrade
Project No. 16048.01, Contract No. E20-17

In consideration of the above-referenced District project, execution of this Section 00210 permits the undersigned potential bidder ("Bidder") to have access to, and to conduct investigations, tests and/or inspections on the Site ("access"), and effective upon such access, Bidder hereby agrees as follows:

1. To the greatest extent permitted by law, including without limitation California Civil Code Section 2782, Bidder hereby releases, and shall defend, indemnify and hold harmless District, and its officers, employees, consultants (including without limitation Engineer), representatives, and agents, and all other parties having any other interest in the Site, against any claim or liability, including attorney’s fees, arising from or relating to any Site-related access, investigation, test, inspection and/or other access activity conducted by Bidder or any of Bidder’s officers, employees, consultants, representatives, and/or agents, regardless of whether claim or liability is caused in part by the negligence of District, except for District’s active negligence, or by any released and indemnified party.

2. In connection with the release referenced in paragraph 1 above, Bidder hereby waives the provisions of California Civil Code Section 1542 which provides as follows:

A general release does not extend to claims that the creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him, must have materially affected his settlement with the debtor.

3. Bidder shall repair any damage to the Site or adjacent property resulting from activities by or on behalf of Bidder authorized hereunder, and comply with and be subject to all other requirements and obligations described or referenced in SECTION 00320 (Geotechnical Data and Existing Conditions).
4. Although this Access, Indemnity and Release Agreement is not a Contract Document (see SECTION 00520 Agreement), it shall be fully effective and binding regardless of whether Bidder submits a Bid for the subject Project, is awarded a contract for the Project or otherwise.

__________________________________________
Name of Bidder

By: ________________________________
    Signature

Its: ________________________________
    Title (If Corporation: Chairman, President or Vice President)

By: ________________________________
    Signature

Its: ________________________________
    Title (If Corporation: Secretary, Assistant Secretary, Chief Financial Officer or Assistant Treasurer)

END OF SECTION
SECTION 00320

GEOTECHNICAL DATA AND EXISTING CONDITIONS

1. SUMMARY

This SECTION 00320 sets forth the terms and conditions under which Bidder may review, study, use, or rely upon geotechnical data at or contiguous to the Site, and existing conditions information concerning existing conditions at or contiguous to the Site. This SECTION 00320, the available geotechnical data, and the supplied existing conditions information are not Contract Documents.

2. REPORT AND INFORMATION

A. District, its consultants, and prior contractors may have collected documents providing a general description of the Site and conditions of the Work. These documents may consist of geotechnical reports for and around the Site, contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding Underground Facilities.

B. Bidders may inspect geotechnical reports and information regarding existing conditions available at the District’s Office, and may obtain copies at cost of reproduction and handling upon Bidder’s payment for the costs. These reports, documents and other information are not part of the Contract Documents. Nevertheless, by submitting a Bid, Bidder accepts full responsibility for reviewing, knowing and understanding the contents of all of these materials.

C. Geotechnical reports may be included in the Project Manual and information regarding existing conditions may also be included in the Project Manual, but neither shall be considered part of the Contract Documents.

D. The following geotechnical reports and data, and information regarding existing conditions and Underground Facilities at or contiguous to the Site, are available as part of this bid package:

   1. Attachment A: Geocon Consultants, Inc. – Geotechnical Investigation, Outingdale Raw Water Intake Stairs

E. The following plans of previous on-site projects are available for review showing existing conditions and underground facilities:

   1. N/A

F. Based on reports obtained by District, District believes there is not naturally occurring asbestos either at the Site or at some other location which makes compliance with applicable naturally occurring asbestos requirements relevant to the Project.
3. **USE OF INFORMATION ON EXISTING CONDITIONS**

A. **Aboveground Existing Conditions.** Under no circumstances shall District be deemed to make a warranty or representation of existing aboveground conditions, as-built conditions, or other aboveground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform prior to bidding and Bidder must not rely on the information supplied by District regarding existing conditions. Bidder represents and agrees that in submitting its Bid, it is not relying on any information regarding existing conditions supplied by District.

B. **Underground Facilities.** Information supplied regarding existing Underground Facilities at or contiguous to the Site is based on information furnished to District by others (e.g., the owners or builders of such Underground Facilities or others) or by District. Except as expressly set forth in this SECTION 00320, District does not assume responsibility for the accuracy, completeness or thoroughness of this information, and Bidder is solely responsible for any interpretation or conclusion drawn from this information. Except as expressly set forth in this SECTION 00320, District will be responsible only for the general accuracy of information regarding Underground Facilities, and only for those Underground Facilities that are owned by District. This express assumption of responsibility applies only if Bidder has conducted the independent investigation required of it and discrepancies were not apparent.

4. **LIMITED RELIANCE PERMITTED ON CERTAIN INFORMATION**

A. **Geotechnical Data.** Except as expressly set forth in this SECTION 00320, District does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data. Bidder represents and agrees that in submitting its Bid, it is not relying on any geotechnical data supplied by District, except as specifically set forth herein.

B. Bidder may rely upon the general accuracy of the “technical data” contained in the geotechnical reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required of it and discrepancies were not apparent. The term “technical data” in the referenced reports and drawings shall be limited as follows:

1. The term “technical data” shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment, or structures that were encountered during subsurface exploration. The technical data indicates subsurface conditions at specific locations and only to the depths penetrated. They do not necessarily reflect strata variations that may exist between such locations. Subsurface conditions at other locations may differ from conditions occurring at the indicated locations. Water levels that may be shown on a log of test borings
are valid only for the stated date of exploration. The water level may change from season to season and from year to year.

2. The term “technical data” does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures.

3. The term “technical data” shall not include the location of Underground Facilities.

4. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder may rely upon the general accuracy of the “technical data” contained in such reports or drawings.

5. Bidder is solely responsible for any interpretation or conclusion drawn from any “technical data” or any other data, interpretations, opinions, or information contained in supplied geotechnical data.

5. INVESTIGATIONS

A. Before submitting a Bid, each Bidder shall be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise, which may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of Contract Documents. Bidders shall advise District in writing during the Bid period of any questions, suppositions, inferences or deductions Bidders may have for District’s review and response.

B. District has provided time in the period prior to bidding for Bidder to perform these investigations.

C. N/A

END OF SECTION
SECTION 00400

BID FORM

To be submitted as part of bid by the time and date specified in SECTION 00200 (Instructions to Bidders), paragraph 1.

TO THE HONORABLE BOARD OF DIRECTORS OF THE EL DORADO IRRIGATION DISTRICT

THIS BID IS SUBMITTED BY:

__________________________________________________________________
(Firm/Company Name)

Re: Contract No. E20-17

OUTINGDALE RAW WATER PUMP STATION UPGRADE
PROJECT NO. 16048.01

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the El Dorado Irrigation District ("District") in the form included in the Contract Documents, SECTION 00520 (Agreement), to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Sum and within the Contract Time indicated in this Bid and in accordance with all other terms and conditions of the Contract Documents.

2. Bidder accepts all of the terms and conditions of the Contract Documents, SECTION 00100 (Advertisement for Bids), and SECTION 00200 (Instructions to Bidders), including, without limitation, those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for 90 calendar Days after the day of Bid opening.

3. In submitting this Bid, Bidder represents:

   (a) Bidder has examined all of the Contract Documents and the following Addenda (receipt of all of which is hereby acknowledged).

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Addendum Date</th>
<th>Signature of Bidder</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

00400 - 1

Bid Form
(b) Bidder has visited the Site and performed tasks, reviews, examinations, and analysis and given notices, regarding the Project and the Site, as set forth in SECTION 00520 (Agreement), Article 5.

(c) Bidder has received and examined copies of the following technical specifications on District-provided, Contractor-installed equipment.

(c) Bidder has given District prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract Documents and as-built drawings and actual conditions and the written resolution thereof through Addenda issued by District is acceptable to Contractor.

4. Based on the foregoing, Bidder proposes and agrees to fully perform the Work within the time stated and in strict accordance with the Contract Documents for the following sums of money listed in the following List of Bid Prices:

**SCHEDULE OF BID PRICES**

All Bid items, including lump sums, unit prices and alternates, must be filled in completely. All items are described in Section 01200 (Measurement and Payment). Quote in figures only, unless words are specifically requested.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>ESTIMATED QUANTITY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bonds and Insurance</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>2.</td>
<td>Mobilization and Demobilization</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>3.</td>
<td>Perform Clearing, Grubbing, Earthwork, Erosion Control, and Excavation</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>4.</td>
<td>Furnish and Install Concrete Footings, Piers, Slabs, Landings, and Floors</td>
<td>25</td>
<td>Cubic Yard</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>5.</td>
<td>Furnish and Install Metal Staircase and Trolley</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>6.</td>
<td>Furnish and Install Metal Deck</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>7.</td>
<td>Furnish and Install 8’x8’ Pump Building Structure and Building Appliances</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>ITEM</td>
<td>DESCRIPTION</td>
<td>ESTIMATED QUANTITY</td>
<td>UNIT</td>
<td>UNIT PRICE</td>
<td>TOTAL</td>
</tr>
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</tr>
<tr>
<td>8.</td>
<td>Furnish and Install 8’x12’ Electrical Building Structure and Building Appliances</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
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<td>9.</td>
<td>Furnish and Install Conical Bottom HDPE Tank Components</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
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<tr>
<td>10.</td>
<td>Furnish and Install 6” Ductile Iron Pipe and Fittings</td>
<td>100</td>
<td>Lineal Feet</td>
<td>$</td>
<td>$</td>
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<tr>
<td>11.</td>
<td>Furnish and Install 4” Ductile Iron Pipe and Fittings</td>
<td>80</td>
<td>Lineal Feet</td>
<td>$</td>
<td>$</td>
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<tr>
<td>12.</td>
<td>Furnish and Install 3” Welded Steel Pipe and Fittings Fusion-Bonded Epoxy Lined and Coated</td>
<td>7</td>
<td>Lineal Feet</td>
<td>$</td>
<td>$</td>
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<tr>
<td>13.</td>
<td>Furnish and Install 2-1/2” and 2” Brass Pipe and Fittings</td>
<td>35</td>
<td>Lineal Feet</td>
<td>$</td>
<td>$</td>
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<tr>
<td>14.</td>
<td>Furnish and Install 3” Fusible HDPE Intake Pipe</td>
<td>20</td>
<td>Lineal Feet</td>
<td>$</td>
<td>$</td>
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<tr>
<td>15.</td>
<td>Furnish and Install 3” Flexible HDPE Intake Hose</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>16.</td>
<td>Furnish and Install LAKOS Sand Seperator with Auto Purge System</td>
<td>1</td>
<td>Each</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>17.</td>
<td>Furnish and Install Valves and Appurtenances</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>18.</td>
<td>Furnish and Install Horizontal Self-Priming Centrifugal Intake Pumps</td>
<td>2</td>
<td>Each</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>19.</td>
<td>Furnish and Install Vertical Multi-Stage Centrifugal Booster Pumps</td>
<td>2</td>
<td>Each</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>20.</td>
<td>Furnish and Install 7.5-hp VFD Control Panels</td>
<td>4</td>
<td>Each</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>21.</td>
<td>Furnish and Install PLC Control Panel</td>
<td>1</td>
<td>Each</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>ITEM</td>
<td>DESCRIPTION</td>
<td>ESTIMATED QUANTITY</td>
<td>UNIT</td>
<td>UNIT PRICE</td>
<td>TOTAL</td>
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</tr>
<tr>
<td>22.</td>
<td>Furnish and Install Main Breaker Panel</td>
<td>1</td>
<td>Each</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>23.</td>
<td>Furnish and Install Instrumentation</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>24.</td>
<td>Furnish and Install Site Electrical</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>25.</td>
<td>PLC, OIT and SCADA Programming</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>26.</td>
<td>Conduct Facility Performance Testing and Startup</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>27.</td>
<td>Furnish Final Documentation and Project Closeout</td>
<td>1</td>
<td>Lump Sum</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>28.</td>
<td>Rock Excavation</td>
<td>20</td>
<td>Cubic Yards</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td></td>
<td><strong>SUB TOTAL (BID ITEMS 1-28)</strong></td>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Optional Bid Item</th>
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</thead>
<tbody>
<tr>
<td>ITEM</td>
</tr>
<tr>
<td>29.</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Total Bid Price: ____________________________________________________________

(Words)

5. The undersigned acknowledges that District reserves the right to accept Alternate(s) within 10 calendar Days after the District signs the Agreement, or other period stated. Following any such acceptance, the undersigned will accept and execute any change order confirming the acceptance. The amount of any change order shall be solely the amount identified above for the Alternate(s) accepted, without any additional overhead, profit, markup or other adjustment. Similarly, the exact amounts payable with respect any Unit Price Items will be confirmed by change order, and the amount of any change order shall be solely the amount
identified above for the applicable Unit Prices times the final quantities, without any additional overhead, profit, markup or other adjustment. Finally, the exact amount payable with respect to any allowance item will be determined as otherwise provided in the Contract Documents.

6. **Selection of Apparent Low Bidder** The undersigned acknowledges that the Apparent Low Bidder will be the Bidder submitting the lowest combination of Bid Items 1 through 29, based on the assumptions (if any) set forth in the Schedule of Bid Prices.

7. The undersigned Bidder understands that District reserves the right to reject this Bid.

8. If written notice of the acceptance of this Bid, hereinafter referred to as Notice of Award, is mailed or delivered to the undersigned Bidder within the time described in paragraph 2 of this SECTION 00400 or at any other time thereafter before it is withdrawn, the undersigned Bidder will execute and deliver the documents required by SECTION 00200 (Instructions to Bidders) within the times specified therein. These documents include, but are not limited to, SECTION 00520 (Agreement), SECTION 00610 (Construction Performance Bond), and SECTION 00620 (Construction Labor and Material Payment Bond).

9. Notice of Award or request for additional information may be addressed to the undersigned Bidder at the address set forth below.

10. The undersigned Bidder herewith encloses cash, a cashier’s check, or certified check of or on a responsible bank in the United States, or a corporate surety bond furnished by a surety authorized to do a surety business in the State of California, in form specified in SECTION 00200 (Instructions to Bidders), in the amount of ten percent (10%) of the Total Bid Price set forth above and made payable to “El Dorado Irrigation District”.

11. The undersigned Bidder agrees to commence Work under the Contract Documents on the date established in SECTION 00700 (General Conditions) and to complete all work within the time specified in SECTION 00520 (Agreement). The undersigned Bidder acknowledges that District has reserved the right to delay or modify the commencement date. The undersigned Bidder further acknowledges District has reserved the right to perform independent work at the Site, the extent of such work may not be determined until after the opening of the Bids, and that the undersigned Bidder will be required to cooperate with such other work in accordance with the requirements of the Contract Documents.
12. The undersigned Bidder agrees that, in accordance with SECTION 00700 (General Conditions), liquidated damages for failure to complete all Work in the Contract within the time specified in SECTION 00520 (Agreement) shall be as set forth in SECTION 00520 (Agreement).

13. The names of all persons interested in the foregoing Bid as principals are:

(IMPORTANT NOTICE: If Bidder or other interested person is a corporation, give the legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of the firm and names of all individual co-partners composing the firm; if Bidder or other interested person is an individual, give first and last names in full).
NAME OF BIDDER: __________________________________________________________
licensed in accordance with an act for the registration of Contractors, and with
license number: ________________________________
Expiration: ________________________________

________________________________________
Where incorporated, if applicable

________________________________________
Principal

I certify (or declare) under penalty of perjury under the laws of the State of
California that the foregoing is true and correct.

______________________________
Signature of Bidder

NOTE: If Bidder is a corporation, set forth the legal name of the corporation together with
the signature of the officer or officers authorized to sign contracts on behalf of the
corporation. If Bidder is a partnership, set forth the name of the firm together with the
signature of the partner or partners authorized to sign contracts on behalf of the
partnership.

Business Address:
____________________________________
____________________________________

Officers authorized to sign contracts:
____________________________________
____________________________________

Telephone Number(s):
____________________________________

Fax Number(s):
____________________________________

E-Mail address:
____________________________________

CA Public Works Contractor (PWC) DIR No.:
____________________________________

Federal ID Number:
____________________________________

Date of Bid:
____________________________________

END OF SECTION
SECTION 00411

BOND ACCOMPANYING BID

KNOW ALL BY THESE PRESENTS:

That the undersigned ________________________ as Principal and the undersigned as Surety are held and firmly bound unto the EL DORADO IRRIGATION DISTRICT (“District”), as obligee, in the penal sum of ______________________________________ Dollars ($____________________) lawful money of the United States of America, being at least ten percent (10%) of the aggregate amount of said Principal’s “Total Bid Price” indicated in SECTION 00400 (Bid Form), for the payment of which, well and truly to be made, we bind ourselves, our successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal is submitting a Bid for District Project No. 16048.01, Contract No. E20-17, Outingdale Raw Water Pump Station Upgrade.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Bid submitted by the said Principal be accepted and the Contract be awarded to said Principal and said Principal shall within the required periods enter into the Contract so awarded and provide the required Construction Performance Bond, Construction Labor and Material Payment Bond, insurance certificates, and all other endorsements, forms, and documents required under SECTION 00200 (Instructions to Bidders), then this obligation shall be void, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument this __________ day of ________________________ 20__. 

(Corporate Seal)

By

______________________________
Principal

______________________________
Surety

(Corporate Seal)

By

______________________________
Attorney in Fact

END OF SECTION
SECTION 00420

BIDDER REGISTRATION AND SAFETY EXPERIENCE FORM

INSTRUCTIONS

In order to register to undertake work for the El Dorado Irrigation District Bidder must provide the following:

Fill out this registration form completely; do not leave blanks.

INDEPENDENT CONTRACTOR REGISTRATION

Contractor's License #:

__________________________________________________________

Date: ________________________ Fed I.D. # ______________________

Full Corporate Name of Company: ______________________________

Street Address: ______________________________________________

Mailing Address: ______________________________________________

Phone: ___________________________ Fax: _________________________

Name of Principal Contact: _____________________________________

Type of Business: _____Sole Proprietor _____Partnership

_____Non-Profit 501 C3 _____Corporation

_____Other

(please explain ___________________________)}
INSURANCE

Workers’ Compensation:
Carrier: 
Address: 
Phone and Fax: 
Policy Number: 
Policy Limit $: 
A.M. Best Rating: 

General Liability:
Carrier: 
Address: 
Phone and Fax: 
Policy Number: 
Policy Limit $: 
A.M. Best Rating: 

Automotive Liability:
Carrier: 
Address: 
Phone and Fax: 
Policy Number: 
Policy Limit $: 
A.M. Best Rating: 
All-Risk Course of Construction:

Carrier: ____________________________________________
Address: __________________________________________
Phone and Fax: ______________________________________
Policy Number: ______________________________________
Policy Limit $: _______________________________________
A.M. Best Rating: __________________________________

Professional Liability (if applicable):

Carrier: ____________________________________________
Address: __________________________________________
Phone and Fax: ______________________________________
Policy Number: ______________________________________
Policy Limit $: _______________________________________
A.M. Best Rating: __________________________________

Environmental Impairment Liability (if applicable):

Carrier: ____________________________________________
Address: __________________________________________
Phone and Fax: ______________________________________
Policy Number: ______________________________________
Policy Limit $: _______________________________________
A.M. Best Rating: __________________________________
SAFETY EXPERIENCE

The following statements as to safety experience of Bidder are submitted with Bid, as part thereof, and Bidder guarantees the truthfulness and accuracy of the information.

1. List Bidder’s Interstate Experience Modification Rate for each of the past three premium years.
   
   Current Year: ___________
   
   Previous Year: ___________
   
   Year Prior to previous year: ___________

2. Use Bidder’s last year’s Cal/OSHA 300 and 300A log to fill in the following:
   
   a. Number of lost workday cases ________________
   
   b. Number of medical treatment cases ________________
   
   c. Number of fatalities ________________

3. Employee hours worked last year ________________

4. State the name of Bidder’s safety engineer/manager or Site Safety Officer:

   ____________________________________________________________________________________

   Attach a resume or outline of this individual’s safety and health qualifications and experience.

   BIDDER CERTIFIES, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND AUTHORIZES THE DISTRICT AND ITS AGENTS AND REPRESENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

   ____________________________________________________________
   SIGNATURE
   
   ____________________________________________________________
   DATE
   
END OF SECTION
All Subcontractors in excess of ½ of 1% of total bid must be listed.

<table>
<thead>
<tr>
<th>Full Name of Subcontractor and Address of Mill or Shop</th>
<th>Description of Work: Reference To Bid Items</th>
<th>Subcontractor's CA License No.</th>
<th>Subcontractor's DIR No.</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

(Bidder to attach additional sheets if necessary)

END OF SECTION
SECTION 00450

STATEMENT OF QUALIFICATIONS FOR CONSTRUCTION WORK

1. GENERAL INFORMATION

A. In SECTION 00100 (Advertisement for Bids) the El Dorado Irrigation District (“District”) has indicated that it will receive sealed Bids for the Contract for the construction of the Outingdale Raw Water Pump Station, Project No. 16048.01, Contract No. E20-17. The Contract will require Contractor to construct the Project, all in accordance with the scope of Work set forth in the Contract.

1. District will accept Bids only from Bidders duly licensed in accordance with the California Business & Professions Code. Additionally, Bidder must meet the following requirements, at a minimum, in order to be considered by District to be qualified for award of the Contract:
   a. 10 years experience as a continuously operating entity engaged in the performance of similar work.
   b. Within the past 5 years completed three construction projects of a similar nature and complexity with a contract dollar amount of at least $500,000 each, or $5,000,000 in the aggregate.

2. Bidder’s compliance with the minimum qualification requirements in paragraph 1.A.1 of this SECTION 00450 will also be measured by the experience of the supervisory personnel who will have responsible charge of the various major components of the Work.
   a. If Bidder subcontracts portions of the Work, District, in its determination of whether the minimum qualification requirements have been met, will consider the qualifications of the Subcontractor’s supervisory personnel.
   b. The qualifications of the Key Personnel are to be submitted with the SOQ, by providing the information described in paragraph 2.G of this SECTION 00450.

2. REQUIRED CONTENTS OF SOQ SUBMISSION

A. Transmittal Letter. The Transmittal Letter shall name the proposed prime contractor, its legal structure (i.e., corporation, partnership, limited partnership, joint venture), and all of the Subcontractors to be used on the Project, and the roles and responsibilities proposed for each firm. If a joint venture or partnership is proposed, Bidder shall identify partner and/or member of the joint venture and their roles and responsibilities.

B. Financial Capacity. Include audited or reviewed financial statements for the three most recently completed fiscal years for Bidder and each member of any proposed consorting or joint venture. Also include audited or reviewed financial statements for the three most recently completed fiscal years for any parent companies) of Bidder and each member of any proposed consortium or joint venture.
Public Contract Code section 20101(e) exempts from this requirement a contractor who has qualified as a small business pursuant to Government Code section 14837(d)(1), if the bid is “no more than 25 percent of the qualifying amount provided in section 14837(d)(1).” As of January 1, 2001, the qualifying amount is $10 million, and 25 percent of that amount, therefore, is $2.5 million. If the applicant intends to declare exemption, a statement must be submitted verifying the exemption requirements are met and placed within the “CONFIDENTIAL FINANCIAL INFORMATION FOR BID FOR THE DISTRICT” envelope along with the contract number, project name, project number, and Bidder’s name). The statement shall be submitted within a separate sealed envelope inside the overall sealed envelope in lieu of the financial statement.

C. **Capability to Provide Required Performance and Payment Bonds.** Bidder shall include a letter from a surety duly licensed to do business in the State of California, having a financial rating from A.M. Best Company of A-, VII or better that the surety has agreed to provide Bidder with the required performance and payment bonds in accordance with the requirements set forth in Sections 00610 (Construction Performance Bond) and 00620 (Construction Labor and material Payment bond). Such performance and payment bonds shall be in the minimum penal sums provided therein. Bidder shall include authorization that gives the District the right to verify with the surety that the surety, based upon the Bid prices, will issue the required bonds under the conditions stated.

D. **Capability to Provide the Required Insurance.** Bidder shall provide a letter from its insurance broker/agent or underwriter and/or current certificates of insurance, confirming that Bidder can obtain the required insurance coverages and amounts specified in SECTION 00700 (General Conditions) from an insurer(s) having a financial rating from A.M. Best Company of A-, VII or better. Bidder may redact renewal dates from certificates of insurance submitted for the SOQ. However, renewal dates may not be redacted from certificates of insurance provided by the successful Bidder upon award of the contract for the Project.

E. **Human and Physical Resources.** Bidder shall identify, describe, and quantify for itself and separately for its designated Subcontractor(s) (as defined in SECTION 00200 Instructions to Bidders), the following technical for the construction work:
   1. Description and location of manufacturing facilities, naming products and quantifying production capacity and current demand;
   2. Description of field organization(s), naming skills and equipment;
   3. Description of safety program quality control procedures, and safety experience; and
   4. Evidence of a valid California A contractor’s license and required licenses of all licensees of persons who are Key Personnel if the Bidder or any designated Subcontractors.

F. **Completed Questionnaire.** Bidder shall include a completed Statement of Qualification Questionnaire in the form attached to this SECTION 00450 as
Attachment “A”. Bidder shall make sure its answers to the Questionnaire describe for itself its Key Personnel proposed, and its designated Subcontractor(s), their public works construction projects of at least $500,000 each. Add supplementary information if necessary.

G. **Resumes of Proposed Key Personnel.** Bidder shall provide a resume for each named Key Personnel of Bidder, and Bidder’s (including but not limited to the superintendent) designated Subcontractor(s), to include the following:

1. Name and proposed assignment of Key Personnel; do not include home addresses or phone numbers
2. Years of experience;
3. Education - degrees, schools and years obtained;
4. Professional Registrations;
5. Fluency in English (Yes/No);
6. Experience directly related to educational projects;
7. At least two client references, including contact names, addresses and telephone numbers, and
8. Description of projects of a similar nature worked on in the past five years.

H. **Litigation History.** Description of litigation history for the past three years, including names of involved parties, nature of dispute, and disposition.

I. **Table of Contents.** **Bidder shall provide a table of contents for its SOQ submission,** identifying the entire contents of its SOQ submission. The SOQ submission shall be stapled or otherwise bound and clearly labeled and shall contain labeled dividers for each component of the SOQ submission.

3. **GENERAL CONDITIONS**

A. **General Conditions for Content.** The SOQ shall be clear and concise to enable management-oriented personnel to make a thorough evaluation and arrive at a sound determination as to whether the SOQ meet District's requirement. To this end, the SOQ should be so specific, detailed and complete as to demonstrate clearly and fully that the Bidder has a thorough understanding of and has demonstrated knowledge of the requirements to perform the Work (or applicable portion thereof).

B. **Explanations to SOQ.** Any explanation requested by a Bidder regarding the meaning or interpretation of this SECTION 00450 must be requested in writing and with sufficient time allowed for a reply to reach Bidder before the submission of its SOQ. Oral explanations or instructions will not be binding. Any information provided to any prospective Bidder concerning this SECTION 00450 will be furnished to all prospective Bidders as an Addendum to the Bidding Documents.

C. **Definitions.** Except as set forth herein, all abbreviations and definitions of terms used in this SECTION 00450 are as set forth in SECTION 00700 (General Conditions) or Section 01420 (References and Definitions).

STATEMENT OF QUALIFICATION QUESTIONNAIRE FOLLOWS ON NEXT PAGE
ATTACHMENT “A” – Statement of Qualification Questionnaire

Bidders shall complete the entire Statement of Qualification Questionnaire and submit it in accordance with SECTION 00200 (Instructions to Bidders) and SECTION 00450 (Statement of Qualifications). Failure to complete the questionnaire or inclusion of any false statement(s) shall be grounds for immediate disqualification.

CONTACT INFORMATION

Company Name: _____________________________________________________________

Owner of Company: _________________________________________________________

Contact Person: ____________________________________________________________

Address: ___________________________________________________________________

Phone: __________________________ Fax: ________________________________

PART A: GENERAL INFORMATION

1. Does Bidder possess a valid and current California Contractor’s license for the work proposed?    Yes ___ No ___

1. Does Bidder have a minimum of $2,000,000 aggregate liability insurance coverage?  
(Excess umbrella insurance coverage is acceptable for meeting the minimum aggregate requirement)     Yes ___ No ___

3. Has Bidder’s License been revoked at any time in the last five years?     Yes ___ No ___

4. Has Bidder been “default terminated” by an owner (other than for convenience), or has a Surety completed a contract for Bidder within the last five years?   Yes ___ No ___

5. Has Bidder been cited more than twice for failure to pay prevailing wages in the last five years?       Yes ___ No ___

6. Has Bidder attached copies of its reviewed or audited financial statements and accompanying notes for the last three years OR attached verification that it is a state qualified small business and exempt from submitting financials?     Yes ___ No ___

Bidder will be immediately disqualified if any answer to questions 1, 2, or 6 is No. Bidder will be immediately disqualified if any answer to questions 3, 4, or 5 is Yes.
PART B: SAFETY, PREVAILING WAGE, DISPUTES AND BONDS

(SAFETY)

1. Has Cal/OSHA, Federal OSHA, the EPA or any Air Quality Management District cited Bidder in the past five years? Yes ___ No ___
   If yes, attach description of each citation.

2. How often does Bidder require documented safety meetings be held for:
   Field Supervisor: Weekly____ Bi-Weekly____ Monthly____ Less Than Monthly___
   Employees: Weekly____ Bi-Weekly____ Monthly____ Less Than Monthly___
   New Hires: Weekly____ Bi-Weekly____ Monthly____ Less Than Monthly____
   Subcontractors: Weekly____ Bi-Weekly____ Monthly____ Less Than Monthly____

3. How often does Bidder conduct documented safety inspections?
   Quarterly _____ Semi-annually ____ Annually _____ Other _____

4. Does Bidder have home office safety representatives who visit/audit the job site?
   Quarterly _____ Semi-annually ____ Annually _____ Other _____

5. What is Bidder’s Experience Modification Rate (EMR)? ______________. (If Bidder’s EMR exceeds 1.0, attach a detailed explanation. A rating in excess of 1.0 may constitute grounds for disqualification as non-responsible).

(PREVAILING WAGE PROVISIONS)

6. Has Bidder been fined, penalized or otherwise found to have violated any prevailing wage or labor code provision? If yes, attach description of each occurrence.
   Yes _____ No _____

/LICENSE PROVISIONS

7. Has Bidder changed names or license numbers in the past 5 years? If so, please state reason for change.
   Yes _____ No _____ Reason: ________________________________________________

(DISPUTES)

8. Has Bidder had any claims, litigation, or disputes ending in mediation or arbitration, or termination for cause associated with any project in the past 5 years? If yes, attach description of each instance including details of total claim amount, settlement amount, and owner’s name and phone number.
   Yes _____ No _____
(BONDING)

9. Bonding Capacity – Provide documentation from Bidder’s surety identifying the following:
   Name of bonding company/surety: ________________________________
   Name of Surety Agent: ________________________________
   Surety Agent address: ________________________________
   Surety Agent phone number: ________________________________
   Is surety a California-admitted surety? Yes _____ No _____
   Is surety listed in the current edition of the California Department of the Treasury’s Listing of approved sureties? Yes _____ No _____
   List surety’s A.M. Best Rating: ________________________________
   What is Bidder’s total bonding capacity? ________________________________
   What percent does Bidder pay for bonds? ________________________________

PART C: EXPERIENCE OF PRIME CONTRACTOR

The unique nature of this Project requires prior similar experience for the firm and the Key Personnel assigned. Summarize similar project experience below and provide the detailed project information requested:

Prime Contractor. List all projects with a construction cost of at least $500,000 each, or $5,000,000 in the aggregate, completed in the past five years, and indicate who were the superintendent and project manager.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Construction Cost ($)</th>
<th>Year Completed</th>
<th>Name of Project Superintendent</th>
<th>Name of Project Manager</th>
</tr>
</thead>
<tbody>
<tr>
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</table>
List Key Personnel that will be assigned to the Work:

Project Manager: ____________________________________________

Project Superintendent: ______________________________________

Recent Projects.

Bidder shall provide information about five of its most currently completed projects. Names and references must be current and verifiable. If a separate sheet is used, it must contain all of the following information:

1. Project Name: ____________________________________________

   Location: __________________________________________________

   Owner: _____________________________________________________

   Owner Contact (name and phone): ______________________________

   Architect/Engineer: __________________________________________

   Architect/Engineer Contact (name and phone number): __________

   Const. Mgr. Or Project Mgr. (name and phone number): __________

   Description of Project, Scope of Work Performed: ________________

   _____________________________________________________________________

   Total Construction Cost: __________________________________________

   Total Change Order Amount: ________________________________________

   Did Change Orders exceed 10% of original contract sum? _________  If yes, please explain on separate sheet.

   Original Scheduled Date of Completion: __________________________

   Time Extensions Granted (number of Days): ________________________

   Actual Date of Completion: ______________________________________

   Number of Stop Notices filed by Subcontractors or Suppliers: _________
2. Project Name: ____________________________________________
   Location: ________________________________________________
   Owner: __________________________________________________
   Owner Contact (name and phone): ____________________________
   Architect/Engineer: ________________________________________
   Architect/Engineer Contact (name and phone number): _________
   Const. Mgr. Or Project Mgr. (name and phone number): _________
   Description of Project, Scope of Work Performed: ______________
   Total Construction Cost: _________________________________
   Total Change Order Amount: ________________________________
   Did Change Orders exceed 10% of original contract sum? ________
   If yes, please explain on separate sheet.
   Original Scheduled Date of Completion: ______________________
   Time Extensions Granted (number of Days): ____________________
   Actual Date of Completion: _________________________________
   Number of Stop Notices filed by Subcontractors or Suppliers: _______

3. Project Name: ____________________________________________
   Location: ________________________________________________
   Owner: __________________________________________________
   Owner Contact (name and phone): ____________________________
   Architect/Engineer: ________________________________________
   Architect/Engineer Contact (name and phone number): _________
Const. Mgr. Or Project Mgr. (name and phone number): ________________

Description of Project, Scope of Work Performed: __________________________

_______________________________________________________________________

Total Construction Cost: _______________________________________________

Total Change Order Amount: _____________________________________________

Did Change Orders exceed 10% of original contract sum? ___________ If yes, please explain on separate sheet.

Original Scheduled Date of Completion: _________________________________

Time Extensions Granted (number of Days): _______________________________

Actual Date of Completion: ____________________________________________

Number of Stop Notices filed by Subcontractors or Suppliers: ________________

4. Project Name: _______________________________________________________

Location: _____________________________________________________________

Owner: __________________________________________________________________

Owner Contact (name and phone): _________________________________________

Architect/Engineer: __________________________________________________________________

Architect/Engineer Contact (name and phone number): _________________________

Const. Mgr. Or Project Mgr. (name and phone number): _________________________

Description of Project, Scope of Work Performed: __________________________

_______________________________________________________________________

Total Construction Cost: _______________________________________________

Total Change Order Amount: _____________________________________________

Did Change Orders exceed 10% of original contract sum? ___________ If yes, please explain on separate sheet.
Original Scheduled Date of Completion: ________________________________

Time Extensions Granted (number of Days): ______________________________

Actual Date of Completion: ________________________________

Number of Stop Notices filed by Subcontractors or Suppliers: ________________

5. Project Name: ______________________________________________________

Location: ____________________________________________________________

Owner: ______________________________________________________________

Owner Contact (name and phone): _______________________________________

Architect/Engineer: _____________________________________________________

Architect/Engineer Contact (name and phone number): ______________________

Const. Mgr. Or Project Mgr. (name and phone number): ______________________

Description of Project, Scope of Work Performed: ____________________________

______________________________________________________________

Total Construction Cost: _____________________________________________

Total Change Order Amount: ___________________________________________

Did Change Orders exceed 10% of original contract sum? __________  If yes, please explain on separate sheet.

Original Scheduled Date of Completion: ________________________________

Time Extensions Granted (number of Days): ______________________________

Actual Date of Completion: _____________________________________________

Number of Stop Notices filed by Subcontractors or Suppliers: ________________
PART D: EXPERIENCE OF DESIGNATED SUBCONTRACTOR(S)

The unique nature of this Project requires prior similar experience of the designated Subcontractor(s) and the Key Personnel assigned. Summarize similar project experience below and provide the detailed project information requested for each of the designated Subcontractor(s). Also expressly indicate which, if any, of the designated Subcontractor(s) functions Bidder will perform itself.

_________________________ Subcontractor: List three similar typed projects completed in the past five years and indicate who were the superintendent and scheduler.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Construction Cost ($)</th>
<th>Year Completed</th>
<th>Name of Project Superintendent</th>
<th>Name of Project Scheduler</th>
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List Key Personnel that will be assigned to the Work:

Project Manager: __________________________

Project Superintendent: ________________________

_________________________ Subcontractor: List three similar typed projects completed in the past five years and indicate who were the superintendent and scheduler.

<table>
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<tr>
<th>Project Name</th>
<th>Construction Cost ($)</th>
<th>Year Completed</th>
<th>Name of Project Superintendent</th>
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00450 - 11 Statement of Qualifications
List Key Personnel that will be assigned to the Work:

Project Manager: ________________________________________________

Project Superintendent: __________________________________________

**Subcontractor:** List three similar typed projects completed in the past five years and indicate who were the superintendent and scheduler.

<table>
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<tr>
<th>Project Name</th>
<th>Construction Cost ($)</th>
<th>Year Completed</th>
<th>Name of Project Superintendent</th>
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</table>

List Key Personnel that will be assigned to the Work:

Project Manager: ________________________________________________

Project Superintendent: __________________________________________

**Recent Projects.**

Provide information about three of its most recently completed projects for each of the designated Subcontractor(s). Names and references must be current and verifiable. Use additional sheets if necessary. If a separate sheet is used, it must contain all of the following information for each of the designated Subcontractor(s):

1. Project Name: ________________________________________________

   Location: ________________________________________________

   Owner: ________________________________________________

   Owner Contact (name and phone): ____________________________

   Architect/Engineer: ______________________________________

2. Project Name: ________________________________________________

   Location: ________________________________________________

   Owner: ________________________________________________

   Owner Contact (name and phone): ____________________________

   Architect/Engineer: ______________________________________

3. Project Name: ________________________________________________

   Location: ________________________________________________

   Owner: ________________________________________________

   Owner Contact (name and phone): ____________________________

   Architect/Engineer: ______________________________________
Architect/Engineer Contact (name and phone number): ______________________

Prime Contractor: ______________________________________________________

Prime Contractor Contact (name and phone number): ______________________

Const. Mgr. Or Project Mgr. (name and phone number): ____________________

Description of Project, Scope of Work Performed: _________________________

Value of Construction Contract: ________________________________

Value of Change Orders: ________________________________

Original Scheduled Date of Completion: ________________________________

Time Extensions Granted (number of Days): ______________________________

Actual Date of Completion: _______________________________________

Number of Stop Notices filed by Subcontractors or Suppliers: ______________

2. Project Name: _____________________________________________________

Location: __________________________________________________________

Owner: ___________________________________________________________

Owner Contact (name and phone): _________________________________

Architect/Engineer: _________________________________________________

Architect/Engineer Contact (name and phone number): _________________

Prime Contractor: _________________________________________________
Prime Contractor Contact (name and phone number): ____________________________

Const. Mgr. Or Project Mgr. (name and phone number): ________________________

Description of Project, Scope of Work Performed: ____________________________

________________________________________________________________________

Value of Construction Contract: ___________________________________________

Value of Change Orders: __________________________________________________

Original Scheduled Date of Completion: ____________________________

Time Extensions Granted (number of Days): _________________________________

Actual Date of Completion: _____________________________________________

Number of Stop Notices filed by Subcontractors or Suppliers: ________________

2. Project Name: _________________________________________________________

Location: __________________________________________________________________

Owner: __________________________________________________________________

Owner Contact (name and phone): __________________________________________

Architect/Engineer: _______________________________________________________

Architect/Engineer Contact (name and phone number): ________________________

________________________________________________________________________

Prime Contractor: _________________________________________________________

Prime Contractor Contact (name and phone number): _________________________

Const. Mgr. Or Project Mgr. (name and phone number): _______________________

Description of Project, Scope of Work Performed: ____________________________

________________________________________________________________________
Value of Construction Contract: ______________________________

Value of Change Orders: ______________________________

Original Scheduled Date of Completion: ______________________________

Time Extensions Granted (number of Days): ______________________________

Actual Date of Completion: ______________________________

Number of Stop Notices filed by Subcontractors or Suppliers: ______________________________

PART E: FINANCIAL INFORMATION

1. Has Bidder ever reorganized under the protection of bankruptcy laws? 
   Yes _____ No _____ If yes, please state when _________________

2. If Bidder has had the general liability carrier identified in SECTION 00420 (Bidder Registration and Safety Experience Form) for less than 5 years, please provide additional information below for balance of the last 5 years:

   Agency Name: ______________________________
   Contact Name: ______________________________
   Phone Number: ______________________________
   Carrier: ______________________________ A.M. Best Rating: __________________
   Carrier: ______________________________ A.M. Best Rating: __________________
   Carrier: ______________________________ A.M. Best Rating: __________________

3. Has Bidder ever had insurance terminated by a carrier? Yes _____ No _____ 
   If yes, explain on a separate signed sheet marked with correlating cross-reference to this paragraph of the questionnaire.

Bidder hereby declares under penalty of perjury that all the information provided in this questionnaire is true and correct.

__________________________________________
SIGNATURE

__________________________________________
TITLE

END OF SECTION
SECTION 00481

NON-COLLUSION DECLARATION
PUBLIC CONTRACT CODE §7106

NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

I am the ___________________ of ________________, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. 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. All statements contained in the bid are true. 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.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on ________________[date], at ________________[city], ________________[state].

________________________________________
(Name of Bidder)

________________________________________
(Signature)

________________________________________
(Title)
(If Bidder is a partnership or a joint venture, this declaration must be signed by every member of the partnership or venture. Print as many forms as needed and submit.)

(If Bidder [including any partner or venturer of a partnership or joint venture] is a corporation, this declaration must be signed by the Chairman, President, or Vice President and by the Secretary, Assistant Secretary, Chief Financial Officer, or Assistant Treasurer. Print as many forms as needed and submit.)

END OF SECTION
SECTION 00482

BIDDER CERTIFICATIONS
TO BE EXECUTED BY ALL BIDDERS AND SUBMITTED WITH BID

The undersigned Bidder certifies to the El Dorado Irrigation District (“District”), as set forth in sections in this document.

1. PREVIOUS DISQUALIFICATIONS

By my signature hereunder, I hereby swear, under penalty of perjury, that the below indicated Bidder, any officer of such Bidder, or any employee of such Bidder who has a proprietary interest in such Bidder, has never been disqualified, removed or otherwise prevented from bidding on, or completing a Federal, State, or local government project because of a violation of law or a safety regulation except as indicated on the separate sheet attached hereto entitled “Previous Disqualifications.” If such exceptions are attached, please explain the circumstances.

2. CERTIFICATION OF WORKER’S COMPENSATION INSURANCE

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker’s compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract.

3. CERTIFICATION OF PREVAILING WAGE RATES AND RECORDS

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Section 1773 of the Labor Code, which requires the payment of prevailing wage on public projects. Also, that the Contractor and any subcontractors under the Contractor shall comply with Section 1776, regarding wage records, and with Section 1777.5, regarding the employment and training of apprentices, of the Labor Code. It is the Contractor’s responsibility to ensure compliance by any and all subcontractors performing work under this Contract.
4. CERTIFICATION OF ADEQUACY OF CONTRACT AMOUNT

By my signature hereunder, as the Contractor, pursuant to Labor Code Section 2810(a), I certify that, if awarded the Contract based on the undersigned’s Bid, the Contract will include funds sufficient to allow the Contractor to comply with all applicable local, state, and federal laws or regulations governing the labor or services to be provided. I understand that the District will be relying on this certification if it awards the Contract to the undersigned.

5. CERTIFICATION OF COMPLIANCE WITH TRUCK AND BUS REGULATION

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of the Truck and Bus Regulation (Title 13, California Code of Regulations, Section 2025), which regulates certain vehicles that operate in California. I certify that, as the Contractor, the vehicle fleet that would be used for performance of the work of this Contract is in compliance with the Truck and Bus Regulation. If requested by the District, I will provide information to demonstrate compliance with the Truck and Bus Regulation, such as certificates of compliance or relevant vehicle fleet information. I understand that it is the Contractor’s responsibility to ensure compliance with the Truck and Bus Regulation by any and all subcontractors performing work under this Contract.

Bidder: [Name of Bidder]

By: [Signature]

Name: [Printed Name]

Its: [Title]

Dated: 

END OF SECTION
SECTION 00505

NOTICE OF INTENT TO AWARD FOR CONSTRUCTION

DATE POSTED: ______________________

PROJECT TITLE: Outingdale Raw Water Pump Station Upgrade

PROJECT NO.: 16048.01

CONTRACT NO.: E20-17

On _______________, 20___, the Board of Directors of the El Dorado Irrigation District will consider award of the above referenced contract to: (Name of Contractor).

Signature ___________________________ Date ________________

Title: Project Manager

END OF SECTION
SECTION 00510

NOTICE OF AWARD

Dated ______________________

TO: ____________________________________________

ADDRESS: ______________________________________________

PROJECT NO.:  16048.01

CONTRACT NO.:  E20-17

CONTRACT FOR:

OUTINGDALE RAW WATER PUMP STATION UPGRADE

The Contract Sum of your contract is ______________________ Dollars ($____________).

1. Three copies of each of the proposed Contract Documents (except Specifications and Drawings) accompany this Notice of Award. Please download specifications and drawings from our website for your files.

2. You must comply with the following conditions precedent by 2:00 p.m. of the 10th Day following the date of this Notice of Award and prior to the issuance of a Notice to Proceed; supply the following:

a. Deliver to District three fully executed counterparts of SECTION 00520 (Agreement). Each of the Contract Documents must bear your signature on the cover page.

b. Deliver to District one original SECTION 00610 (Construction Performance Bond), executed by you and your surety.

c. Deliver to District one original SECTION 00620 (Construction Labor and Material Payment Bond), executed by you and your surety.

d. Deliver to District one original set of the insurance certificates with endorsements required under SECTION 00700 (General Conditions).

e. Deliver to District three original copies of SECTION 00630 (Guaranty), each executed by you.

f. Deliver to District Safety Submittals in accordance with Section 01340 (Safety Submittals) and Section 01330 (Submittal Procedures).

3. Failure to comply with these conditions within the time specified will entitle District to consider your Bid abandoned, to annul this Notice of Award, and to declare your Bid security forfeited.
4. Within 20 Days after you comply with the conditions in paragraph 2 of this SECTION 00510, District will return to you one fully signed counterpart of SECTION 00520 (Agreement) with the Contract Documents.

5. Upon commencement of the Work, you and each of your Subcontractors shall certify and make available for inspection payroll records on forms provided by the Division of Labor Standards Enforcement, in accordance with Section 1776 of the California Labor Code.

EL DORADO IRRIGATION DISTRICT
(“District”)

BY: ________________________________
    Name

ITS: Project Manager

c: Safety and Security Officer
    Deputy Safety and Security Officer

END OF SECTION
SECTION 00520

AGREEMENT

THIS AGREEMENT, dated this ______ day of __________, 20___, by and between TBD whose place of business is located at TBD (“Contractor”), and the EL DORADO IRRIGATION DISTRICT (“District”), an irrigation special district organized and existing under the California Irrigation District Law (Water Code §20500, et seq.).

WHEREAS, District, has awarded to Contractor the following contract:

OUTINGDALE RAW WATER PUMP STATION UPGRADE
PROJECT NO. 16048.01
CONTRACT NO. E20-17

NOW, THEREFORE, in consideration of the mutual covenants hereinafter set forth, Contractor and District agree as follows:

Article 1. Work

1.1 Contractor shall complete all Work specified in the Contract Documents, in accordance with the Specifications, Drawings, and all other terms and conditions of the Contract Documents.

Article 2. District’s Representative, Construction Manager

2.1 District has designated Patrick Wilson, to act as District’s Representative, who will represent District in performing District’s duties and responsibilities and exercising District’s rights and authorities in Contract Documents. District may change the individual(s) acting as District’s Representative(s), or delegate one or more specific functions to one or more specific District’s Representatives, including without limitation on general administrative functions, at any time with notice and without liability to Contractor. Each District’s Representative is the beneficiary of all Contractor obligations to District, including without limitation, all releases and indemnities.

2.2 District has designated Project Manager to act as Construction Manager. District may assign all or part of the District Representative’s rights, responsibilities and duties to Construction Manager. District may change the identity of the Construction Manager at any time with notice and without liability to Contractor.

2.3 District has designated Luhdorff & Scalmanini Consulting Engineers to act as Engineer. District may change the identity of the Engineer at any time with notice and without liability to Contractor.
2.4 All notices or demands to District under the Contract Documents shall be in writing and directed to District’s Representative at:

Patrick Wilson, P.E.
pwilson@eid.org

or to such other person(s) and address(es) as District shall provide to Contractor. Except as otherwise expressly provided herein, notices shall be dispatched by Email, facsimile transmission, overnight delivery and/or U.S. mail. Except as otherwise expressly provided herein, notices dispatched by Email, facsimile or overnight delivery shall be deemed received on the business day following dispatch. Notices dispatched by U.S. mail shall be deemed received on the third business day following dispatch.

Article 3. Contract Time and Liquidated Damages for Delay

3.1 Contract Time.

3.1.1 Contractor shall commence Work at the Site on the date established in the Notice to Proceed. District reserves the right to modify or alter the Commencement Date of the Work.

3.1.2 Contractor shall achieve Substantial Completion of the entire Work within 150 Days from the date when the Contract Time commences to run as provided in SECTION 00700 (General Conditions).

3.1.3 Contractor shall achieve Final Completion of the entire Work and be ready for Final Payment in accordance with Section 01770 (Contract Closeout) within 160 Days from the date when the Contract Time commences to run as provided in SECTION 00700 (General Conditions).

3.2 Liquidated Damages for Delay.

District and Contractor recognize that time is of the essence of this Agreement and that District will suffer financial loss if all or any part of the Work is not completed within the times specified above, plus any extensions thereof allowed in accordance with the Contract Documents. Delay damages may include, but are not limited to, lost revenue from hydroelectric power generation, costs to supplement the water supply, and contract administration expenses such as project management and consultant expenses.

Consistent with SECTION 00700 (General Conditions), District and Contractor agree that as liquidated damages for delay Contractor shall pay District:
3.2.1 $1,500 for each Day that expires after the time specified herein for Contractor to achieve Substantial Completion of the entire Work, until achieved.

3.2.2 $1,000 for each Day that expires after the time specified herein for Contractor to achieve Final Completion of the entire Work, until achieved.

These measures of liquidated damages shall apply cumulatively and shall be presumed to be the damages suffered by District resulting from delay in completion of the Work.

**Article 4. Contract Sum**

4.1 District shall pay Contractor the Contract Sum for completion of Work in accordance with Contract Documents as follows:

___________________________________________________________________

Here enter final Contract award price

**Article 5. Contractor’s Representations**

In order to induce District to enter into this Agreement, Contractor makes the following representations and warranties:

5.1 Contractor has visited the Site and has examined thoroughly and understood the nature and extent of the Contract Documents, Work, Site, locality, actual conditions, as-built conditions, and all local conditions, and federal, state and local laws and regulations that in any manner may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Contractor and safety precautions and programs incident thereto.

5.2 Contractor has examined thoroughly and understood all reports of exploration and tests of subsurface conditions, as-built drawings, drawings, products specifications or reports, available for Bidding purposes, of physical conditions, including Underground Facilities, which are identified in SECTION 00320 (Geotechnical Data and Existing Conditions), or which may appear in the Drawings. Contractor accepts the determination set forth in these Documents and SECTION 00700 (General Conditions) of the limited extent of the information contained in such materials upon which Contractor may be entitled to rely. Contractor agrees that except for the information so identified, Contractor does not and shall not rely on any other information contained in such reports and drawings.
5.3 Contractor has conducted or obtained and has understood all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in Section 5.2 of this SECTION 00520) that pertain to the subsurface conditions, as-built conditions, Underground Facilities and all other physical conditions at or contiguous to the Site or otherwise that may affect the cost, progress, performance or furnishing of Work, as Contractor considers necessary for the performance or furnishing of Work at the Contract Sum, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of SECTION 00700 (General Conditions); and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

5.4 Contractor has correlated its knowledge and the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.

5.5 Contractor has given District prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract Documents and as-built drawings and actual conditions and the written resolution thereof through Addenda issued by District is acceptable to Contractor.

5.6 Contractor is duly organized, existing and in good standing under applicable state law, and is duly qualified to conduct business in the State of California.

5.7 Contractor has duly authorized the execution, delivery and performance of this Agreement, the other Contract Documents and the Work to be performed herein. The Contract Documents do not violate or create a default under any instrument, agreement, order or decree binding on Contractor.

5.8 Contractor has listed the following Subcontractors pursuant to the Subcontractor Listing Law, California Public Contracting Code §4100 et seq.:
Article 6. Contract Documents

6.1 Contract Documents include the following documents, including all changes, addenda, and modifications thereto:

- Divisions 0 through 48
- Attachment(s)
- Bid Drawings
- All addendums issued during bid process

6.2 There are no Contract Documents other than those listed in this SECTION 00520, Article 6. SECTION 00320 (Geotechnical Data and Existing Conditions), and the information supplied therein, are not Contract Documents. The Contract Documents may only be amended, modified or supplemented as provided in SECTION 00700 (General Conditions).

Article 7. Miscellaneous

7.1 Terms used in this Agreement are defined in SECTION 00700 (General Conditions) and Section 01420 (References and Definitions) and will have the meaning indicated therein.
7.2 It is understood and agreed that in no instance are the persons signing this Agreement for or on behalf of District or acting as an employee, agent, or representative of District, liable on this Agreement or any of the Contract Documents, or upon any warranty of authority, or otherwise, and it is further understood and agreed that liability of the District is limited and confined to such liability as authorized or imposed by the Contract Documents or applicable law.

7.3 Contractor shall not assign any portion of the Contract Documents, and may subcontract portions of the Contract Documents only in compliance with the Subcontractor Listing Law, California Public Contracting Code §4100 et seq.

7.4 The Contract Sum includes all allowances (if any).

7.5 In entering into a public works contract or a subcontract to supply goods, services or materials pursuant to a public works contract, Contractor or Subcontractor offers and agrees to assign to the awarding body all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. §15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time District tenders final payment to Contractor, without further acknowledgment by the parties.

7.6 Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are deemed included in the Contract Documents and on file at District’s office, and shall be made available to any interested party on request. Pursuant to Section 1861 of the Labor Code, Contractor represents that it is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers’ compensation or to undertake self-insurance in accordance with the provisions of that Code, and Contractor shall comply with such provisions before commencing the performance of the Work of the Contract Documents.

7.7 Should any part, term or provision of this Agreement or any of the Contract Documents, or any document required herein or therein to be executed or delivered, be declared invalid, void or unenforceable, all remaining parts, terms and provisions shall remain in full force and effect and shall in no way be invalidated, impaired or affected thereby. If the provisions of any law causing such invalidity, illegality or unenforceability may be waived, they are hereby waived to the end that this Agreement and the Contract Documents may be deemed valid and binding agreements, enforceable in accordance with their terms to the greatest extent permitted by applicable law. In the event any provision not otherwise included in the Contract Documents is required to be included by any applicable law, that provision is deemed included herein by this reference (or, if such provision
is required to be included in any particular portion of the Contract Documents, that provision is deemed included in that portion).

7.8 This Agreement and the Contract Documents shall be deemed to have been entered into in the County of El Dorado, State of California, and governed in all respects by California law (excluding choice of law rules). The exclusive venue for all disputes or litigation hereunder shall be in the Superior Court of the State of California for the County of El Dorado. Both parties hereby waive their rights under California Code of Civil Procedure Section 394 to file a motion to transfer any action or proceeding arising out of the Contract Documents to another venue. Contractor accepts the Claims Procedure in SECTION 00700, Article 12, established under the California Government Code, Title 1, Division 3.6, Part 3, Chapter 5.

7.9 Attorneys' Fees. Except as otherwise provided in the Contract Documents, if either party institutes or is required to defend any legal proceeding, action or motion to enforce or interpret the terms of this Agreement, the prevailing party shall be entitled to recover all costs and expenses, specifically including, but not limited to, reasonable attorneys' fees.

7.10 The District is currently using Procore as its project management application. All documents shall be submitted to the District through the Procor application except as otherwise directed by District.
IN WITNESS WHEREOF the parties have executed this Agreement in triplicate the day and year first above written.

**DISTRICT**  
EL DORADO IRRIGATION DISTRICT

By:

______________________________  
James M. Abercrombie, General Manager

Brian M. Mueller P.E., Director of Engineering

______________________________  
Elizabeth Dawson Wells P.E., Engineering Manager

Project Manager, title

Approved as to form by Office of the General Counsel:

______________________________

**CONTRACTOR:**  
TBD

By:

______________________________  
[Signature]

[Please print name here]

Title:  
[If Corporation: Chairman, President, or Vice President]

By:  
______________________________  
[Signature]

[Please print name here]

Title:  
[If Corporation: Secretary, Assistant Secretary, Chief Financial Officer, or Assistant Treasurer]

State Contractor’s License No.

Classification

Expiration Date

Taxpayer ID No.
Designated Representative:

Name: ____________________________  Name: ____________________________
Title: ____________________________  Title: ____________________________
Address: __________________________
Phone: ____________________________  Phone: ____________________________
Email: ____________________________  Email: ____________________________

END OF SECTION
SECTION 00550
NOTICE TO PROCEED

Dated: _________________ N________
To: TBD
Attn: Contact person
Mailing Address: TBD
Phone No.: (###) ###-####
E-mail: xxxxxxxx

CONTRACT FOR:
OUTINGDALE RAW WATER PUMP STATION UPGRADE PROJECT
CONTRACT NO. E20-17
PROJECT NO. 16048.01

PURCHASE ORDER NO.: ######
EID NOS.: 340 0000 0000 52620
COST CATEGORY: CONO
BOARD APPROVAL DATE: ##/##/####
AUTHORIZED AMOUNT (CONTRACT PRICE): $_________

You are notified that the Contract Time under the above Contract will commence to run on xxxxx ##, 20##. On that date, you are to start performing your obligations with respect to the Contract Documents. In accordance with Article 3 of SECTION 00520 (Agreement), the dates of Substantial Completion and Final Completion for the entire Work are _________________, 20## and _________________, 20##, respectively.

Before you may start any Work at the Site, you must:
1. Have a District-reviewed Health and Safety Plan (HSP) in accordance with Section 01330 (Submittal Procedures) and 01340 (Safety Submittals).
2. Attend the preconstruction conference. The preconstruction conference may be arranged through ___________.

NOTES: One complete set of agreement documents is for your files and one set for your Surety. Please reference Purchase Order Number ###### when invoicing.

EL DORADO IRRIGATION DISTRICT

Name:

By: __________________________
Project Manager

Attachments: Signed Agreement (2)
c: District Safety and Security Officer
   Deputy Safety and Security Officer

END OF SECTION
SECTION 00610

CONSTRUCTION PERFORMANCE BOND

THIS CONSTRUCTION PERFORMANCE BOND ("Bond") is dated ____________, is in the penal sum of ________________ [which is one hundred percent of the Contract Price], and is entered into by and between the parties listed below to ensure the faithful performance of the Construction Contract listed below. This Bond consists of this page and the Bond Terms and Conditions, paragraphs 1 through 10, attached to this page. Any singular reference to TBD ("Contractor"), ________________________ ("Surety"), El Dorado Irrigation District ("District") or other party shall be considered plural where applicable.

CONTRACTOR:      SURETY:
TBD
Name
Principal Place of Business
Address
City/State/Zip

CONSTRUCTION CONTRACT:

OUTINGDALE RAW WATER PUMP STATION UPGRADE
PROJECT NO. 16048.01
CONTRACT NO. E20-17

at ______________, California.

DATED ______________, 20___ in the Amount of $________________________ (the "Penal Sum")

CONTRACTOR AS PRINCIPAL                      SURETY
Company:  (Corp. Seal)                       Company:  (Corp. Seal)
Signature: ________________________________  Signature: ________________________________
Name and Title: ____________________________  Name and Title: ____________________________

00610 - 1  Construction Performance Bond
BOND TERMS AND CONDITIONS

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to District for the complete and proper performance of the Construction Contract, which is incorporated herein by reference.

2. If Contractor completely and properly performs each and every obligation under the Construction Contract, Surety and Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.

3. If there is no District Default, Surety’s obligation under this Performance Bond shall arise after:

   3.1 District has declared a Contractor Default and has notified Contractor and Surety at its address described in Paragraph 10 below that District has declared a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than seven days after receipt of such notice to discuss methods of performing the Construction Contract and

   3.2 District has agreed to pay the Balance of the Contract Sum to Surety in accordance with the terms of this Bond and the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of this Bond and the Construction Contract.

4. When District has satisfied the conditions of Paragraph 3, Surety shall promptly (within 30 days) and at Surety’s expense elect to take one of the following actions:

   4.1 Arrange for Contractor, with consent of District, to perform and complete the Construction Contract (but District may withhold consent, in which case the Surety must elect an option described in paragraphs 4.2, 4.3 or 4.4, below); or

   4.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors, provided, that Surety may not select Contractor as its agent or independent contractor without District’s consent; or

   4.3 Undertake to perform and complete the Construction Contract by obtaining bids from qualified contractors acceptable to District for a contract for performance and completion of the Construction Contract, and, upon determination by District of the lowest responsible bidder, arrange for a contract to be prepared for execution by District and the contractor selected with District’s concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and if Surety’s obligations defined in Paragraph 6 exceed the Balance of the Agreement Price, then Surety shall pay to District the amount of such excess; or
4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances, and after investigation and consultation with District, determine in good faith its monetary obligation to District under paragraph 6, below, for the performance and completion of the Construction Contract and, as soon as practicable after the amount is determined, tender payment thereof to District with full explanation of the payment’s calculation. If District accepts Surety’s tender under this paragraph 4.4, District may still hold Surety liable for future damages then unknown or unliquidated resulting from the Contractor Default. If District disputes the amount of Surety’s tender under this paragraph 4.4, District may exercise all remedies available to it at law to enforce Surety’s liability under paragraph 6, below.

5. If Surety does not proceed as provided in Paragraph 4 above, then Surety shall be deemed to be in default on this Bond ten days after receipt of an additional written notice from District to Surety demanding that Surety perform its obligations under this Bond. At all times District shall be entitled to enforce any remedy available to District at law or under the Construction Contract including, without limitation, and by way of example only, rights to perform work, protect work, mitigate damages, advance critical work to mitigate schedule delay, or coordinate work with other consultants or contractors.

6. Surety’s monetary obligation under this Bond is limited by the Amount of this Bond identified herein as the Penal Sum. This monetary obligation shall augment the Balance of the Contract Sum. Subject to these limits, Surety’s obligations under this Bond are commensurate with the obligations of Contractor under the Construction Contract. Surety’s obligations shall include, but are not limited to:

6.1 The responsibilities of Contractor for correction of defective work, materials and equipment and completion of the Construction Contract;

6.2 Additional legal, design professional, construction management and delay costs resulting from Contractor’s Default, or resulting from the actions or failure to act of the Surety under Paragraph 4 above (but excluding attorney’s fees incurred to enforce this Bond); and

6.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of Contractor under the Construction Contract, including, but not limited to, all valid and proper backcharges, offsets, payments, indemnities, or other damages.
7. Surety hereby waives notice of any change, alteration or addition, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations. Surety consents to all terms of the Construction Contract, including provisions on changes to the Contract. No extension of time, change, alteration, modification, deletion, or addition to the Contract Documents, or of the work required thereunder, shall release or exonerate Surety on this Bond or in any way affect the obligations of Surety on this Bond.

8. Any proceeding, legal or equitable, under this Bond shall be instituted in any court of competent jurisdiction where a proceeding is pending between District and Contractor regarding the Construction Contract, or in the Superior Court of the State of California for the County of El Dorado, or in a court of competent jurisdiction in the location in which the work is located. Communications from District to Surety under paragraph 3.1 of this Bond shall be deemed to include the necessary agreements under paragraph 3.2 of this Bond unless expressly stated otherwise.

9. Notice to Surety Contractor shall be mailed or delivered to the address, or sent via tele copier to the facsimile number, shown on the signature page of this Bond, and notice to District shall be mailed or delivered as provided in SECTION 00520 (Agreement). Actual receipt of notice by Surety, District or Contractor, however accomplished, shall be sufficient compliance as of the date received at the foregoing addresses.

10. DEFINITIONS

10.1 Balance of the Agreement Price: The total amount payable by District to Contractor under the Construction Contract after all proper adjustments have been made under the Construction Contract, for example, deductions for progress payments made, and increases/decreases for approved modifications to the Construction Contract.

10.2 Construction Contract: The agreement between District and Contractor identified on the first page of this bond, including all Contract Documents and changes thereto.

10.3 Contractor Default: Material failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract, including, but not limited to, “default” or any other condition allowing a termination for cause as provided in SECTION 00700 (General Conditions).

10.4 District Default: Material failure of District, which has neither been remedied nor waived, to pay Contractor progress payments due under the Construction Contract or to perform other material terms of the Construction Contract, if such failure is the cause of the asserted Contractor Default and is sufficient to justify Contractor termination of the Construction Contract.

END OF SECTION
SECTION 00620

CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1. THAT WHEREAS, the El Dorado Irrigation District (“District”) has awarded to TBD as Principal, Project No. 16048.01, Contract No. E20-17 dated the __________ day of __________, 20___ (the “Contract”), titled THE EL DORADO IRRIGATION DISTRICT Outingdale Raw Water Pump Station Upgrade Project in the amount of TBD, which Contract is by this reference made a part hereof, for the work described as follows: Complete replacement of the existing Raw Water Pump Station for the Outingdale Water Treatment Plant. This includes installation of new pumps, inlet, tank, and access.

2. AND WHEREAS, Principal is required to furnish a bond in connection with the Contract to secure the payment of claims of laborers, mechanics, material suppliers, and other persons as provided by law;

3. NOW, THEREFORE, we, the undersigned Principal and ______________________________, as Surety, are held and firmly bound unto District in the sum of 100% OF THE CONTRACT PRICE (TBD), for which payment well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

4. THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its executors, administrators, successors, or assigns approved by District, or its subcontractors shall fail to pay any of the persons named in California Civil Code §3181, or amounts due under the State of California Unemployment Insurance Code with respect to work or labor performed under the Contract, or for any amounts required to be deducted, withheld, and paid over to the State of California Employment Development Department from the wages of employees of Principal and subcontractors pursuant to Section 13020 of the State of California Unemployment Insurance Code with respect to such work and labor, that Surety will pay for the same in an amount not exceeding the sum specified in this bond, plus reasonable attorneys’ fees, otherwise the above obligation shall become and be null and void.

5. This bond shall inure to the benefit of any of the persons named in California Civil Code §3181, as to give a right of action to such persons or their assigns in any suit brought upon this bond. The intent of this bond is to comply with the California Mechanic’s Lien Law.

6. Surety, for value received, hereby expressly agrees that no extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Contract, or to the work to be performed
thereunder, shall in any way affect the obligation of this bond; and it does hereby waive notice of any such extension of time, change, modification, alteration, or addition to the undertakings, covenants, terms, conditions, and agreements of the Contract, or to the work to be performed thereunder.

7. Surety’s obligations hereunder are independent of the obligations of any other surety for the payment of claims of laborers, mechanics, material suppliers, and other persons in connection with Contract; and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing District’s rights against the other.

8. Correspondence or claims relating to this bond shall be sent to Surety at the address set forth below.

IN WITNESS WHEREOF, we have hereunto set our hands this ________ day of ________, 20___

CONTRACTOR AS PRINCIPAL

Surety

Company: (Corp. Seal) Company: (Corp. Seal)

Signature

Name

Title

Street Address

City, State, Zip Code

END OF SECTION
SECTION 00630

GUARANTY

TO THE EL DORADO IRRIGATION DISTRICT for construction of

OUTINGDALE RAW WATER PUMP STATION UPGRADE PROJECT
PROJECT NO. 16048.01
CONTRACT NO. E20-17

_________________, CALIFORNIA.

The undersigned guarantees all construction performed on this Project and also guarantees all material and equipment incorporated therein.

Contractor hereby grants to District for a period of one year following the date of Final Completion, or such longer period specified in the Contract Documents, its unconditional warranty of the quality and adequacy of all of the Work including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers in connection with the Work.

Neither final payment nor use or occupancy of the Work performed by the Contractor shall constitute an acceptance of Work not done in accordance with this Guaranty or relieve Contractor of liability in respect to any express warranties or responsibilities for faulty materials or workmanship. Contractor shall remedy any defects in the Work and pay for any damage resulting therefrom, which shall appear within one year, or longer if specified, from the date of Final Completion.

If within one year after the date of Final Completion, or such longer period of time as may be prescribed by laws or regulations, or by the terms of Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to District and in accordance with District’s written instructions, correct such defective Work. Contractor shall remove any defective Work rejected by District and replace it with Work that is not defective, and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, District may have the defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct defective Work, or defects are discovered outside the correction period, District shall have all rights and remedies granted by law.

Inspection of the Work shall not relieve Contractor of any of its obligations under the Contract Documents. Even though equipment, materials, or Work required to be provided under the Contract Documents have been inspected, accepted, and estimated for
payment, Contractor shall, at its own expense, replace or repair any such equipment, material, or Work found to be defective or otherwise not to comply with the requirements of the Contract Documents up to the end of the guaranty period.

All abbreviations and definitions of terms used in this Agreement shall have the meanings set forth in the Contract Documents, including, without means of limitation, Section 01420 (References and Definitions).

The foregoing Guaranty is in addition to any other warranties of Contractor contained in the Contract Documents, and not in lieu of, any and all other liability imposed on Contractor under the Contract Documents and at law with respect to Contractor's duties, obligations, and performance under the Contract Documents. In the event of any conflict or inconsistency between the terms of this Guaranty and any warranty or obligation of the Contractor under the Contract Documents or at law, such inconsistency or conflict shall be resolved in favor of the higher level of obligation of the Contractor.

Contractor’s Company Name

______________________________

Signature

______________________________

Address

Printed Name and Title

______________________________

City/State/Zip

Date

END OF SECTION
SECTION 00640

UNCONDITIONAL/CONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT

*****

UNCONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant:___________________________________________________________

Name of Customer:_________________________________________________________

Job Location:______________________________________________________________

Owner:_________________________________________________________________

Through Date:_____________________________________________________________

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has received the following progress payment: $______________________________.

Exceptions

This document does not affect the following:

(1) Retentions.
(1) Extras for which the claimant has not received payment.
(2) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by payment.

**CONDITIONAL WAIVER AND RELEASE ON PROGRESS PAYMENT**

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT’S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

**Identifying Information**

Name of Claimant:___________________________________________________________

Name of Customer:________________________________________________________

Job Location:_____________________________________________________________

Owner:______________________________________________________________

Through Date:__________________________________________________________
Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job through the Through Date of this document. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant’s receipt of payment from the financial institution on which the following check is drawn:

Maker of Check:______________________________________________________________

Amount of Check: $___________________________________________________________

Check Payable to:____________________________________________________________

Exceptions

This document does not affect any of the following:

(1) Retentions.
(1) Extras for which the claimant has not received payment.
(2) The following progress payments for which the claimant has previously given a conditional waiver and release but has not received payment:

Date(s) of waiver and release:_________________________________________________

Amount(s) of unpaid progress payment(s): $____________________________________

(3) Contract rights, including (A) a right based on rescission, abandonment, or breach of contract, and (B) the right to recover compensation for work not compensated by the payment.

Signature

Claimant’s Signature:_________________________________________________________

Claimant’s Title:_____________________________________________________________

Date of Signature:____________________________________________________________
SECTION 00650

UNCONDITIONAL/CONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT

*****

UNCONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT

NOTICE TO CLAIMANT: THIS DOCUMENT WAIVES AND RELEASES LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT, EVEN IF YOU HAVE NOT BEEN PAID. IF YOU HAVE NOT BEEN PAID, USE A CONDITIONAL WAIVER AND RELEASE FORM.

Identifying Information

Name of Claimant:______________________________________________________________

Name of Customer:______________________________________________________________

Job Location:______________________________________________________________

Owner:______________________________________________________________

Unconditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for all labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. The claimant has been paid in full.

Exceptions

This document does not affect the following:

Disputed claims for extras in the amount of $______________________________

Signature

Claimant’s Signature:______________________________________________________________

Claimant’s Title:______________________________________________________________

Date of Signature:______________________________________________________________
CONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT

NOTICE: THIS DOCUMENT WAIVES THE CLAIMANT’S LIEN, STOP PAYMENT NOTICE, AND PAYMENT BOND RIGHTS EFFECTIVE ON RECEIPT OF PAYMENT. A PERSON SHOULD NOT RELY ON THIS DOCUMENT UNLESS SATISFIED THAT THE CLAIMANT HAS RECEIVED PAYMENT.

Identifying Information

Name of Claimant: ______________________________________________________________

Name of Customer: ______________________________________________________________

Job Location: ________________________________________________________________

Owner: ________________________________

Conditional Waiver and Release

This document waives and releases lien, stop payment notice, and payment bond rights the claimant has for labor and service provided, and equipment and material delivered, to the customer on this job. Rights based upon labor or service provided, or equipment or material delivered, pursuant to a written change order that has been fully executed by the parties prior to the date that this document is signed by the claimant, are waived and released by this document, unless listed as an Exception below. This document is effective only on the claimant’s receipt of payment from the financial institution on which the following check is drawn:

Maker of Check: ______________________________________________________________

Amount of Check: $____________________________________________________________

Check Payable to: ____________________________________________________________

Exceptions

This document does not affect any of the following:

Disputed claims for extras in the amount of: $______________________________

Signature

Claimant’s Signature: _________________________________________________________

Claimant’s Title: _____________________________________________________________

Date of Signature: ___________________________________________________________

END OF SECTION
SECTION 00660

SUBSTITUTION REQUEST FORM

To: El Dorado Irrigation District

Project: Outingdale Raw Water Pump Station Upgrade

Project No. 16048.01

Contract No. E20-17

Contractor: TBD

Subcontractor/Supplier: ______________________________________________________

Drawing Sheet Reference/Detail No: ___________________________________________

The undersigned Bidder submits for consideration the following equipment instead of the specified item for the above project:

<table>
<thead>
<tr>
<th>Section</th>
<th>Paragraph</th>
<th>Specified Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>_______</td>
<td>_________</td>
<td>__________________</td>
</tr>
<tr>
<td>_______</td>
<td>_________</td>
<td>__________________</td>
</tr>
</tbody>
</table>

Proposed Substitution: ______________________________________________________

The undersigned encloses the information required herein. If this SECTION 00660 is being submitted by a Bidder wishing to use “or equal” item(s) as provided in SECTION 00200 (Instructions to Bidders), the undersigned Bidder must also enclose the technical information (other than cost) otherwise required for a post-Award of Contract Request for Substitution (“RFS”) under Section 01600 (Product Requirements). However, If this SECTION 00660 is being submitted under provisions of Contract Documents after Award of Contract, the undersigned Contractor must include all information required under Section 1600 (Product Requirements).

The undersigned has (a) attached manufacturer’s literature, including complete technical data and laboratory test results, if applicable, (b) attached an explanation of why proposed substitution is a true equivalent to specified item, (c) included complete information on
changes to Drawings and Specifications that the proposed substitution will require for its proper installation, and (d) filled in the blanks below:

A. Does the substitution affect dimensions shown on Drawings?

B. Are the manufacturer’s guarantees and warranties on the proposed substitution items identical to those on the specified items? If there are differences, please specify each and every difference in detail.

C. What effect does the substitution have on other contractors, trades, or suppliers?

D. What are the differences between the proposed substitution and the specified item? If proposed substitution has a color or pattern, provide a color board showing proposed substitution in relation to the other adjacent colors and patterns.

D. Will granting the requested substitution cause any schedule delay? (If yes, please explain)

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

Submitted by:

Bidder/Contractor

For Use by District:

[note applicable]  

Accepted  Accepted as Noted

Not Accepted  Received Too Late

Signature

By: ____________________________

District’s Representative

Name

Date: ____________________________

00660 - 2  Substitution Request Form
Remarks: ______________________

______________________________

______________________________

______________________________

______________________________

END OF SECTION
SECTION 00680

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

P.C.C. §22300

THIS ESCROW AGREEMENT ("Escrow Agreement") is made and entered into this ______ day of _______________, 20__, by and between the EL DORADO IRRIGATION DISTRICT (hereinafter called the "District"), whose address is 2890 Mosquito Road, Placerville, CA 95667; ___________________________ ("Contractor"), whose place of business is located at _____________________________________; and ____________________________________, a state or federally chartered bank in the State of California, whose place of business is located at _____________________________________ ("Escrow Agent").

For the consideration hereinafter set forth, District, Contractor and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by District pursuant to Contract Number E20-17 for Project Number 16048.01 entered into between District and Contractor for OUTINGDALE RAW WATER PUMP STATION UPGRADE PROJECT in the amount of ________________________ dated ____________________ (the "Contract"). Alternatively, on written request of Contractor, District shall make payments of the retention earnings directly to Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, Escrow Agent shall notify District within ten Days of the deposit. The market value of the securities at the time of substitution shall be at least equal to the cash amount then required to be withheld as retention under terms of Contract between District and Contractor. Securities shall be held in name of El Dorado Irrigation District, and shall designate Contractor as the beneficial owner.

2. District shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified in paragraph 1 of this SECTION 00680.

3. When District makes payment(s) of retention earned directly to Escrow Agent, Escrow Agent shall hold said payment(s) for the benefit of Contractor until the time that the escrow created under this Escrow Agreement is terminated. Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when District pays Escrow Agent directly.

4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of District.
Such expenses and payment terms shall be determined by District, Contractor, and Escrow Agent.

5. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to District.

6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from District to Escrow Agent that District consents to withdrawal of amount sought to be withdrawn by Contractor.

7. District shall have the right to draw upon the securities in event of default by Contractor. Upon seven (7) Days written notice to Escrow Agent from District of the default, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by District.

8. Upon receipt of written notification from District certifying that the Contract is final and complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

9. Escrow Agent shall rely on written notifications from District and Contractor pursuant to paragraphs 5 through 8, inclusive, of this SECTION 00680 and District and Contractor shall hold Escrow Agent harmless from Escrow Agent’s release and disbursement of securities and interest as set forth.

10. Names of persons who are authorized to give written notice or to receive written notice on behalf of District and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:
At the time the Escrow Account is opened, District and Contractor shall deliver to Escrow Agent a fully executed counterpart of this SECTION 00680.
IN WITNESS WHEREOF, the parties have executed this Escrow Agreement by their proper officers on the date first set forth above.

<table>
<thead>
<tr>
<th>District</th>
<th>Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Dorado Irrigation District</td>
<td>__________</td>
</tr>
<tr>
<td>General Manager</td>
<td>__________</td>
</tr>
<tr>
<td>Title</td>
<td>__________</td>
</tr>
<tr>
<td>James M. Abercrombie</td>
<td>__________</td>
</tr>
<tr>
<td>Name</td>
<td>__________</td>
</tr>
<tr>
<td>Signature</td>
<td>__________</td>
</tr>
<tr>
<td>Escrow Agent</td>
<td>__________</td>
</tr>
<tr>
<td>Office of the General Counsel</td>
<td>__________</td>
</tr>
<tr>
<td>Title</td>
<td>__________</td>
</tr>
<tr>
<td>Date</td>
<td>__________</td>
</tr>
<tr>
<td>Name</td>
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<tr>
<td>Signature</td>
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END OF SECTION
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GENERAL CONDITIONS

1. GENERAL

A. Documents

Contract Documents are complementary; what is called for by one is as binding as if called for by all. Contract Documents shall not be construed to create a contractual relationship of any kind between (1) Engineer or any District Representative and Contractor; (2) District and/or its representatives and (except as provided in paragraph 13.I below) a Subcontractor, sub-Subcontractor, or supplier of any Project labor, materials, or equipment; or (3) between any persons or entities other than District and Contractor. District shall be deemed to be an intended third-party beneficiary of each agreement referenced in clause (2) above, and each such agreement shall so provide. Contractor is fully responsible for Contractor’s own acts and omissions. Contractor is responsible for all acts and omissions of its Subcontractors, suppliers, and other persons and organizations performing or furnishing any of the Work, labor, materials, or equipment under a direct or indirect contract with Contractor.

B. Exercise of Contract Responsibilities

In exercising its responsibilities and authorities under the Contract Documents, District does not assume any duties or responsibilities to any Subcontractor or supplier and does not assume any duty of care to Contractor, Contractor’s Subcontractors or suppliers. Except as expressly set forth in the Contract Documents, in exercising their respective responsibilities and authorities under the Contract Documents, neither Engineer nor any District Representative assume any duties or responsibilities to any Subcontractor, sub-Subcontractor or supplier nor assume any duty of care to Contractor or any Subcontractor, sub-Subcontractor or suppliers.

C. Defined Terms

All abbreviations and definitions of terms used and not otherwise defined in this SECTION 00700 are set forth in Section 01420 (References and Definitions). This SECTION 00700 subdivides at first level into Articles, and then into paragraphs.

2. BIDDING

A. Investigation Prior To Bidding

1. Prior to bidding, Bidders shall perform the work, investigations, research and analysis required by Article 5 of SECTION 00520 (Agreement). Under the Contract Documents, Contractor is charged with all information and knowledge that a reasonable Bidder would ascertain from having performed the required work, investigations, research, and analysis. Bid prices shall include entire cost of all “incidental work” to complete the Work, as that term is defined in Article 5 of this SECTION 00700.

2. Conditions Shown on Contract Documents: Information as to underground conditions, as-built conditions, or other conditions or obstructions indicated in the Contract Documents, e.g., on Drawings or in Specifications, has been obtained with reasonable care, and has been recorded in good faith. District warrants, and Contractor may rely on, the accuracy of only limited types of information as discussed below.

   a. Aboveground and as-built conditions: There is no express or implied
warranty and no express or implied representation that any information as to aboveground conditions or as-built conditions indicated in the Contract Documents is correctly shown, or indicated, or complete. As a condition to bidding, Contractor shall verify by independent investigation all aboveground and as-built conditions. In submitting its Bid, Contractor shall rely on the results of its own independent investigation and shall not rely on District-supplied information regarding aboveground conditions and as-built conditions.

b. **Subsurface conditions:** Contractor may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated in the Contract Documents. District is not responsible for (1) the completeness of any subsurface condition information for bidding or construction, (2) Contractor’s conclusions or opinions drawn from any subsurface condition information, or (3) subsurface conditions that are not specifically shown. (For example, District is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown.)

c. **Conditions Shown in Reports and Drawings Supplied for Informational Purposes:** Reference is made to SECTION 00320 (Geotechnical Data and Existing Conditions) for identification of geotechnical reports, “as built” information, and other drawings or other documents describing physical conditions in or relating to existing surface or subsurface conditions or structures at or contiguous to the Site. These materials are not Contract Documents and, except for any “technical data” regarding subsurface conditions specifically identified in SECTION 00320 (Geotechnical Data and Existing Conditions), and “Underground Facilities” data, as limited in SECTION 00320 (Geotechnical Data and Existing Conditions), Contractor shall not in any manner rely on the information in these materials. Subject to the foregoing, Contractor shall make its own independent investigation of all conditions affecting the Work and must not rely on information provided by District.

### B. Subcontractors

1. Consistent with Public Contract Code Sections 4101 et seq., Contractor shall not substitute any other person or firm in place of any Subcontractor listed in the Bid. Subcontractors shall not assign or transfer their subcontracts or permit them to be performed by any other contractor without District’s written approval. At District’s request, Contractor shall provide District with a complete copy of all executed subcontracts or final commercial agreements with Subcontractors and/or suppliers.

2. Subcontract agreements shall preserve and protect the rights of District under the Contract Documents so that subcontracting will not prejudice such rights. To the extent of the Work to be performed by a Subcontractor, Contractor shall require the Subcontractor’s written agreement (1) to be bound to the terms of Contract Documents and (2) to assume vis-à-vis Contractor all the obligations and responsibilities that Contractor assumes
toward District under the Contract Documents. (These agreements include for example, and not by way of limitation, all warranties, claims procedures and rules governing submittals of all types to which Contractor is subject under the Contract Documents.)

3. Contractor shall provide for the assignment to District of all rights any Subcontractor may have against any manufacturer, supplier, or distributor for breach of warranties and guaranties relating to the Work performed by the Subcontractor under the Contract Documents.

3. CONTRACT AWARD AND COMMENCEMENT OF THE WORK

A. Award of Contract

District will make the Award of Contract by issuing a Notice of Award. As a condition to District signing SECTION 00520 (Agreement), however, Contractor shall deliver to District the executed agreements, forms, bonds and insurance documents required by SECTION 00200 (Instructions to Bidders) in the required quantities and within the required times.

B. Commencement of Work

The Contract Time will commence to run on the 30th Day after the issuance of the Notice of Award or, if a Notice to Proceed is given, on the date indicated in the Notice to Proceed. See also paragraph 15.A.2 of this SECTION 00700. District may give a Notice to Proceed at any time within 30 Days after the Notice of Award. Contractor shall not do any Work at the Site prior to the date on which the Contract Time commences to run.

4. BONDS AND INSURANCE

A. Bonds

1. At or before the date indicated in SECTION 00200 (Instructions to Bidders), Contractor shall file with District the following bonds:

   a. Corporate surety bond, in the form of SECTION 00610 (Construction Performance Bond), in the penal sum of 100% of the Contractor's Bid as accepted, to guaranty faithful performance of the Work; and
   b. Corporate surety bond, in the form of SECTION 00620 (Construction Labor and Material Payment Bond), in the penal sum of 100% of the Contractor's Bid as accepted, to guaranty payment of wages for services engaged and of bills contracted for materials, supplies, and equipment used in performance of Contract Documents.

2. Sureties shall be satisfactory to District. Corporate sureties on these bonds and on bonds accompanying Bids shall be duly licensed to do business in the State of California and shall have an A.M. Best Company financial rating of A-, VII or better.

B. Insurance

See SECTION 00821 (Insurance), incorporated herein by this reference.
5. DRAWINGS AND SPECIFICATIONS

A. Intent

1. Drawings and Specifications are intended to describe a functionally complete and operable Project (and all parts thereof) to be constructed in accordance with the requirements of Contract Documents. Contractor shall perform any work, provide services and furnish any materials or equipment that may reasonably be inferred from the requirements of Contract Documents or from prevailing custom or trade usage as being required to produce this intended result. Contractor shall interpret words or phrases used to describe work (including services), materials or equipment, that have well-known technical or construction industry or trade meaning in accordance with that meaning. Drawings’ intent specifically includes the intent to depict construction that complies with all applicable laws, codes and standards.

2. As part of the “Work,” Contractor shall provide all labor, materials, equipment, machinery, tools, facilities, services, employee training and testing, hoisting facilities, shop drawings, storage, testing, security, transportation, disposal, the securing of all necessary or required field dimensions, the cutting or patching of existing materials, notices, permits, documents, reports, agreements and any other items required or necessary to timely and fully complete Work described and the results intended by Contract Documents and, in particular, Drawings and Specifications. Divisions and Specification Sections and the identification on any Drawings shall not control Contractor in dividing Work among Subcontractors or suppliers or delineating the Work to be performed by any specific trade.

3. Contractor shall perform reasonably implied parts of Work as “incidental work” although absent from Drawings and Specifications. Incidental work includes any work not shown on Drawings or described in Specifications that is necessary or normally or customarily required as a part of the Work shown on Drawings or described in Specifications. Incidental work includes any Work necessary or required to make each installation satisfactory, legally operable, functional, and consistent with the intent of Drawings and Specifications or the requirements of Contract Documents including required tasks to be performed under Division 1 of Specifications. Contractor shall perform incidental work without extra cost to District. Incidental work shall be treated as if fully described in Specifications and shown on Drawings, and the expense of incidental work shall be included in price Bid and Contract Sum.

B. Drawing Details

A typical or representative detail on Drawings shall constitute the standard for workmanship and material throughout corresponding parts of Work. Where necessary, and where reasonably inferable from Drawings, Contractor shall adapt such representative detail for application to such corresponding parts of Work. The details of such adaptation shall be subject to prior approval by District. Repetitive
features shown in outline on Drawings shall be in exact accordance with corresponding features completely shown.

C. Interpretation of Drawings And Specifications

Should any discrepancy appear or any misunderstanding arise as to the import of anything contained in Drawings and Specifications, or should Contractor have any questions or requests relating to Drawings or Specifications, Contractor shall refer the matter to District, in writing. District will issue with reasonable promptness written responses, clarifications or interpretations as District may determine necessary, which shall be consistent with the intent of and be reasonably inferable from Contract Documents. Such written clarifications or interpretations shall be binding upon Contractor. If Contractor believes that a written response, clarification or interpretation justifies an adjustment in the Contract Sum or Contract Time, Contractor shall give District prompt written notice as provided in Section 01250 (Modification Procedures). If the parties are unable to agree to the amount or extent of the adjustment, if any, then Contractor shall perform the Work in conformance with District's response, clarification, or interpretation and may make a written claim for the adjustment as provided in Article 12 of this SECTION 00700.

D. Checking of Drawings

Before undertaking each part of Work, Contractor shall carefully study and compare Contract Documents and check and verify pertinent figures shown in the Contract Documents and all applicable field measurements. Contractor shall be responsible for any errors that might have been avoided by such comparison. Figures shown on Drawings shall be followed; Contractor shall not scale measurements. Contractor shall promptly report to District, in writing, any conflict, error, ambiguity or discrepancy that Contractor may discover. Contractor shall obtain a written interpretation or clarification from District before proceeding with any Work affected thereby. Contractor shall provide District with a follow-up correspondence every ten days until it receives a satisfactory interpretation or clarification.

E. Standards to Apply Where Specifications Are Not Furnished

The following general specifications shall apply wherever in the Specifications, or in any directions given by District in accordance with or supplementing Specifications, it is provided that Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are shown. Materials or manufactured articles shall be of the best grade, in quality and workmanship, obtainable in the market from firms of established good reputation. If not ordinarily carried in stock, the materials or manufactured articles shall conform to industry standards for first-class materials or articles of the kind required, with due consideration of the use to which they are to be put. Work shall conform to the usual standards or codes, such as those cited in Section 01420 (References and Definitions), for first-class work of the kind required. Contractor shall specify in writing to District the materials to be used or Work to be performed under this paragraph 5.E ten Business Days prior to furnishing such materials or performing such Work.
F. Deviation from Specifications and Drawings

1. Contractor shall perform Work in accordance with Drawings and Specifications. Contractor maydeviate from Drawings or the dimensions given in the Drawings, and may deviate from the Specifications, only upon District’s advance written approval of the proposed deviation.

2. District may order that locations, lines and grades for Work vary from those shown on Drawings. Changes may be made in locations, lines or grades for Work under any item of Contract Documents. No payment in addition to unit price fixed in the Contract Documents for Work under respective items will be allowed on account of variations from Drawings in unit price items. In lump sum contracts, or where there are no unit price items covering Work affected by variations of locations, lines or grades, all changes in the Contract Documents will be made as set forth in Article 14 of this SECTION 00700.

G. Precedence of Documents

1. In the case of discrepancy or ambiguity in the Contract Documents, the following order of precedence shall prevail:
   a. Modifications in inverse chronological order (i.e., most recent first), and in the same order as specific portions they are modifying;
   b. SECTION 00520 (Agreement), and terms and conditions referenced therein;
   c. SECTION 00800 (Supplementary General Conditions);
   d. SECTION 00700 (General Conditions);
   e. Division 1 Specifications;
   f. Division 2 through 16 Specifications;
   g. Drawings;
   h. Written numbers over figures, unless obviously incorrect;
   i. Figured dimensions over scaled dimensions;
   j. Large-scale drawings over small-scale drawings.

2. Any conflict between Drawings and Division 2 through 16 Specifications will be resolved in favor of the document of the latest date (i.e., the most recent document), and if the dates are the same or not determinable, then in favor of Specifications.

3. Any conflict between a bill or list of materials shown in the Contract Documents and the actual quantities required to complete Work required by Contract Documents, will be resolved in favor of the actual quantities.

4. In the event the Specifications include divisions above Division 16 (e.g., Division 17 and above), then such divisions shall be included within the Contract Documents unless identified otherwise.

H. Ownership and Use Of Drawings, Specifications And Contract Documents

Drawings, Specifications and other Contract Documents were prepared for use for Work of Contract Documents only. No part of Contract Documents shall be used for any other construction or for any other purpose except with the written consent of
6. CONSTRUCTION BY DISTRICT OR BY SEPARATE CONTRACTORS

A. District’s Right to Perform Construction and to Award Separate Contracts

District may perform with its own forces, construction or operations related to the Project. District may also award separate contracts in connection with other portions of the Project or other construction or operations, on the Site or areas contiguous to the Site, under conditions similar to these Contract Documents, or may have utility owners perform other work. When separate contracts are awarded for different portions of the Project or other construction or operations on the Site, the term “Contractor” in these Contract Documents shall mean the Contractor herein.

B. Mutual Responsibility

1. Contractor shall afford all other contractors, utility owners and District (if District is performing work with its own forces), proper and safe access to the Site, and reasonable opportunity for the installation and storage of their materials. Contractor shall ensure that the execution of its Work properly connects and coordinates with others’ work, and shall cooperate with them to facilitate the progress of the Work.

2. Contractor shall coordinate its Work with the work of other separate contractors, District, and utility owners. Contractor shall hold coordination meetings with other contractors, District and its representatives, and utility owners as required by Section 01315 (Project Meetings).

3. Unless otherwise provided in the Contract Documents, Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of other separate contractors, District or utility owners by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of District and the others whose work will be affected.

4. Contractor’s duties and responsibilities under Article 6 of this SECTION 00700 are for the benefit of District and also for the benefit of such other contractors and utility owners working at the Site to the extent that there are comparable provisions for the benefit of Contractor in the direct contracts between District and such other contractors and utility owners.

5. To the extent that any part of Contractor’s Work is to interface with work performed or installed by other contractors or utility owners, Contractor shall inspect and measure the in-place work. Contractor shall promptly report to District in writing any defect in the in-place work that will impede or increase the cost of Contractor’s interface unless corrected. District will require the Contractor responsible for the Defective Work to make corrections so as to conform to its contract requirements, or, if the defect is the result of an error or omission in the Contract Documents, issue a Change Order. If Contractor fails to measure, inspect and/or report to District in writing defects that are reasonably discoverable, Contractor shall bear all costs of
accomplishing the interface acceptable to District. This provision shall be included in any and all other contracts or subcontracts for Work to be performed where such a conflict could exist.

C. District Authority Over Coordination

1. District will have authority over coordination of the activities of multiple contractors in cases where District performs work with its own forces or contracts with others for the performance of other work on the Project, or utilities work on the Site. District may at any time and in its sole discretion, designate a person or entity other than District to have authority over the coordination of the activities among the various contractors. District’s authority with respect to coordination of the activities of multiple contractors and utility owners shall not relieve Contractor of its obligation to other contractors and utility owners to coordinate its Work with other contractors and utility owners as specified in paragraph 6.B of this SECTION 00700. Contractor shall promptly notify District in writing when another contractor on the Project fails to coordinate its work with the Work of Contract Documents.

2. Contractor shall suspend any part of the Work or carry on the same in such manner as directed by District when such suspension or prosecution is necessary to facilitate the work of other contractors or workers. No damages or claims by Contractor will be allowed if the suspension or Work change is due in whole or in part to Contractor’s failure to perform its obligation to coordinate its Work with other contractors and utility owners. Damages or claims will be allowed only to the extent of fault by District if the suspension or Work change is due in whole or in part to another contractor’s failure to coordinate its work with Contractor, other contractors, and utility owners. District reserves the right to back charge Contractor for any damages or claims incurred by other contractors as a result of Contractor’s failure to perform its obligations to coordinate with other contractors and utility owners. District may deposit the funds retained with a Court of competent jurisdiction pursuant to applicable interpleader procedures and Contractor releases District of further liability regarding such funds.

7. DISTRICT AND PAYMENT

A. District Representative(s)

District Representative(s) will have limited authority to act on behalf of District as set forth in the Contract Documents. Except as otherwise provided in these Contract Documents or subsequently identified in writing by District, District will issue all communications to Contractor through District Representative, and Contractor shall issue all communications to District through District Representative in a written document delivered to District. Should any direct communications between Contractor and District’s consultants, architects or engineers not identified in Article 2 of SECTION 00520 (Agreement) occur during field visits or by telephone, Contractor shall immediately confirm them in a written document copied to District.
B. **Means and Methods of Construction**

Subject to those rights specifically reserved in the Contract Documents, District will not supervise, or direct, or have control over, or be responsible for, Contractor’s means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or Contractor’s failure to comply with laws and regulations applicable to the furnishing or performance of Work. District will not be responsible for Contractor’s failure to perform or furnish the Work in accordance with Contract Documents.

C. **Receipt and Processing of Applications for Payment**

As required by Section 01200 (Measurement and Payment), Contractor shall prepare the schedules, submit Applications for Payment and warrant title to all Work covered by each Application for Payment. District will review Contractor’s Applications for Payment and District will make payment thereon, and Contractor shall make payments to Subcontractors, suppliers and others, as required by Section 01200 (Measurement and Payment).

8. **CONTROL OF THE WORK**

A. **Supervision of Work By Contractor**

1. Contractor shall supervise, inspect, and direct Work competently and efficiently, devoting the attention and applying such personal skills and expertise as may be required and necessary to perform Work in accordance with Contract Documents. Contractor shall be solely responsible for and have control and charge of construction means, methods, techniques, sequences and procedures, safety precautions, safety coordination and programs in connection with the Work. Contractor shall be responsible to see that the completed Work complies accurately with Contract Documents.

2. Contractor shall keep on the Site at all times during Work progress a competent resident Superintendent, who shall not be replaced without District’s express written consent. The Superintendent shall be Contractor’s representative at the Site and shall have complete authority to act on behalf of Contractor. All communications to and from the Superintendent shall be as binding as if given to or by Contractor.

B. **Observation of Work By District**

1. Work shall be performed under District’s general observation and administration. Contractor shall comply with District’s directions and instructions in accordance with the terms of Contract Documents, but nothing contained in these General Conditions shall be taken to relieve Contractor of any obligations or liabilities under the Contract Documents. District’s failure to review or, upon review, failure to object to any aspect of Work reviewed, shall not be deemed a waiver or approval of any non-conforming aspect of Work.

2. District may engage an independent consultant or engineer (collectively for purposes of this paragraph 8.B, “Engineer”) to assist in administering the Work. If so engaged, Engineer will advise and consult with District, but will have authority to act on behalf of District only to extent provided in the
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Contract Documents or as set forth in writing by District. Engineer will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with Work. Engineer will not be responsible for or have control over the acts or omissions of Contractor, Subcontractors or their agents or employees, or any other persons performing Work.

3. Engineer may review Contractor’s submittals, such as Shop Drawings, Product Data, and Samples, but only for conformance with design concept of Work and with information given in the Contract Documents.

4. Engineer may visit the Site at intervals appropriate to stage of construction to become familiar generally with the progress and quality of Work and to determine in general if Work is proceeding in accordance with Contract Documents. Based on its observations, Engineer may recommend to District that it disapprove or reject Work that Engineer believes to be defective or will not produce a complete Project that conforms to Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by Contract Documents. District will also have authority to require special inspection or testing of Work, whether or not the Work is fabricated, installed or completed.

5. Engineer may conduct inspections to recommend to District the dates that Contractor has achieved Substantial Completion and Final Acceptance, and will receive and forward to District for review written warranties and related documents required by Contract Documents.

C. Access to Work

1. During performance of Work, District and its agents, officers, consultants, and employees may at any time enter upon Work, shops or studios where any part of the Work may be in preparation, or factories where any materials for use in Work are being or are to be manufactured, and Contractor shall provide proper and safe facilities for this purpose, and shall make arrangements with manufacturers to facilitate inspection of their processes and products to such extent as District’s interests may require. Other contractors performing work for District may also enter upon Work for all purposes required by their respective contracts. Subject to the rights reserved in the Contract Documents, Contractor shall have sole care, custody, and control of the Site and its Work areas.

2. District may, at any time, and from time to time, during the performance of the Work, enter the Work Site for the purpose of installing any necessary work by District labor or other contracts, and for any other purpose in connection with the installation of facilities. In doing so, District shall endeavor not to interfere with Contractor and Contractor shall not interfere with other work being done by or on behalf of District.

3. If, prior to completion and final acceptance of all the Work, District takes possession of any structure or facility (whether completed or otherwise) comprising a portion of the Work with the intent to retain possession thereof (as distinguished from temporary possession contemplating return to
Contractor), then, while District is in possession of the same, Contractor shall be relieved of liability for loss or damage to such structure other than that resulting from the Contractor’s fault or negligence. Such taking of possession by District shall not relieve the Contractor from any provisions of the Contract respecting such structure, other than to the extent specified in the preceding sentence, nor constitute a final acceptance of such structure or facility. See also Section 01100 (Summary), paragraph 1.10.

4. If, following installation of any equipment or facilities furnished by Contractor, defects requiring correction by Contractor are found, District shall have the right to operate such unsatisfactory equipment or facilities and make reasonable use thereof until the equipment or facilities can be shut down for correction of defects without injury to the District.

D. Existing Utilities

Drawings may indicate above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, chemical, hot water, and other similar items and utilities. Contractor shall locate these existing installations in accordance with California Government Code Section 4216.2 before proceeding with trenching or other operations that may cause damage, shall maintain them in service where appropriate, and shall repair any damage to them caused by the Work, at no increase in Contract Sum. Additional utilities whose locations are unknown to District are suspected to exist. Contractor shall be alert to their existence; if they are encountered, Contractor shall immediately report to District for disposition of the same. In addition to reporting if any utility is damaged, Contractor shall take appropriate action as provided in this SECTION 00700. Additional compensation or extension of time on account of utilities not shown or otherwise brought to Contractor’s attention, including reasonable action taken to protect or repair damage, shall be determined as provided in this SECTION 00700.

1. At no additional cost to District, Contractor shall incorporate into the Work main or trunk line utilities identified in the Contract Documents and other utilities or underground structures known or reasonably discernible and that will remain in service, including reasonable adjustments to the design location (including minor relocations) of the existing or new installations. Contractor shall take immediate action to restore any in service installations damaged by Contractor’s operations. Should District determine that Contractor has not responded in a timely manner or not diligently pursued completion of the Work, District may restore service and deduct the costs of such action by District from the amounts due under the Contract.

2. Consistent with Government Code Section 4215, as between District and Contractor, District will be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the Site only if such utilities are not identified in the Contract Documents or SECTION 00320 (Geotechnical Data and Existing Conditions). District will compensate for the cost of locating and repairing damage not due to Contractor’s failure to exercise reasonable care, removing and relocating such main or trunk line utility facilities not indicated in the Contract Documents or SECTION 00320 (Geotechnical Data and Existing Conditions).
Conditions) with reasonable accuracy, and equipment on the Project necessarily idled during such work.

3. Prior to performing Work at the Site, Contractor shall lay out the locations of known underground utilities that are to remain in service and other significant known underground installations. At no additional cost to District, prior to commencing other Work in proximity to such known underground utilities or installations that can be readily inferred from adjacent surface improvements, Contractor shall further locate, by carefully excavating with small equipment, potholing and principally by hand, such utilities or installations that are to remain and that are subject to damage. This obligation applies to all utilities (including, but not limited to, those referenced in paragraph 8.D.3 of this SECTION 00700).

4. Nothing in this SECTION 00700 shall be deemed to require District to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred by Contractor from the presence of an underground transmission main or other visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the Site. Contractor shall immediately secure all available information and notify District and utility, in writing, of its discovery, while performing Work under the Contract Documents, of any utility facilities not identified in the Drawings and Specifications.

E. Underground Facilities

1. Before commencing work of digging trenches or excavation, Contractor shall review all information available regarding subsurface conditions, including but not limited to information supplied in SECTION 00320 (Geotechnical Data and Existing Conditions), and subject to the terms and conditions of these documents, Contractor shall also comply with Government Code Sections 4216 to 4216.9, and in particular Section 4216.2 which provides, in part:

   “Except in an emergency, every person planning to conduct any excavation shall contact the appropriate regional notification center at least two working days, but no more than 14 calendar days, prior to commencing that excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator, and, if practical, the excavator shall delineate with white paint or other suitable markings the area to be excavated. The regional notification center shall provide an inquiry identification number to the person who contacts the center and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation.”

2. Contractor shall contact USA, and schedule the Work to allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities. Contractor is charged with knowledge of all subsurface conditions reflected in USA records. Prior to commencing excavation or trenching work, Contractor shall provide District with copies
of all USA records secured by Contractor. Contractor shall advise District of any conflict between information provided in SECTION 00320 (Geotechnical Data and Existing Conditions), the Drawings and that provided by USA records. Contractor’s excavation shall be subject to and comply with the Contract Documents, including without limitation Paragraphs 2.A and 8.D of this SECTION 00700.

3. The cost of all of the following will be included in the Contract Sum and Contractor shall have full responsibility for (a) reviewing and checking all available information and data including, but not limited to, SECTION 00320 (Geotechnical Data and Existing Conditions) and information on file at USA; (b) locating all Underground Facilities shown or indicated in the Contract Documents, available information, or indicated by visual observation including, but not limited to, and by way of example only, engaging qualified locating services and all necessary backhoeing and potholing; (c) coordination of the Work with the owners of such Underground Facilities during construction; and (d) the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

4. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated in the materials supplied by District or in information on file at USA or is otherwise reasonably available to Contractor, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than seven Days), and prior to performing any Work in connection therewith (except in an emergency as required by Article 16 of this SECTION 00700), identify the owner of such Underground Facility and give written notice to that owner and to District. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

5. Contractor shall be allowed an increase in the Contract Sum or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that is owned and was built by District only where the Underground Facility:
   a. Was not shown or indicated in the Contract Documents or in the information supplied pursuant to SECTION 00320 (Geotechnical Data and Existing Conditions) or in information on file at USA; and
   b. Contractor did not know of it; and
   c. Contractor could not reasonably have been expected to be aware of it or to have anticipated it from the information available. (For example, if surface conditions such as pavement repairs, valve covers, or other markings, indicate the presence of an Underground Facility, then an increase in the Contract Price or an extension of the Contract Time will not be due, even if the Underground Facility was not indicated in the Contract Documents, in the information supplied to Contractor pursuant to SECTION 00320 (Geotechnical Data and Existing Conditions), in
information on file at USA, or otherwise reasonably available to Contractor.)

6. Contractor shall bear the risk that Underground Facilities not owned or built by District may differ in nature or locations shown in information made available by District pursuant to SECTION 00320 (Geotechnical Data and Existing Conditions), in information on file at USA, or otherwise reasonably available to Contractor. Underground Facilities are inherent in construction involving digging of trenches or other excavations and Contractor is to apply its skill and industry to verify the information available.

9. WARRANTY, GUARANTY, AND INSPECTION OF WORK

A. Warranty and Guaranty

1. General Representations and Warranties: Contractor represents and warrants that it is and will be at all times fully qualified and capable of performing every Phase of the Work and to complete Work in accordance with the terms of Contract Documents. Contractor warrants that all construction services shall be performed in accordance with generally accepted professional standards of good and sound construction practices and all requirements of Contract Documents. Contractor warrants that Work, including but not limited to each item of materials and equipment incorporated therein, shall be new, of suitable grade of its respective kind for its intended use, and free from defects in design, engineering, materials, construction and workmanship. Contractor warrants that Work shall conform in all respects with all applicable requirements of federal, state and local laws, applicable construction codes and standards, licenses, and permits, Drawings and Specifications and all descriptions set forth therein, and all other requirements of Contract Documents. Contractor shall not be responsible, however, for the negligence of others in the specification of specific equipment, materials, design parameters and means or methods of construction where that is specifically shown and expressly required by Contract Documents.

2. Extended Guaranties: Any guaranty exceeding one year provided by the supplier or manufacturer of any equipment or materials used in the Project shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials and shall supply District with all warranty and guaranty documents relative to equipment and materials incorporated in the Project and guaranteed by their suppliers or manufacturers.

3. Environmental and Toxics Warranty: The covenants, warranties and representations contained in this paragraph 3 are effective continuously during Contractor’s Work on the Project and following cessation of labor for any reason including, but not limited to, Project completion. Contractor covenants, warrants and represents to District that:

a. To Contractor’s knowledge after due inquiry, no lead or asbestos-containing materials were installed or discovered in the Project at any time during Contractor’s construction thereof. If any lead or asbestos-
containing materials were discovered, Contractor made immediate written disclosure to District.

b. To Contractor’s knowledge after due inquiry, no electrical transformers, light fixtures with ballasts or other equipment containing PCBs are or were located on the Project at any time during Contractor’s construction thereof.

c. To Contractor’s knowledge after due inquiry, no storage tanks for gasoline or any other toxic substance are or were located on the Project at any time during Contractor’s construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to District.

d. Contractor’s operations concerning the Project are and were not in violation of any applicable environmental federal, state, or local statute, law or regulation dealing with hazardous materials substances or toxic substances and no notice from any governmental body has been served upon Contractor claiming any violation of any such law, ordinance, code or regulation, or requiring or calling attention to the need for any work, repairs, construction, alteration, or installation on or in connection with the Project in order to comply with any such laws, ordinances, codes, or regulations, with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide District with copies thereof.

B. Inspection of Work

1. All materials, equipment, and workmanship used in Work shall be subject to inspection and testing at all times during construction and/or manufacture in accordance with the terms of Contract Documents. Work and materials, manufacture and preparation of materials, from beginning of construction until final completion and acceptance of Work, shall be subject to inspection and rejection by District, its agents, representatives or independent contractors retained by District to perform inspection services, or governmental agencies with jurisdictional interests. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor’s Site safety procedures and program so that they may comply therewith as applicable. Upon request or where specified, District shall be afforded access for inspection at the source of supply, manufacture or assembly of any item of material or equipment, with reasonable accommodations supplied for making such inspections.

2. Contractor shall give District timely notice of readiness of Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

3. If applicable laws or regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, and furnish District with the required certificates of inspection, or approval. District will pay the cost of initial
testing and Contractor shall pay all costs in connection with any follow-up or additional testing. Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for the acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to Contractor’s purchase thereof for incorporation in the Work.

4. If Contractor covers any Work, or the work of others, prior to any required inspection, test or approval without written approval of District, Contractor shall uncover the Work at District’s request. Contractor shall bear the expense of uncovering Work and replacing Work.

5. In any case where Contractor covers Work contrary to District’s request, Contractor shall uncover Work for District’s observation or inspection at District’s request. Contractor shall bear the cost of uncovering Work.

6. Whenever required by District, Contractor shall furnish tools, labor and materials necessary to make examination of Work that may be completed or in progress, even to extent of uncovering or taking down portions of finished Work. Should Work be found unsatisfactory, cost of making examination and of reconstruction shall be borne by Contractor. If Work is found to be satisfactory, District, in manner herein prescribed for paying for alterations, modifications, and extra Work, except as otherwise herein specified, will pay for examination.

7. Inspection of the Work by or on behalf of District, or District’s failure to do so, shall not under any circumstances be deemed a waiver or approval of any non-conforming aspect of the Work. Contractor shall have an absolute duty, in the absence of a written Change Order signed by District, to perform Work in conformance with the Contract Documents.

8. Any inspection, evaluation, or test performed by or on behalf of District relating to the Work is solely for the benefit of District, and shall not be relied upon by Contractor. Contractor shall not be relieved of the obligation to perform Work in accordance with the Contract Documents, nor relieved of any guaranty, warranty, or other obligation, as a result of any inspections, evaluations, or tests performed by District, whether or not such inspections, evaluations, or tests are permitted or required under the Contract Documents. Contractor shall be solely responsible for testing and inspecting Work already performed to determine whether such Work is in proper condition to receive later Work.

C. Correction of Defective Work

1. If Contractor fails to supply sufficient skilled workers, suitable materials or equipment, or to furnish or perform the Work in such a way that the completed Work will conform to Contract Documents, District may order Contractor to replace any Defective Work, or stop any portion of Work to permit District (at Contractor’s expense) to replace such Defective Work. These District rights are entirely discretionary on the part of the District, and shall not give rise to any duty on the part of District to exercise the rights for the benefit of Contractor or any other party.
2. District may direct Contractor to correct any Defective Work or remove it from the Site and replace it with Work that is not defective and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting from the correction or removal. Contractor shall be responsible for any and all claims, costs, losses and damages caused by or resulting from such correction or removal. A Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, District may decide the proper amount or, in its discretion may elect to leave the Contract Sum unchanged and deduct from moneys due Contractor, all such claims, costs, losses and damages caused by or resulting from the correction or removal. If Contractor disagrees with District’s calculations, it may make a claim as provided in Article 12 of this SECTION 00700. District’s rights under this paragraph 9.C.2 shall be in addition to any other rights it may have under the Contract Documents or by law.

3. Correction period:
   a. With respect to equipment and machinery supplied by Contractor and incorporated into the Work, if within one year after the date of Final Completion of the portion of the Work incorporating the equipment and/or machinery (or, to the extent expressed by Change Order or Certificate of Final Completion, one year after District’s written acceptance of such equipment), or such longer period as may be prescribed by laws or regulations, or by the terms of the Contract Documents, any equipment or machinery is found to be defective, Contractor shall promptly, without cost to District and in accordance with District’s written instructions, correct such Defective Work.
   b. With respect to structures within the scope of Work, if within one year after the date of Final Acceptance, or such longer period of time as may be prescribed by laws or regulations, or by the terms of Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to District and in accordance with District’s written instructions, correct such Defective Work.
   c. Contractor shall remove any Defective Work rejected by District and replace it with Work that is not defective, and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, District may have the Defective Work corrected or the rejected Work removed and replaced.
   d. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, District shall have all rights and remedies granted by law.
4. Additionally, in special circumstances where a part of the Work is occupied or a particular item of equipment is placed in continuous service before Final Acceptance of all the Work, the correction period for that part of Work or that item may start to run from an earlier date if so provided by Change Order or Certificate of Substantial Completion.

5. Where Defective Work or rejected Work (and damage to other Work resulting therefrom) has been removed and replaced under this provision after the commencement of the correction period, the correction period hereunder with respect to such Work shall be extended for an additional period of one year after such removal and replacement has been satisfactorily completed.

6. If following installation of any equipment, machinery, or facilities furnished by Contractor, defects requiring correction by Contractor are found, District shall have the right to operate such defective equipment or facilities and make reasonable use thereof until the equipment, machinery, or facilities can be shut down for correction of defects without causing injury to District.

D. Acceptance and Correction of Defective Work By District

1. District may accept Defective Work. Contractor shall pay all claims, costs, losses and damages attributable to District’s evaluation of and determination to accept such Defective Work. If District accepts any Defective Work prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, District may deduct from moneys due Contractor, all claims, costs, losses, damages, expenses and liabilities attributable to the Defective Work. If Contractor disagrees with District’s calculations, Contractor may make a claim as provided in Article 12 of this SECTION 00700. If District accepts any Defective Work after final payment, Contractor shall pay to District, an appropriate amount as determined by District.

2. District may correct and remedy deficiency if, after five Days' written notice to Contractor, Contractor fails to correct Defective Work or to remove and replace rejected Work in accordance with paragraph 9.C.2 of this SECTION 00700; or provide a plan for correction of Defective Work acceptable to District; or perform Work in accordance with Contract Documents. In connection with such corrective and remedial action, District may exclude Contractor from all or part of the Site; take possession of all or part of Work and suspend Contractor’s Work related thereto; take possession of all or part of Contractor’s tools, appliances, construction equipment and machinery at the Site; and incorporate in Work any materials and equipment stored at the Site or for which District has paid Contractor but which are stored elsewhere. Contractor shall allow District, its representatives, agents, employees, and other contractors and District’s consultants’ access to the Site to enable District to exercise the rights and remedies under this paragraph 9.C.2. Contractor shall be responsible for all claims, costs, losses, damages, expenses and liabilities incurred or sustained by District.
in exercising such rights and remedies. A Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, District may deduct from moneys due Contractor, all claims, costs, losses and damages caused by or resulting from the correction or removal. If Contractor disagrees with District’s calculations, Contractor may make a claim as provided in Article 12 of this SECTION 00700.

E. Rights Upon Inspection or Correction

1. Contractor shall not be allowed an extension of Contract Time because of any delay in the performance of Work attributable to the exercise by District of its rights and remedies under this Article 9. Where District exercises its rights under this Article 9, it retains all other rights it has by law or under the Contract Documents including, but not limited to, the right to terminate Contractor’s right to proceed with the Work under the Contract Documents and/or make a claim or back charge where a Change Order cannot be agreed upon.

2. Inspection by District shall not relieve Contractor of its obligation to have furnished material and workmanship in accordance with Contract Documents. Payment for Work completed through periodic progress payments or otherwise shall not operate to waive District’s right to require full compliance with Contract Documents and shall in no way be deemed as acceptance of the Work paid therefor. Contractor’s obligation to complete the Work in accordance with Contract Documents shall be absolute, unless District agrees otherwise in writing.

F. Samples and Tests of Materials and Work

Contractor shall furnish, in such quantities and sizes as may be required for proper examination and tests, samples or test specimens of all materials to be used or offered for use in connection with Work. Contractor shall prepare samples or test specimens at its expense and furnish them to District. Contractor shall submit all samples in ample time to enable District to make any necessary tests, examinations, or analyses before the time it is desired to incorporate the material into the Work.


In order that District may determine whether Contractor has complied or is complying with requirements of Contract Documents not readily enforceable through inspection and tests of Work and materials, Contractor shall at any time, when requested, submit to District properly authenticated documents or other satisfactory proofs of compliance with all applicable requirements.

H. Acceptance

Inspection by District or its authorized agents or representatives, any order or certificate for the payment of money, any payment, acceptance of the whole or any part of Work by District, any extension of time, any verbal statements on behalf of District or its authorized agents or representatives shall not operate as a waiver or
modification of any provision of the Contract Documents, or of any power reserved to
District herein or therein or any right to damages provided in the Contract Documents.
Any waiver of any breach of the Contract Documents shall not be held to be a waiver
of any other subsequent breach.

10. CONTRACTOR’S ORGANIZATION AND EQUIPMENT

A. Contractor’s Legal Address

Address and facsimile number given in Contractor’s Bid are hereby designated as
Contractor’s legal address and facsimile number. Contractor may change its legal
address and facsimile number by notice in writing, delivered to District, which in
conspicuous language advises District of a change in legal address or facsimile
number, and which District accepts in writing. Delivery to Contractor’s legal address
or depositing in any post office or post office box regularly maintained by the United
States Postal Service, in a wrapper with postage affixed, directed to Contractor at
legal address, or of any drawings, notice, letter or other communication, shall be
deemed legal and sufficient service thereof upon Contractor. Facsimile to
Contractor’s designated facsimile number of any letter, memorandum, or other
communication on standard or legal sized paper, with proof of facsimile transmission,
shall be deemed legal and sufficient service thereof upon Contractor.

B. Contractor’s Office at the Work Site

Contractor shall maintain an office at the Site, which office shall be headquarters of a
Contractor representative authorized to transmit to and receive from District,
communications, instructions or Drawings. Communications, instructions, or
Drawings given to Contractor’s representative or delivered at the Site office in
representative’s absence shall be deemed to have been given to Contractor.

C. Contractor’s Superintendents or Forepersons

Contractor shall at all times be represented on Site by one or more superintendents
or forepersons authorized and competent to receive and carry out any instructions
that District may give, and shall be liable for faithful observance of instructions
delivered to Contractor or to authorized representative or representatives on Site.

D. Proficiency in English

Supervisors, security guards, safety personnel and employees who have unescorted
access to the Site shall possess proficiency in the English language in order to
understand, receive and carry out oral and written communications or instructions
relating to their job functions, including safety and security requirements.

E. Contractor’s and Subcontractors’ Employees

Contractor shall employ, and shall permit its Subcontractors to employ, only
competent and skillful personnel to do Work. If District notifies Contractor that any of
its employees, or any of its Subcontractors’ employees on Work is incompetent,
unfaithful, disorderly or profane, or fails to observe customary standards of conduct or
refuses to carry out any provision of the Contract Documents, or uses threatening or
abusive language to any person on Work representing District, or violates sanitary
rules, or is otherwise unsatisfactory, and if District requests that such person be
discharged from Work, then Contractor or its Subcontractor shall immediately discharge such person from Work and the discharged person shall not be re-employed on the Work except with consent of District.

F. Contractor to Supply Sufficient Workers And Materials
   1. Unless otherwise required by District under the terms of Contract Documents, Contractor shall at all times keep on the Site materials and employ qualified workers sufficient to prosecute Work at a rate and in a sequence and manner necessary to complete Work within the Contract Time. This obligation shall remain in full force and effect notwithstanding disputes or claims of any type.
   2. At any time during progress of Work should Contractor directly or indirectly (through Subcontractors) refuse, neglect, or be unable to supply sufficient materials or employ qualified workers to prosecute the Work as required, then District may require Contractor to accelerate the Work and/or furnish additional qualified workers or materials as District may consider necessary, at no cost to District. If Contractor does not comply with the notice within three Business Days of date of service thereof, District shall have the right (but not a duty) to provide materials and qualified workers to finish the Work or any affected portion of Work, as District may elect. District may, at its discretion, exclude Contractor from the Site, or portions of the Site or separate work elements during the time period that District exercises this right. District will deduct from moneys due or which may thereafter become due under the Contract Documents, the sums necessary to meet expenses thereby incurred and paid to persons supplying materials and doing Work. District will deduct from funds or appropriations set aside for purposes of Contract Documents the amount of such payments and charge them to Contractor as if paid to Contractor. Contractor shall remain liable for resulting delay, including liquidated damages and indemnification of District from claims of others.
   3. Exercise by District of the rights conferred upon District in paragraph 10.F.2 of this SECTION 00700, is entirely discretionary on the part of District. District shall have no duty or obligation to exercise the rights referred to in paragraph 10.F.2 of this SECTION 00700 and its failure to exercise such rights shall not be deemed an approval of existing Work progress or a waiver or limitation of District’s right to exercise such rights in other concurrent or future similar circumstances. The rights conferred upon District under paragraph 10.F.2 of this SECTION 00700 are cumulative to District’s other rights under any provision of the Contract Documents.

G. Contractor to List Trades Working
Contractor shall list the trades working on the Site and their scheduled activities on a daily basis, and provide a copy of that list to District

H. Contractor’s Use of The Site
Contractor shall not make any arrangements with any person to permit occupancy or use of any land, structure or building within the limits of the Work, for any purpose
whatsoever, either with or without compensation, in conflict with any agreement between District and any owner, former owner or tenant of such land, structure or buildings. Contractor may not occupy District-owned property outside the limit of the Work as indicated on the Drawings unless it obtains prior written approval from District.

11. PROSECUTION AND PROGRESS OF THE WORK

A. Schedules and Examinations of Contract Documents

1. Contractor shall submit schedules and reports, Shop Drawings and Submittals in the appropriate quantity and within the required time, arrange conferences and meetings and proceed with the Work in accordance with Contract Documents, including Sections 01315 (Project Meetings), 01320 (Progress Schedules and Reports), and 01330 (Submittal Procedures).

2. Contractor shall submit to District for review and discussion at the Preconstruction Conference described in Section 01315 (Project Meetings):
   a. Progress schedules and reports as required by Sections 01320 (Progress Schedules and Reports), and 01300 (Submittal Procedures). Contractor shall utilize Progress Schedule in planning, scheduling, coordinating, performing and controlling Work (including all activities of Subcontractors, assigned contractors, equipment vendors and suppliers). Contractor shall update Progress Schedule on a monthly basis to depict accurately the actual progress of Work and for evaluating and preparing Contractor's monthly progress payments. Contractor's failure to submit and maintain an acceptable progress schedule may, in District's discretion, and without limiting the materiality of Contractor's other obligations under the Contract Documents, constitute grounds to declare Contractor in material breach of the Contract Documents.
   b. Within 30 Days after the Notice to Proceed, a preliminary schedule of Shop Drawing and Sample submittals that shall list each required submittal and the times for submitting, reviewing and processing such submittal, as required by Section 01330 (Submittal Procedures). If no such schedule is agreed upon, then all Shop Drawings, Samples and product data submittals shall be completed and submitted within 30 Days after receipt of Notice to Proceed from District.
   c. Within 30 Days after the Notice to Proceed, a preliminary Schedule of Values for all the Work which shall include quantities and prices of items aggregating the Contract Sum and shall subdivide each Schedule of Values into component activities in sufficient detail to serve as the basis for progress payments during construction. Such Schedule of Values shall include an appropriate amount of overhead and profit applicable to each item of Work, a line item for Project Record Documents, and a line item for Project scheduling, and shall conform to Section 01200 (Measurement and Payment).

3. Unless otherwise provided in the Contract Documents, at least 15 Days before submission of the first application for payment, a conference attended by Contractor, District, and others as appropriate, will be held to review for acceptability the schedules submitted in accordance with
paragraph 11.A.2 of this SECTION 00700 and first reviewed at the Preconstruction Conference. Contractor shall have an additional seven Days to make corrections and adjustments and to complete and resubmit the schedules. Schedules shall be updated and completed as required by Sections 01200 (Measurement and Payment), 01320 (Progress Schedules and Reports) and 01300 (Submittal Procedures). No progress payment shall be due or owing to Contractor until the schedules are submitted to and acceptable to District and/or Engineer as meeting the requirements of the Contract Documents, including Sections 01200 (Measurement and Payment), 01320 (Progress Schedules and Reports) and 01300 (Submittal Procedures). District’s acceptance of Contractor’s schedules will not create any duty of care or impose on District any responsibility for the sequencing, scheduling or progress of Work nor will it interfere with or relieve Contractor from Contractor’s full responsibility therefor.

4. Before commencing any portion of Work, Contractor shall inform District in writing as to time and place at which Contractor wishes to commence Work, and nature of Work to be done, in order that proper provision for inspection of Work may occur, and to assure measurements necessary for record and payment. Information shall be given to District a reasonable time in advance of time at which Contractor proposes to begin Work, so that District may complete necessary preliminary work without inconvenience or delay to Contractor.

5. Contractor shall submit submittals and Shop Drawings to District (or Engineer if District so designates) for review in strict accordance with Section 01330 (Submittal Procedures). Submission of a Shop Drawing shall constitute Contractor’s representation that all requirements of Section 01330 (Submittal Procedures) have been complied with. All submittals will be identified as District may require and in the number of copies specified in Section 01330 (Submittal Procedures).

6. Contractor shall not perform Work that requires submission of a Shop Drawing or Sample or other submittal prior to submission and favorable review of the Shop Drawing or Sample or submittal. Where a Shop Drawing or Sample or other submittal is required by Contract Documents or the final Schedule of Shop Drawing and Sample Submittals accepted by District, any related Work performed prior to District’s approval of the pertinent submittal shall be at the sole expense, responsibility and risk of Contractor.

B. Cost Data

1. Contractor shall maintain full and correct information as to the number of workers employed in connection with each subdivision of Work, the classification and rate of pay of each worker in form of certified payrolls, the cost to Contractor of each class of materials, tools and appliances used by Contractor in Work, and the amount of each class of materials used in each subdivision of Work. Contractor shall provide District with monthly summaries of this information. If Contractor maintains or is capable of generating summaries or reports comparing actual Project costs with Bid
estimates or budgets, Contractor shall provide District with a copy of such report upon District’s request and whenever it is generated.

2. Contractor shall maintain daily job reports recording all significant activity on the job, including the number of workers on Site, Work activities, problems encountered and delays. Contractor shall provide District with copies for each Day Contractor works on the Project, to be delivered to District either the same Day or the following morning before starting work at the Site. Contractor shall take monthly progress photographs of all areas of the Work. Contractor shall maintain copies of all correspondence with Subcontractors and records of meetings with Subcontractors.

3. District shall have the right to audit and copy Contractor’s books and records of any type, nature or description relating to the Project (including but not limited to financial records reflecting in any way costs claimed on the Project), and to inspect the Site, including Contractor’s trailer, or other job Site office, and this requirement shall be contained in the subcontracts of Subcontractors working on Site. By way of example, District shall have the right to inspect and obtain copies of all Contract Documents, planning and design documents, Bid proposal and negotiation documents (subject to SECTION 00670 [Escrow Bid Documents]), cost records and job cost variance reports, design modification proposals, value engineering or other cost reduction proposals, revisions made to the original design, job progress reports, photographs, and as-built drawings maintained by Contractor. District and any other applicable governmental entity shall have the right to inspect all information and documents maintained under this paragraph 11.B at any time during the Project and for a period of five years following Final Completion. This right of inspection shall not relieve Contractor of its duties and obligations under the Contract Documents. This right of inspection shall be specifically enforceable in a court of law, either independently or in conjunction with enforcement of any other rights in the Contract Documents.

4. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Contract Modifications, Change Orders, Work Directives, Force Account orders, and written interpretations and clarifications in good order and annotated to show all changes made during construction. These Project Record Documents, together with all approved Samples and a counterpart of all approved Shop Drawings, shall be maintained and available to District for reference. Upon completion of the Work, Contractor shall deliver to District, the Project Record Documents, Samples and Shop Drawings and as-built drawings.

12. CLAIMS BY CONTRACTOR

A. General

1. Contract Interpretation Disputes: Should it appear to Contractor that Work to be performed or any of the matters relative to Contract Documents (including without limitation Drawings or Specifications) are not satisfactorily detailed or explained therein, or should any questions arise as to the meaning or intent of Contract Documents (including without limitation
Drawings or Specifications), Contractor shall give written notice to District within seven Days after Contractor’s first knowledge of the Contract interpretation dispute. Contractor shall bear all costs incurred in giving notice. District will render a determination regarding the issue, which shall be final. If Contractor disagrees with District’s decision, Contractor’s sole and exclusive remedy is to file a claim in accordance with this Article 12. Contractor shall diligently prosecute the Disputed Work (as defined below) to Final Completion pending resolution of any claim.

2. Work Disputes: Contractor shall give written notice to District of any dispute arising under the Contract Documents respecting the true value of any Work performed, the implementation or performance of Work required by Contract Documents, any Work omitted, any extra Work that Contractor may be required to perform or time extensions, respecting the size of any payment to Contractor during the performance of Contract Documents, or of compliance with Contract Documents procedures. Contractor shall give written notice to District before commencing the Disputed Work (as defined below), or within seven Days after Contractor’s first knowledge of the Disputed Work, whichever is earlier. District will render a determination regarding the issue, which shall be final. If Contractor disagrees with District’s decision, Contractor’s sole and exclusive remedy is to file a claim in accordance with this Article 12. Pending the resolution of any claim, Contractor shall diligently prosecute the Disputed Work to Final Completion.

3. The claim notice and documentation procedure described in this Article 12 applies to all claims and disputes arising under the Contract Documents, including without limitation any claim or dispute by any Subcontractor or material supplier. All Subcontractor and supplier claims of any type shall be brought only through Contractor as provided in this Article 12. Under no circumstances shall any Subcontractor or supplier make any direct claim against District.

4. Except as otherwise set forth in Public Contract Code section 9204, “claim” means a written demand or written assertion by Contractor seeking, as a matter of right, the payment of money, the adjustment or interpretation of Contract Documents terms, or other relief arising under or relating to Contract Documents. In order to qualify as a “claim,” the written demand must state that it is a claim submitted under this Article 12, or section 9204 of the Public Contract Code.

5. A voucher, invoice, proposed change, Application for Payment, cost proposal, RFI, change order request, or other routine or authorized form of request for payment is not a claim under the Contract Documents. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a claim under the Contract Documents by submitting a separate claim in compliance with claim submission requirements.

6. The provisions of this Article 12 constitute a non-judicial claim settlement procedure, and also a claim presentation procedure by agreement under Section 930.2 of the California Government Code, and shall survive
termination, breach or completion of the Contract Documents. Contractor shall bear all costs incurred in the preparation and submission of a claim. Pursuant to Government Code Section 930.2, the one-year period in Government Code section 911.2 shall be reduced to 150 days. Any claims shall be presented in accordance with the Government Code and shall affirmatively indicate Contractor’s prior compliance with the claims procedure herein and previous dispositions under paragraph 12.B.3 below.

B. Procedure

1. District and Contractor shall comply with the claims procedures in Public Contract Code § 9204, which is incorporated herein by reference. Additionally, pursuant to § 9204(f)(2), District and Contractor shall comply with the claims procedures and requirements set forth herein.

2. Should any clarification, determination, action or inaction by District or Engineer, Work, or any other event, in the opinion of Contractor, exceed the requirements of or not comply with Contract Documents in any way, or otherwise result in Contractor seeking additional compensation in time or money or damages for any reason (collectively “Disputed Work”), then Contractor and District will make good faith attempts to resolve informally any and all such issues, claims and/or disputes. Before commencing the Disputed Work, or within seven Days after Contractor’s first knowledge of the Disputed Work, whichever is earlier, Contractor shall file a written notice and cost proposal for the Disputed Work with District stating clearly and in detail its objection and reasons for contending the Disputed Work or interpretation is outside or in breach of the requirements of Contract Documents. If a written notice and cost proposal for Disputed Work is not issued within this time period, or if Contractor proceeds with the Disputed Work without first having given the notice required by this paragraph 12.B.1, Contractor shall waive its rights to further claim on the specific issue.

3. District will review Contractor’s timely notice and cost proposal for Disputed Work and provide a decision. If, after receiving the decision, Contractor disagrees with it or still considers the Work required of it to be outside of the requirements of Contract Documents, it shall so notify District, in writing, within seven Days after receiving the decision, by submitting a notice of potential claim, stating that a formal claim will be issued. Within 30 Days of receiving the decision, Contractor shall submit its claim in the form specified herein and all arguments, justification, cost or estimates, schedule analysis, and detailed documentation supporting its position. Contractor’s failure to furnish notification within seven Days and all justifying documentation within 30 Days will result in Contractor waiving its right to the subject claim. If Disputed Work persists longer than 30 Days, then Contractor shall, every 30 Days until the Disputed Work ceases, submit to District a document titled “Claim Update” that shall update and quantify all elements of the claim as completely as possible. Contractor’s failure to submit a Claim Update or to quantify costs every 30 Days shall result in waiver of the claim for that 30-Day period. Claims or Claim Updates stating that damages, total damages (direct and indirect), schedule input and/or any time extension will be
determined at a later date shall not comply with this paragraph 12.B.2 and shall result in Contractor waiving its claim(s).

4. Except as otherwise provided in public contract code § 9204, within 45 days of District’s receipt of Contractor’s formal claim including all arguments, justifications, cost or estimates, schedule analysis, and documentation supporting its position as required herein, District or its designee will review the issue and render a final written determination. District may in its discretion conduct an administrative hearing on Contractor's claim, in which case Contractor shall appear, participate, answer questions and inquiries, and present any further evidence or analysis requested by District to evaluate and decide Contractor’s claim. District’s written determination will specify which portion of the claim is disputed and what portion is undisputed. District shall pay the undisputed portion of Contractor’s claim within 60 days after the district issues its final written determination. District’s failure to respond to Contractor’s claim within the time periods described herein shall results in the claim being deemed rejected in its entirety.

5. If Contractor disputes the District’s final written determination, or if the District fails to respond to a claim issued pursuant to this section within the time prescribed, Contractor may, within 10 days of District’s issuance of its final written determination, or if no final written determination is made within the time periods prescribed herein, within 60 days of District’s receipt of Contractor’s claim, demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, District shall schedule a meet and confer conference within 30 days for settlement of the dispute. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, District shall provide Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after District issues its written statement. Any disputed portion of the claim, as identified by Contractor in writing, shall be submitted to nonbinding mediation (or if otherwise permitted by the Contract Documents, arbitration), as a condition precedent to litigation, with District and Contractor sharing the associated costs equally. District and Contractor shall mutually agree to a mediator trained in construction industry mediation within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator trained in construction industry mediation and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. All statutes of limitation shall be tolled from the date of the demand for mediation until a date two weeks
following the mediation’s conclusion. All unresolved Contractor claims shall be submitted to the same mediator. The cost of the mediation shall be equally shared.

6. Claims shall be calculated in the same manner as Change Orders per Section 01250 (Modification Procedures). EXCEPT WHERE PROVIDED BY LAW, OR ELSEWHERE IN THESE CONTRACT DOCUMENTS (IF APPLICABLE), DISTRICT SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES, AND CONTRACTOR SHALL NOT INCLUDE THEM IN ITS CLAIMS. CONTRACTOR SHALL BE LIMITED IN ITS RECOVERY ON CLAIMS TO THE CHANGE ORDER CALCULATIONS SET FORTH IN SECTION 01250 (MODIFICATION PROCEDURES).

7. If Contractor’s claims submitted in accordance with this Article 12 at Project completion total less than $375,000, then claims resolution shall proceed in the manner prescribed by Article 1.5, Chapter 1, Part 3 of Division 2 of the California Public Contract Code.

C. Claim Format

1. Contractor shall submit the claim justification in the following format:
   a. Cover letter and certification under penalty of perjury of the accuracy of the claim;
   b. Summary of claim, including underlying facts, entitlement, schedule analysis, quantum calculations, contract provisions supporting relief;
   c. List of documents relating to claim including Specifications, Drawings, clarifications/requests for information, schedules, notices of delay, and any others;
   d. Chronology of events and correspondence;
   e. Analysis of claim merit;
   f. Analysis of claim cost; and
   g. Attach supporting documents referenced in paragraph 12.C.1.c.

D. Subcontractor Claims

Contractor shall present as its claims all Subcontractor, sub-Subcontractor and supplier claims of any type, and prove them under the terms of the Contract Documents. District shall not be directly liable to any Subcontractor, any supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages or extra costs of any type arising out of or resulting from the Project.

E. Exclusive Remedy

Contractor’s performance of its duties and obligations specified in this Article 12 and administration of a claim as provided in this Article 12 is Contractor’s sole and exclusive remedy for disputes of all types pertaining to the payment of money, extension of time, the adjustment or interpretation of Contract Documents terms or other contractual or tort relief arising from Contract Documents. This exclusive remedy and the limitation of liability (expressed herein and elsewhere throughout Contract Documents) apply notwithstanding the completion, termination, suspension,
cancellation, breach or rescission of the Work or Contract Documents, negligence or
strict liability by District, its representatives, consultants or agents, or the transfer of
Work or the Project to District for any reason whatsoever. Contractor waives and
covenants not to use any claims of waiver, estoppel, release, bar, or any other type of
excuse for non-compliance with the claim submission, administration, and mediation
requirements. Compliance with the claim submission, administration, and mediation
procedures described in Article 12 is a condition precedent to the right to commence
litigation or commence any other legal action. Claim(s) or issue(s) not raised in a
timely protest and timely claim submitted under this Article 12 may not be asserted in
any subsequent Government Code claim, litigation or legal action. District shall not
be deemed to waive any provision under this Article 12, if at District’s sole discretion,
a claim is administered in a manner not in accord with this Article 12. Contractor's
timely and full compliance with its obligations in this Article 12 shall constitute a
condition precedent to Contractor’s compliance with the claims presentation
requirements under the California Government Code, which shall remain upon
substantial completion or termination of the Contract Documents.

13. LEGAL AND MISCELLANEOUS

A. Laws and Regulations

1. Contractor shall keep fully informed of and shall comply with all laws,
ordinances, regulations and orders of any properly constituted authority
affecting the Contract Documents, Work and persons connected with Work,
and shall protect and indemnify District and its officers, employees,
consultants and agents against any claim or liability, including attorney’s
fees, arising from or based on violation of law, ordinance, regulation or
order, whether by Contractor or by Subcontractors, employees or agents.
Authorized persons may at any time enter upon any part of Work to
ascertain compliance of all applicable laws, ordinances, regulations and
orders.

2. Whenever Drawings and Specifications require larger sizes or higher
standards than are required by any applicable law, ordinance, regulation or
order, Drawings and Specifications shall govern. Whenever Drawings and
Specifications require something that will violate such laws, ordinances,
regulations or orders, then such laws, ordinances, regulations or orders
shall govern.

B. Permits and Taxes

Contractor shall procure all permits and licenses applicable to the Work (including
environmental matters to the extent applicable), pay all charges and fees, including
fees for street opening permits, comply with, implement and acknowledge
effectiveness of all permits, initiate and cooperate in securing all required notifications
or approvals therefore, and give all notices necessary and incident to due and lawful
prosecution of Work, unless otherwise provided herein. District will pay applicable
building permits, school, sanitation and water fees, except as otherwise provided in
the Contract Documents. Contractor shall pay all sales and/or use taxes levied on
materials, supplies, or equipment purchased and used on or incorporated into Work,
and all other taxes properly assessed against equipment or other property used in connection with Work, without any increase in the Contract Sum. Contractor shall make necessary arrangements with proper authorities having jurisdiction over roads, streets, pipelines, navigable waterways, railroads, and other works in advance of operations, even where District may have already obtained permits for the Work.

C. Responsibility of Contractor And Indemnification

1. District and each of its officers, employees, consultants and agents including, but not limited to the Board, Engineer and each District Representative, shall not be liable or accountable in any manner for loss or damage that may happen to any part of the Work; loss or damage to materials or other things used or employed in performing the Work; injury, sickness, disease, or death of any person; or damage to property resulting from any cause whatsoever except their sole negligence, willful misconduct or active negligence, attributable to performance or character of the Work, and Contractor releases all of the foregoing persons and entities from any and all such claims.

2. To the furthest extent permitted by law (including without limitation California Civil Code Section 2782), Contractor shall assume defense of, and indemnify and hold harmless, District and each of its officers, employees, consultants and agents, including but not limited to the Board, Engineer and each District representative, from claims, suits, actions, losses and liability of every kind, nature and description, including but not limited to claims and fines of regulatory agencies and attorney’s fees and consultant’s fees, directly or indirectly arising out of, connected with or resulting from performance of the Work, failure to perform the Work, or condition of the Work which is caused in whole or part by any act or omission of Contractor, Subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether it is caused in part by the negligence of District or by any person or entity required to be indemnified hereunder.

3. With respect to third-party claims against Contractor, Contractor waives any and all rights to any type of express or implied indemnity against District and each of its officers, employees, consultants and agents including, but not limited to District, the Board, Engineer and each District representative.

4. Approval or purchase of any insurance contracts or policies shall in no way relieve from liability nor limit the liability of Contractor, its Subcontractors of any tier, or the officers or agents of any of them.

5. To the furthest extent permitted by law (including, without limitation, Civil Code Section 2782), the indemnities, releases of liability and limitations of liability, claims procedures, and limitations of remedy expressed throughout Contract Documents shall apply even in the event of breach of contract, negligence (active or passive), fault or strict liability of the party(ies) indemnified, released, or limited in liability, and shall survive the termination, rescission, breach, abandonment, or completion of the Work or the terms of the Contract Documents. If Contractor fails to perform any of these defense or indemnity obligations, District may in its discretion back charge
Contractor for District’s costs and damages resulting therefrom and withhold such sums from progress payments or other contract moneys which may become due.

6. The indemnities in the Contract Documents shall not apply to any indemnified party to the extent of its sole negligence or willful misconduct; nor shall they apply to District or other indemnified party to the extent of its active negligence.

D. Concealed or Unknown Conditions

1. If either of the following conditions is encountered at Site when digging trenches or other excavations that extend deeper than four feet below the surface, Contractor shall give a written Notice of Differing Site Conditions to District promptly before conditions are disturbed, except in an emergency as required by paragraph 16.D of this SECTION 00700, and in no event later than seven Days after first observance of:
   a. Subsurface or Latent physical conditions which differ materially from those indicated in the Contract Documents; or
   b. Unknown physical conditions of an unusual nature or which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

In response to Contractor’s Notice of Differing Site Conditions under this paragraph 13.D.1, District will investigate the identified conditions, and if they differ materially and cause increase or decrease in Contractor’s cost of, or time required for, performance of any part of the Work, District will issue either a Request for Proposal or a Construction Change Directive under the procedures described in the Contract Documents, including without limitation Section 01250 (Modification Procedures). If District determines that physical conditions at the Site are not Latent or are not materially different from those indicated in Contract Documents or that no change in terms of the Contract Documents is justified, District will so notify Contractor in writing, stating reasons.

2. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed Latent or materially different Site conditions (whether above or below grade) if:
   a. Contractor knew of the existence of such conditions at the time Contractor submitted its Bid; or
   b. Contractor should have known of the existence of such conditions as a result of having complied with the requirements of Contract Documents, including without limitation paragraphs 2.A and 8.D of this SECTION 00700; or
   c. The information or conditions claimed by Contractor to be Latent or materially different consist of information, conclusions, opinions or deductions of the kind that paragraph 2.A of this SECTION 00700 precludes reliance upon; or
d. Contractor was required to give written Notice of Differing Site Conditions and failed to do so within the time required.

3. If District and Contractor are unable to agree on entitlement to or as to the amount or length of any adjustment in the Contract Sum or Contract Time required under this paragraph 13.D, Contractor shall proceed with the Work as directed by District and may make a claim as provided in Article 12 of this SECTION 00700.

E. Notice of Hazardous Waste or Materials Conditions

1. Contractor shall give a written Notice of Hazardous Materials Condition to District promptly, before any of the following conditions are disturbed (except in an emergency as required by paragraph 16.D of this SECTION 00700), and in no event later than 24 hours after first observance of any:
   a. Material that Contractor believes may be hazardous waste or hazardous material, as defined in Section 25117 of the Health and Safety Code (including, without limitation, asbestos, lead, PCBs, petroleum and related hydrocarbons, and radioactive material) that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law (“hazardous material”); or
   b. Other material that may present an imminent substantial danger to persons or property exposed thereto in connection with Work at the Site (“other materials”).

2. Except as otherwise provided in the Contract Documents or as provided by applicable law, Contractor shall not be required to give any notice for the disturbance or observation of any such hazardous materials or other materials where such matter is disturbed or observed as part of the scope of Work under the Contract Documents (such as hazardous waste or hazardous material investigation, remediation or disposal activities which are identified as the subject of Work under the Contract Documents), where Contractor complies with all requirements in the Contract Documents and applicable law respecting such materials.

3. Contractor’s Notice of Hazardous Materials Condition shall indicate whether the hazardous materials or other materials were shown or indicated in the Contract Documents to be within the scope of Work, and whether the hazardous materials or other materials were brought to the Site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible.

4. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed hazardous waste or materials if:
   a. Contractor knew of the existence of such hazardous materials or other materials at the time Contractor submitted its Bid; or
   b. Contractor should have known of the existence of such hazardous material or other materials as a result of its having the responsibility to obtain additional or supplementary examinations, investigation, explorations, tests, studies, and data concerning the conditions at or contiguous to the Site prior to submitting its Bid; or
c. Contractor failed to give the written notice within the time required by paragraph 13.E.1 of this SECTION 00700.

5. If District determines that conditions involve hazardous materials or other materials and that a change in Contract Document terms is justified, District will issue either a Request for Proposal or Construction Change Directive under the procedures described in the Contract Documents, including without limitation Section 01250 (Modification Procedures). If District determines that conditions do not involve hazardous materials or other materials or that no change in Contract Document terms is justified, District will notify Contractor in writing, stating the reasons for its determination.

6. If District and Contractor are unable to agree on entitlement to or as to the amount or length of any adjustment in the Contract Sum or Contract Time required under this paragraph 13.E, Contractor shall proceed with the Work as directed by District and may make a claim as provided in Article 12 of this SECTION 00700.

7. In addition to the parties' other rights under paragraph 13.E.5 of this SECTION 00700, if Contractor does not agree to resume Work based on a reasonable belief that it is unsafe, or does not agree to resume Work under special conditions, District may order the disputed portion of Work deleted from the Work, or performed by others, or District may invoke its right to terminate Contractor's right to proceed under the Contract Documents in whole or in part, for convenience or for cause as the facts may warrant. If Contractor does not agree with District’s determination of any adjustment in the Contract Sum or Contract Time as a result, Contractor may make a claim as provided in Article 12 of this SECTION 00700.

F. Suspension of Work

1. District may, without cause, order Contractor in writing to suspend, delay or interrupt Work in whole or in part for such period of time as District may determine. An adjustment shall be made for increases in cost of performance of Work of the Contract Documents caused by any such suspension, delay or interruption, calculated using the measures set forth in Section 01250 (Modification Procedures). No adjustment shall be made to extent that:
   a. Performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible; or
   b. An equitable adjustment is made or denied under any other provision of Contract Documents; or
   c. The suspension of Work was the direct or indirect result of Contractor’s failure to perform any of its obligations hereunder. Adjustments made in cost of performance may have a mutually agreed fixed or percentage fee; if the parties cannot agree, Contractor may file a claim under Article 12 of this SECTION 00700.
G. Termination of Contract for Cause

1. District may declare Contractor in default of Contract Documents and District may terminate Contractor’s right to proceed under the Contract Documents for cause:
   a. Should Contractor make an assignment for the benefit of creditors; admit in writing its inability to pay its debts as they become due; file a voluntary petition in bankruptcy; be adjudged a bankrupt or insolvent; be the subject of an involuntary petition in bankruptcy which is not dismissed within 60 Days; file a petition or answer seeking for itself any reorganization, arrangement, composition, readjustment, liquidation, dissolution, or similar relief under any present or future statute, law, or regulation; file any answer admitting or not contesting the material allegations of a petition filed against Contractor in any such proceeding; or seek, consent to, or acquiesce in, the appointment of any trustee, receiver, custodian or liquidator of Contractor or of all or any substantial part of its properties or if Contractor, its directors or shareholders, take action to dissolve or liquidate Contractor; or
   b. Should Contractor commit a material breach of the Contract Documents. If District declares Contractor in default due to material breach, however, District must allow Contractor an opportunity to cure such breach within ten Days of the date of notice from District to Contractor providing notice of the default; or, if such breach is curable but not curable within such ten-Day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for Contractor to avail itself of a time period in excess of ten Days, Contractor must provide District within the ten-Day period with a written plan acceptable to District to cure said breach which includes, for example, evidence of necessary resources, Subcontractor commitments, schedules and recovery schedules meeting Contract Document requirements and showing a realistic and achievable plan to cure the breach. Contractor must then diligently commence and continue such cure according to the written plan); or
   c. Should Contractor violate or allow (by a Subcontractor or other person or entity for which Contractor is responsible) a violation of any valid law, statute, regulation, rule, ordinance, permit, license or order of any governmental agency applicable to the Project or Work and does not cure (or cause to be cured) such violation within ten Days of the date of the notice from District to Contractor demanding such cure; or, if such violation is curable but not curable within such ten-Day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for Contractor to avail itself of a time period in excess of ten Days, Contractor shall provide District within the ten-Day period with a written plan to cure said violation acceptable to District, and then diligently commence and continue performance of such cure according to the written plan.)

2. If District at any time reasonably believes that Contractor is or may be in default under the Contract Documents as provided in paragraph 13.G.1 of
this SECTION 00700, District may in its sole discretion notify Contractor of this fact and request written assurances from Contractor of performance of Contract Documents and a written plan from Contractor to remedy any default under the terms of Contract Documents which District may advise Contractor of in writing. Contractor shall, within 10 Days of District’s request, deliver a written cure plan which meets the requirements of the written plan deliverable under paragraph 13.G.1.b of this SECTION 00700. Failure of Contractor to provide such written assurances of performance and the required written plan, within ten Days of request, will constitute a material breach of Contract Documents sufficient to justify termination for cause.

3. In event of termination for cause, District will immediately serve written notice thereof upon Surety and Contractor. Surety shall have the rights and obligations set forth in SECTION 00610 (Construction Performance Bond). Subject to the Surety’s rights under the Performance Bond (which rights are waived upon a default thereunder), District may take over the Work and prosecute it to completion by contract or by any other methods it may deem advisable.

4. In the event of termination by District as provided in paragraph 1 of this SECTION 00700 for cause:
   a. District will compensate Contractor for the value of the Work delivered to District upon termination as determined in accordance with the Contract Documents, subject to all rights of offset and back charges, and provided that Contractor provides District with updated as-builts and Project Record Documents showing the Work performed up to the date of termination. However, District will not compensate Contractor for its costs in terminating the Work or any cancellation charges owed to third parties.
   b. Contractor shall deliver to District possession of the Work in its then condition including, but not limited to, all designs, engineering, Project records, Project Record Documents, cost data of all types, Drawings and Specifications and contracts with vendors and Subcontractors, all other documentation associated with the Project, and all construction supplies and aids dedicated solely to performing the Work which, in the normal course of construction, would be consumed or only have salvage value at the end of the construction period. Contractor shall remain fully liable for the failure of any Work completed and materials and equipment provided through the date of such termination to comply with the provisions of the Contract Documents. The provisions of this paragraph 13.G.4 shall not be interpreted to diminish any right which District may have to claim and recover damages for any breach of Contract Documents or otherwise, but rather, Contractor shall compensate District for all loss, cost, damage, expense, and/or liability suffered by District as a result of such termination and failure to comply with Contract Documents.
c. District’s rights under paragraph 13.G.4.b shall be specifically enforceable to the greatest extent permitted by law. District shall, to the extent applicable, have all other rights and remedies set forth in any Bidding Document.

5. District may terminate portions or parts of the Work for cause, provided these portions or parts (1) have separate geographic areas from parts or portions of the Work not terminated or (2) are limited to the work of one or more specific trades or Subcontractors. In such case, Contractor shall cooperate with a completing contractor as required under Article 6 of this SECTION 00700.

6. In the event a termination for cause is later determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience, and Contractor shall have the recovery rights specified in paragraph 13.H. Any Contractor claim arising out of a termination for cause, however, shall be made in accordance with Article 12 of this SECTION 00700. No other loss cost, damage, expense or liability may be claimed, requested or recovered by Contractor.

H. Termination of Contract for Convenience

1. District may terminate performance of the Work under the Contract Documents in accordance with this clause in whole, or from time to time in part, whenever District shall determine that termination is in District’s best interest. Termination shall be effected by District delivering to Contractor notice of termination specifying the extent to which performance of the Work under the Contract Documents is terminated and the effective date of the termination.

2. After receiving a notice of termination under paragraph 13.H.1 of this SECTION 00700, and except as otherwise directed by District, Contractor shall:
   a. Stop Work under the Contract Documents on date and to extent specified in notice of termination;
   b. Place no further orders or subcontracts for materials, services, or facilities except as necessary to complete portion of Work under the Contract Documents which is not terminated;
   c. Terminate all orders and subcontracts to extent that they relate to performance of Work terminated by the notice of termination;
   d. Assign to District in manner, at times, and to extent directed by District, all right, title, and interest of Contractor under orders and subcontracts so terminated. District shall have the right, in its sole discretion, to settle or pay any or all claims arising out of termination of orders and subcontracts;
   e. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with approval or ratification of District to extent District may require. District’s approval or ratification shall be final for purposes of this paragraph 13.H;
   f. Transfer title to District, and deliver in the manner, at the times, and to the extent, if any, directed by District, all fabricated or unfabricated parts,
Work in process, completed Work, supplies, and all other material produced as part of, or acquired in connection with performance of, Work terminated by the notice of termination, and completed or partially completed drawings, drawings, specifications, information, and other property which, if the Project had been completed, would have been required to be furnished to District;

g. Use its best efforts to sell, in manner, at times, to extent, and at price or prices that District directs or authorizes, any property of types referred to in paragraph 13.H.2.f of this SECTION 00700, but Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under conditions prescribed and at price or prices approved by District. Proceeds of transfer or disposition shall be applied to reduce payments to be made by District to Contractor under the Contract Documents or shall otherwise be credited to the price or cost of Work covered by Contract Documents or paid in such other manner as District may direct;

h. Complete performance of the part of the Work which was not terminated by the notice of termination; and

i. Take such action as may be necessary, or as District may direct, to protect and preserve all property related to Contract Documents which is in Contractor's possession and in which District has or may acquire interest.

3. After receipt of a notice of termination under paragraph 13.H.1 of this SECTION 00700, Contractor shall submit to District its termination claim, in form and with all certifications required by Article 12 of this SECTION 00700. Contractor’s termination claim shall be submitted promptly, but in no event later than 6 months from effective date of the termination. Contractor and District may agree upon the whole or part of the amount or amounts to be paid to Contractor because of a total or partial termination of Work under this paragraph 13.H. If Contractor and District fail to agree on the whole amount to be paid to Contractor because of the termination of the Work under this paragraph 13.H, District’s total liability to Contractor by reason of the termination shall be the total (without duplication of any items) of:

a. The reasonable cost to Contractor, without profit, for all Work performed prior to the effective date of the termination, including Work done to secure the Project for termination. Reasonable cost may not exceed the applicable percentage completion values derived from the progress schedule and the schedule of values. Deductions shall be made for cost of materials to be retained by Contractor, cost of Work defectively performed, amounts realized by sale of materials, and for other appropriate credits against cost of Work. Reasonable cost will include reasonable allowance for Project overhead and general administrative overhead not to exceed a total of ten percent of direct costs of such Work. When, in District’s opinion, the cost of any item of Work is excessively high due to costs incurred to remedy or replace defective or
rejected Work, reasonable cost to be allowed will be the estimated reasonable cost of performing the Work in compliance with requirements of Contract Documents and excessive actual cost shall be disallowed.

b. A reasonable allowance for profit on cost of Work performed as determined under paragraph 13.H.3.a of this SECTION 00700, provided that Contractor establishes to District’s satisfaction that Contractor would have made a profit had the Project been completed, and provided further that the profit allowed shall not exceed 5 percent of cost.

c. Reasonable costs to Contractor of handling material returned to vendors, delivered to District or otherwise disposed of as directed by District.

d. A reasonable allowance for Contractor’s internal administrative costs in preparing termination claim.

e. Except as provided in this paragraph 13.H.3 of this SECTION 00700, District shall not be liable for costs incurred by Contractor or Subcontractors after receipt of a notice of termination. Such non-recoverable costs include, but are not limited to, anticipated profits on Work not performed as of the date of termination, post-termination employee salaries, post-termination general administrative expenses, post-termination overhead or unabsorbed overhead, costs of preparing and submitting Contractor’s Bid, attorney’s fees of any type, and all costs relating to prosecution of claim or lawsuit.

f. District shall have no obligation to pay Contractor under this paragraph 13.H unless and until Contractor provides District with updated and acceptable as-builts and Project Record Documents for Work completed prior to termination.

4. In arriving at the amount due Contractor under this clause, there shall be deducted in whole (or in the appropriate part[s] if the termination is partial):

a. All unliquidated advances or other payments on account previously made to Contractor, including without limitation all payments applicable to the terminated portion of Contract Documents;

b. Any claim which District may have against Contractor in connection with Contract Documents; and

c. The agreed price for, or proceeds of sale of, any materials, supplies, or other things kept by Contractor or sold under provisions of this paragraph 13.H, and not otherwise recovered by or credited to District.

I. Contingent Assignment of Subcontracts

1. Contractor hereby assigns to District each Subcontract for a portion of the Work, provided that:

a. The assignment is effective only after District’s termination of Contractor’s right to proceed under the Contract Documents (or portion thereof relating to that Subcontract) pursuant to paragraphs 13.G or 13.H of this SECTION 00700.

b. The Assignment is effective only for the Subcontracts which District expressly accepts by notifying the Subcontractor in writing;
c. The assignment is subject to the prior rights, if any, of the Surety, obligated by SECTION 00610 (Construction Performance Bond) provided under the Contract Documents, where the Surety exercises its rights to complete the Contract;
d. After the effectiveness of an assignment, Contractor shall, at its sole cost and expense (except as otherwise provided in paragraphs 13.G or 13.H of this SECTION 00700), sign all instruments and take all actions reasonably requested by District to evidence and confirm the effectiveness of the assignment in District; and
e. Nothing in this paragraph 13.I shall modify or limit any of Contractor’s obligations to District arising from acts or omissions occurring before the effectiveness of any Subcontract assignment, including but not limited to all defense, indemnity and hold-harmless obligations arising from or related to the assigned Subcontract.

J. Remedies and Contract Integration

1. Subject to Contract Documents provisions regarding Contractor claims, claim review, and claim resolution, and subject to the limitations therein, the exclusive jurisdiction and venue for resolving all claims, counter-claims, disputes and other matters in question between District and Contractor arising out of or relating to Contract Documents, any breach thereof or the Project shall be the Superior Court of the State of California for the County of El Dorado. Both parties hereby waive their rights under California Code of Civil Procedure Section 394 to file a motion to transfer any action or proceeding arising out of the Contract Documents to another venue. All District remedies provided in the Contract Documents shall be taken and construed as cumulative and not exclusive; that is, in addition to each and every other remedy herein provided; and in all instances District shall have any and all other equitable and legal rights and remedies which it would have according to law.

2. The Contract Documents, any Contract Modifications and Change Orders shall represent the entire and integrated agreement between District and Contractor regarding the subject matters hereof and thereof and shall constitute the exclusive statement of the terms of the parties’ agreement. The Contract Documents, and any Contract Modifications and Change Orders, shall supersede any and all prior negotiations, representations or agreements, written or oral, express or implied, that relate in any way to the subject matter of the Contract Documents or written modifications. District and Contractor represent and agree that, except as otherwise expressly provided in the Contract Documents, they are entering into the Contract Documents and any subsequent written modification in sole reliance upon the information set forth or referenced in the Contract Documents or Contract Modifications and the parties are not and will not rely on any other information.

3. In any proceeding to enforce the Contract Documents, Contractor and District agree that the finder of fact shall receive detailed instructions on the meaning and operation of the Contract Documents, including their
conditions, limitations of liability and remedies clauses, claims procedures and any other provisions impacting major defenses and theories of liability of the parties. Detailed findings of fact shall be requested, to verify Contract enforcement.

4. Either party’s waiver of any breach or failure to enforce any of the terms, covenants, conditions or other provisions of the Contract Documents at any time shall not in any way affect, limit, modify or waive that party’s right thereafter to enforce or compel strict compliance with every term, covenant, condition or other provision hereof, any course of dealing or custom of the trade or oral representations notwithstanding.

K. Patents

Fees or claims for any patented invention, article or arrangement that may be used upon or in any manner connected with performance of the Work or any part thereof shall be included in the Bid price for doing the Work. Contractor shall defend, indemnify and hold harmless District and each of its officers, employees, consultants and agents, including, but not limited to, the Board, Engineer and each District representative, from all damages, claims for damages, costs or expenses in law or equity, including attorney’s fees, arising from or relating to any claim that any article supplied or to be supplied under the Contract Documents infringes on the patent rights, copyright, royalties, trade name, trademark, service mark, trade secret or other intellectual property right of any person or persons or that the person or entity supplying the article does not have a lawful right to sell the same. Such costs or expenses for which Contractor agrees to indemnify and hold harmless the above indemnities include but are not limited to any and all license fees, whether such fees are agreed by any indemnitee or ordered by a court or administrative body of any competent jurisdiction.

L. Substitution for Patented and Specified Articles

Except as noted specifically in Specifications, whenever in Specifications, material or process is designated by patent or proprietary name or by name of manufacturer, such designation shall be deemed to be used for purpose of facilitating description of material and process desired, and shall be deemed to be followed by the words “or equal” and Contractor may offer any substitute material or process that Contractor considers equal in every respect to that so designated and if material or process offered by Contractor is, in opinion of District, equal in every respect to that so designated, its use will be approved. However, Contractor may utilize this right only by timely submitting SECTION 00660 (Substitution Request Form) as provided in SECTION 00200 (Instructions to Bidders). A substitution will be approved only if it is a true “equal” item in every aspect of its design and quality, including but not limited to its dimensions, weights, service requirements, durability, functioning, impact on contiguous construction elements, overall schedule and design.

M. Interest of Public Officers

No representative, officer, or employee of District, no member of the governing body of the locality in which the Project is situated, no member of the locality in which District was activated, and no other public official of such locality or localities who exercises
any functions or responsibilities with respect to the Project, during the tenure of the official or for one year thereafter, shall, as principal, agent, attorney or otherwise, be directly or indirectly interested, in the Contract Documents or the proceeds thereof.

N.  Limit of Liability

DISTRICT, AND EACH OF ITS OFFICERS, BOARD MEMBERS, EMPLOYEES, CONSULTANTS AND AGENTS INCLUDING, BUT NOT LIMITED TO, ENGINEER AND EACH OTHER DISTRICT REPRESENTATIVE, SHALL HAVE NO LIABILITY TO CONTRACTOR FOR SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, EXCEPT TO THE LIMITED EXTENT THAT THESE CONTRACT DOCUMENTS OR APPLICABLE PUBLIC CONTRACTING STATUTES MAY SPECIFY THEIR RECOVERY.

O.  Severability

Any provisions or portions thereof of Contract Documents that are prohibited by, unlawful, or unenforceable under any applicable law of any jurisdiction shall as to such jurisdiction be ineffective without affecting other provisions or portions thereof in the Contract Documents.

14. MODIFICATIONS OF CONTRACT DOCUMENTS

A.  Alterations, Modifications and Force Account Work

1. No modification or deviation from the Drawings and Specifications will be permitted except by written Contract Modification.

2. District may, without notice to the sureties, make alterations, deviations, additions to, or deletions from Contract Documents; increase or decrease the quantity of any item or portion of the Work; expand, contract or otherwise change the Contract Time; delete any item or portion of the Work; and require extra Work. Contractor shall perform such Work under applicable provisions of the Contract Documents, unless specifically provided otherwise at the time the change is ordered. In the case of any ordered extra Work, Owner reserves the right to furnish all or portions of associated labor, material, and equipment, which Contractor shall accept and use without payment for costs, markup, profit, or otherwise for such District-furnished labor, materials, and equipment.

3. District may make changes to the Work during the course of construction to bring the Work into compliance with environmental requirements or standards established by state and federal statutes and regulations enacted after the Contract has been awarded. Contractor shall be compensated for changes affecting the Contract Time or Contract Sum of the Work as set forth in this Article 14 and in Section 01250 (Modification Procedures).

4. Changes affecting the Contract Time or Contract Sum of the Work shall be set forth in a written Change Order that shall specify:
   a. The Work performed in connection with the change to be made;
   b. The amount of the adjustment of the Contract Sum, if any, and the basis for compensation for the Work ordered; and
   c. The extent of the adjustment in the Contract Time, if any.
5. A Change Order will become effective when signed by District. If District exercises its right to decide disputed issues pertaining to changed Work as set forth in Articles 12 and 14 of this SECTION 00700, then the resulting Change Order shall be effective when signed by District, notwithstanding that Contractor has not signed it.

6. Changes not affecting the Contract Time or Contract Sum of the Work, in District’s discretion, may be set forth in a written RFI-Reply executed by District. Execution of such an RFI-Reply constitutes Contractor’s agreement to make the specified change without change to the Contract Sum or the Contract Time.

7. Changes or deviations from Contract Documents affecting the Contract Time or Contract Sum of the Work shall not be made without the authority of an effective Change Order or Construction Change Directive as provided in Section 01250 (Modification Procedures), except in cases of emergency discussed in Article 16 of this SECTION 00700.

8. If changes ordered in design, workmanship or materials are of such a nature as to increase or decrease the cost of any part of the Work, the price fixed in the Contract Documents shall be increased or decreased by the amount that Contractor and District may agree upon as a reasonable and proper allowance for the cost increase or decrease. If an agreement cannot be reached, then District will reach a determination, which shall be final, subject to Contractor’s rights under Article 12 of this SECTION 00700. In all cases Contractor shall perform the changed Work as directed by District subject to Contractor’s rights under Article 12 of this SECTION 00700.

9. Contractor shall, upon District’s request, permit inspection of the original unaltered Bid estimate, subcontract agreements, purchase orders relating to the change, and documents substantiating all costs associated with its cost proposal or claims arising from changes in the Work.

10. Changes in the Work made pursuant to this Article 14 and extensions of Contract Time necessary by reason thereof shall not in any way release the guaranties and warranties given by Contractor pursuant to provisions of the Contract Documents, nor shall such changes in the Work relieve or release the Sureties of bonds executed pursuant to said provisions. The Sureties, in executing such bonds, shall be deemed to have expressly agreed to any such change in the Work and to any extension of time made by reason thereof.

11. Procedures for Modifications of Contract Documents and for calculating the cost of extra Work are given in Section 01250 (Modification Procedures). Regarding delay and impact costs of any nature, Contractor may not seek delay compensation for on-Site or off-Site costs based on formulas, e.g., “Eichlay” or other formula. Rather, Contractor shall prove actual costs resulting from such delays. If Contractor requests compensation for delay to the construction, then Contractor shall prove and document actual costs plus markup per the cost categories and procedures in Section 01250 (Modification Procedures) in order to request, claim or prove compensation for delay.
12. Change Orders in excess of District’s approved limit must be approved by the District’s Board of Directors and a performance bond rider covering the changed Work executed before proceeding with the changed Work. Contractor is charged with knowledge of District’s approved Change Order limits and procedures in effect at the applicable time.

15. TIME ALLOWANCES

A. Time Allowances for Performance Of Contract Documents

1. When Contractor and District have signed the Contract Documents, District will serve a Notice to Proceed upon Contractor to that effect, either by depositing notice in a post office or post office box regularly maintained by United States Postal Service in a pre-paid wrapper directed to Contractor at legal address or (at District’s option) by delivery by other means authorized for notices under the Contract documents at legal address.

2. The start date for Contract Time shall be on the date indicated in the applicable Notice to Proceed. If no date is indicated, the start date for Contract Time shall be the fifth Day from the date that Contractor receives, by hand or overnight delivery or facsimile transmission, District’s written Notice to Proceed, unless the Notice to Proceed is served by mail only, in which case the start date for Contract Time shall be the fifth Day following the mailing date. The total number of Days for completion of the Work under the Contract Documents shall be as provided in SECTION 00520 (Agreement).

B. Entitlement to Change of Contract Time

1. The Contract Time may only be changed by Change Order or by Contract Modification, and all time limits stated in the Contract Documents are of the essence of Contract Documents.

2. The Contract Time will be adjusted in an amount equal to the time lost due to:
   a. Changes in the Work ordered by District;
   b. Acts or neglect by District, Engineer, any District representative, utility owners or other contractors performing other work, provided that Contractor has fully and completely performed its responsibilities under the Contract Documents; or
   c. Fires, floods, epidemics, abnormal weather conditions beyond the parameters otherwise set forth in this paragraph 15.B, earthquakes, civil or labor disturbances, strikes or acts of God, provided damages resulting therefrom are not the result of Contractor’s failure to protect the Work as required by Contract Documents.

3. The Contract Time shall not be extended for any cause identified in paragraph 15.B.2 above, however, unless:
   a. Contractor actually has been prevented from completing any part of the Work within the Contract Time due to delay that is beyond Contractor’s control and due to reasons for which Contractor is not responsible (delays attributable to and within the control of a Subcontractor, or its
subcontractors, or supplier shall be deemed to be delays within the control of Contractor); 

b. A claim for delay is made as provided herein; and 
c. Contractor submits a Time Impact Evaluation as required under Section 01320 (Progress Schedules and Reports) that demonstrates actual delay to critical Work activities that actually delay the progress of the Work in the amount of time requested.

4. Where Contractor is prevented from completing any part of the Work within the Contract Time due to delay beyond the control of both District and Contractor (including, but not limited to, adverse weather of all types and acts of other contractors or utilities), an extension of Contract Time, in an amount equal to the time lost due to such delay (without compensation), shall be Contractor’s sole and exclusive remedy for such delay.

5. Delays due to abnormal or adverse weather conditions will not be allowed for weather conditions that fall within the parameters listed or referenced in this paragraph 15.B.5. Adverse weather delays may be allowed only if the number of workdays of adverse weather exceeds these parameters on a monthly basis and Contractor proves that adverse weather actually caused delays. Contractor shall give written notice of intent to claim an adverse weather day within one Day of the adverse weather day occurring. See SECTION 00800 (Supplementary General Conditions) for precipitation parameters.

6. Contractor shall include the foregoing precipitation parameters as a monthly activity in its progress schedule. As Work on the critical path is affected by precipitation, Contractor shall notify District and request that the days be moved to the affected activities. Any adverse weather days remaining shall be considered Project float.

7. Adverse weather delay for precipitation shall be recognized for the actual period of time Contractor proves it was delayed by precipitation exceeding the specified parameters. For example, and not by way of limitation, if precipitation exceeding the specified parameters does not in fact delay Contractor’s progress on the critical path, then no time extension shall be recognized; and conversely, if Contractor proves to District’s satisfaction that precipitation exceeding the specified parameters causes delay to Contractor for a period longer than the number of precipitation days incurred (e.g., if it rains or snows during grading work), then Contractor shall be entitled to a time extension equal to the actual period of such delay.

8. Contractor shall take reasonable steps to mitigate potential weather delays, such as dewatering the Site, and covering Work and material that could be affected adversely by weather. Failure to do so shall be cause for District to not grant a time extension due to adverse weather, where Contractor could have avoided or mitigated the potential delay by exercising reasonable care.

C. Notice of Delay

Within seven Days of the beginning of any delay, Contractor shall notify District in writing, by submitting a notice of potential claim, of all anticipated delays resulting from
the delay event in question. Any request for extension of time shall be accompanied by Contractor’s written statement that the adjustment claimed is the entire adjustment to which the claimant is entitled as a result of the occurrence of said event, and shall include a written schedule document that demonstrates delay to the critical path using a Time Impact Evaluation as specified in Section 01320 (Progress Schedules and Reports). District will determine all claims and adjustments in the Contract Time. No claim for an adjustment in the Contract Time will be valid and such claim will be waived if not submitted in accordance with the requirements of this paragraph 15.C.

D. Time Extensions and/or Damages Entitlements for Delays

1. Contractor may receive a time extension and be compensated for delays caused directly and solely by District.

2. Contractor may receive a time extension without compensation for delays resulting in whole or in part from causes beyond the reasonable control of Contractor and District, e.g. adverse weather conditions exceeding Contract Documents parameters, earthquakes, Acts of God and epidemics. In such cases, a time extension without compensation shall constitute Contractor’s sole and exclusive remedy for such delays.

3. Contractor shall not be entitled to any time extension or compensation including, but not limited to, extended field or home office overhead, field supervision, costs of capital, interest, escalation charges, acceleration costs or other impacts for any delays caused in whole or in part by Contractor’s failure to perform its obligations under the Contract Documents, or during periods of delay concurrently caused by Contractor and either District or others.

4. Contractor shall not be entitled to damages for delay to the Work caused by the following reasons:
   a. District’s right to sequence the Work in a manner which would avoid disruption to District’s tenants and their contractors or other prime contractors and their respective subcontractors, exercised as a result of Contractor’s failure to perform its cooperation and coordination responsibilities required by Contract Documents; District’s enforcement of any government act or regulation; or the provisions of the Contract Documents;
   b. For changed Site conditions that are beyond the parties’ contemplation, except that District may approve direct costs associated with unknown conditions (but not costs or damages which result from such delays); and
   c. Extensive requests for clarifications to Contract Documents or Contract Modifications thereto, provided such clarifications or Contract Modifications are processed by District or its consultants in a reasonable time commensurate with Contract Documents requirements.

E. Liquidated Delay Damages And Other Consequential Damages

1. Time is of the essence. Execution of Contract Documents by Contractor shall constitute acknowledgement by Contractor that Contractor understands, has ascertained and agrees that District will actually sustain
damages in the amount fixed in the Contract Documents for each and every Day during which completion of Work required is delayed beyond expiration of time fixed for completion or extensions of time allowed pursuant to provisions hereof. Contractor and District agree that specified measures of liquidated damages shall be presumed to be the delay damages actually sustained by District as defined below, and that because of the nature of the Project, it would be impracticable or extremely difficult to fix the actual delay damages.

2. Liquidated damages shall be considered not as a penalty but as agreed monetary damage sustained by District because Contractor failed to perform and complete Work within time fixed for completion or extensions of time allowed pursuant to provisions hereof. Liquidated damages for delay shall not be deemed to include within their scope additional damages or administrative costs arising from causes other than delay in the completion of Work, such as damages incurred from Defective Work, claims and fines of regulatory agencies, etc. Contractor shall be fully responsible for the actual amount of any such consequential non-delay damages it causes, in addition to being responsible for the liquidated delay damages otherwise due District.

3. District may deduct from any money due or to become due to Contractor subsequent to time for completion of entire Work and extensions of time allowed pursuant to provisions hereof, a sum representing then-accrued liquidated damages. Should Contractor fall behind the approved Progress Schedule, District may deduct liquidated damages based on its estimated period of late completion. District need not wait until Final Completion to withhold liquidated damages from Contractor’s progress payments. Should money due or to become due to Contractor be insufficient to cover aggregate liquidated damages due, then Contractor forthwith shall pay the remainder of the assessed liquidated damages to District.

16. WORKING CONDITIONS AND PREVAILING WAGES

A. Use of Site/Sanitary Rules

1. All portions of the Work shall be maintained at all times in neat, clean and sanitary condition. Contractor shall furnish toilets for use of Contractor’s and Subcontractors’ employees on the Site where needed, and their use shall be strictly enforced. All toilets shall be properly secluded from public observation, and shall be located, constructed and maintained subject to District’s approval.

2. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Site and land areas identified in and permitted by Contract Documents and other land and areas permitted by applicable laws and regulations, rights of way, permits and easements or as designated by District, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, any improvement located thereon, or to the owner or occupant thereof resulting from the performance of Work.
3. During the progress of the Work, Contractor shall keep the Site and the Project free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, Contractor shall remove all waste materials, rubbish and debris from and about the Site as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall leave the premises clean and ready for occupancy by District at Substantial Completion of Work. Contractor shall restore to original condition all property not designated for alteration by Contract Documents.

4. Contractor shall not load nor permit any part of any structure or pavement to be loaded in any manner that will endanger the structure or pavement, nor shall Contractor subject any part of Work or adjacent property to stresses or pressures that will endanger it. Contractor shall conduct all necessary existing conditions investigation regarding structural, mechanical, electrical or any other system existing, shall perform Work consistent with such existing conditions, and shall have full responsibility for insufficiencies or damage resulting from insufficiencies of existing systems, equipment or structures to accommodate performing the Work.

B. Protection of Work, Persons, Property And Operations

1. Contractor shall be responsible for initiating, maintaining, coordinating with the District as required, and supervising all safety precautions and programs in connection with Work. Contractor shall comply with all safety requirements specified in the contract documents and any safety program submitted and reviewed by District, or required by state, federal or local laws and ordinances. Contractor shall be responsible for all damage to Work, property or structures, all injuries to persons, and all damage and interruptions to District’s operations, arising from the performance of Work of the Contract Documents. Except as otherwise expressly approved by District in writing, Contractor shall at all times perform all Work in a manner which does not interrupt, damage or otherwise adversely impact any facilities, operations, or real or personal property of District, its officers, employees, agents, invitees, licensees, lessees or contractors.

2. Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property.

3. Contractor shall remedy all damage, injury, loss or interruption to any property or operations referred to in paragraph 16.B.1 of this SECTION 00700, caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, supplier, or any other person or organization directly or indirectly employed by any of them to perform or furnish any Work or anyone for whose acts any of them may be liable. Contractor’s duties and responsibility for safety and for protection of Work shall continue until such
time as all the Work is completed and Final Acceptance of the Work. District and its agents do not assume any responsibility for collecting any indemnity from any person or persons causing damage to Contractor’s Work.

4. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be accident prevention and the implementing, maintaining and supervising of safety precautions and programs.

5. District may, at its option, retain such moneys due under the Contract Documents as District deems necessary until any and all suits or claims against Contractor for injury to persons, property or operations shall be settled and District receives satisfactory evidence to that effect.

C. Responsibility for Safety and Health

1. Contractor shall ensure that its and each tier of Subcontractors’ employees, agents, and invitees comply with applicable health and safety laws while at the Site. These laws include, but are not limited to, the California Labor Code Sections 6400-6413.5 and California Code of Regulation, Title 8, Div. 1, Chapter 4.

2. Contractor shall be fully responsible for the safety of its and its Subcontractors’ employees, agents and invitees on the Site. Contractor shall notify District, in writing, of the existence of hazardous conditions, property or equipment at the Site that are not under Contractor’s control. Contractor shall be responsible for taking all the necessary precautions against injury to persons or damage to the property of Contractor, Subcontractors or persons from reasonably anticipated and recognized hazards until the responsible party corrects the hazard.

3. Contractor shall confine all persons acting on its or its Subcontractors’ behalf to that portion of the Site where Work under the Contract Documents is to be performed: District designated routes for ingress and egress thereto and any other District designated area. Except those routes for ingress and egress over which Contractor has no right of control, within such areas, Contractor shall provide safe means of access to all places at which persons may at any time have occasion to be present.

D. Emergencies

In emergencies affecting the safety or protection of persons or Work or property at the Site or adjacent thereto, Contractor, without special instruction or authorization from District, is obligated to act to prevent threat and damage, injury or loss, until directed otherwise by District. Contractor shall give District prompt written notice if Contractor believes that any significant changes in Work or variations from Contract Documents have been caused thereby. If District determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Change Order or Construction Change Directive will be issued to document the consequences of such action.
E. **Use of Roadways And Walkways**

Contractor shall not unnecessarily interfere with use of any roadway, walkway or other facility for vehicular or pedestrian traffic. Before beginning any interference and only with District’s prior concurrence, Contractor may provide detour or temporary bridge for traffic to pass around or over the interference, which Contractor shall maintain in satisfactory condition as long as interference continues. Unless otherwise provided in the Contract Documents, Contractor shall bear the cost of these temporary facilities.

F. **Nondiscrimination**

No person or entity shall discriminate in the employment of persons upon public works because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sexual preference, or gender of such persons, except as provided in Section 12940 of the Government Code. Every contractor for public works violating the provisions of Section 1735 of the Labor Code is subject to all the penalties imposed for a violation of Chapter 1, Part 7, Division 2 of the Labor Code.

G. **Prevailing Wages**

1. Contractor shall pay to persons performing labor in and about Work provided for in the Contract Documents an amount equal to or more than the general prevailing rate of per diem wages for (1) work of a similar character in the locality in which the Work is performed and (2) legal holiday and overtime work in said locality. The per diem wages shall be an amount equal to or more than the stipulated rates contained in a schedule that has been ascertained and determined by the Director of the State Department of Industrial Relations and District to be the general prevailing rate of per diem wages for each craft or type of workman or mechanic needed to execute this Contract. Contractor shall also cause a copy of this determination of the prevailing rate of per diem wages to be posted at each Site.

2. Contractor shall forfeit, as a penalty to District, Fifty Dollars ($50.00) for each laborer, workman, or mechanic employed in performing labor in and about the Work provided for in the Contract Documents for each Day, or portion thereof, that such laborer, workman or mechanic is paid less than the said stipulated rates for any work done under the Contract Documents by him or her or by any Subcontractor under him or her, in violation of Articles 1 and 2 of Chapter 1 of Part 7 of Division II of the California Labor Code. The sums and amounts which shall be forfeited pursuant to this paragraph 16.G.2 and the terms of the Labor Code shall be withheld and retained from payments due to Contractor under the Contract Documents, pursuant to this SECTION 00700 and the Labor Code, but no sum shall be so withheld, retained or forfeited except from the final payment without a full investigation by either the State Department of Industrial Relations or by District. The Labor Commissioner pursuant to Labor Code Section 1775 shall determine the final amount of forfeiture.

3. Contractor shall insert in every subcontract or other arrangement which Contractor may make for performance of work or labor on Work provided...
for in the Contract, provision that Subcontractor shall pay persons performing labor or rendering service under subcontract or other arrangement not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the Work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed in the Labor Code.

4. Contractor stipulates that it shall comply with all applicable wage and hour laws, including without limitation Labor Code Section 1813.

H. Environmental Controls

Contractor shall comply with all rules, regulations, ordinances, and statutes that apply to any work performed under the Contract Documents including, without limitation, any toxic, water and soil pollution controls and air pollution controls specified in Government Code, Section 11017. Contractor shall be responsible for insuring that Contractor’s employees, Subcontractors and the public are protected from exposure to airborne hazards or contaminated water, soil or other toxic materials used during or generated by activities on the Site or associated with the Project.

I. Cal-OSHA Permits

Contractor shall submit to District a detailed plan showing the shoring, bracing and sloping design and other provisions to be made for worker protection from the hazard of caving ground during the excavation as required by Section 01340 (Safety Submittals) The Contractor shall comply with Labor Code Section 6500, and shall obtain, as applicable, all required permits for the following:

1. Construction of trenches or excavations that are five feet or more in depth and into which a person is required to descend.
2. Construction or demolition of any building, structure, or scaffolding for falsework more than three stories high, or the equivalent height (36 feet).
3. The underground use of diesel engines in mines or tunnels.

END OF SECTION
SECTION 00800

SUPPLEMENTARY GENERAL CONDITIONS

1. SUMMARY

This document includes requirements that supplement the paragraphs of SECTION 00700 (General Conditions).

2. SUPPLEMENT TO PARAGRAPH 15.B.5

Placerville Station

Precipitation parameters are as follows, pro-rated in the individual month Contractor starts and finishes Work:
January, [8]; February, [8]; March, [8]; April, [5]; May, [3]; June, [1]; July, [0]; August, [0]; September, [1]; October, [3]; November, [6]; and December, [8].

In order to qualify as an adverse weather delay with respect to the foregoing parameters, daily snow must exceed 6 inches or more, or daily rain must exceed 0.1 of an inch or more, at the Placerville, California station, as measured by the National Oceanic & Atmospheric Administration, and Contractor shall prove that the precipitation actually caused delay as set forth in paragraph 15.B.7 of SECTION 00700 (General Conditions).

END OF SECTION
SECTION 00821

INSURANCE

A. At or before the date specified in SECTION 00200 (Instructions to Bidders), Contractor shall furnish to District satisfactory proof that Contractor has in force continuously for the entire period covered by the Contract the following classes of insurance in the form and with limits specified below:

1. **Comprehensive or Commercial General Liability Insurance** covering claims for personal injury, bodily injury and property damage arising out of the Work and in a form providing coverage not less than that of a standard Commercial General Liability Insurance policy ("Occurrence Form"). Such insurance shall provide for all operations and include independent contractors, products liability, completed operations for one year after Final Completion of the last Phase to be completed and acceptance of the final payment for the Work, contractual liability, and coverage for explosion, collapse and underground hazards. The limits of such insurance shall not be coverage of less than $1,000,000 each occurrence, $2,000,000 general aggregate limit, and $2,000,000 aggregate for products and completed operations. The policies shall be endorsed to provide Broad Form Property Damage Coverage.

2. **Comprehensive Automobile Liability Insurance** covering all owned, non-owned, and hired vehicles. Such insurance shall provide coverage not less than the standard Comprehensive Automobile Liability policy with limits not less than $1,000,000 each person Bodily Injury, $1,000,000 each occurrence Bodily Injury and $1,000,000 each occurrence Property Damage (or $1,000,000 combined single limit, each accident).

3. **All-Risk Course of Construction Insurance** for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, collapse, debris removal, demolition occasioned by enforcement of Laws, water damage, flood, and damage caused by frost and freezing, in the amount of 100 percent of the completed value of the Work to be performed under this Contract. Each loss shall be borne by Contractor.

4. **Workers’ Compensation and Employer’s Liability Insurance** for all persons whom the Contractor may employ in carrying out Work contemplated under Contract Documents, in accordance with California Labor Code section 3200 et seq. in the statutory amount.

B. Regardless of these contract minimum insurance requirements, the contractor and its insurer shall agree to commit the contractor’s full policy limits and these minimum requirements shall not restrict the contractor’s liability or coverage limit obligations.

C. All policies of insurance shall be placed with insurers acceptable to District. The insurance underwriter(s) must be duly licensed and admitted to do business in the State of California and (other than for workers’ compensation insurance provided by the State Compensation Insurance Fund) must have an A. M. Best Company rating of A-,VII or better.
D. The District retains the right to increase insurance requirements when additional risk exposures are evident. Contractor shall increase the required insurance amounts contained herein upon direction by District.

E. Required Endorsements: The policies required under paragraphs A.1, A.2, A.3 and A.4 of this SECTION 00821 shall be endorsed, in a form and manner acceptable to District, as follows:

1. Name El Dorado Irrigation District, its Board of Directors, the County of El Dorado and their employees, representatives, consultants (including without limitation Engineer), and agents, as additional insureds, but only with respect to liability arising out of the activities of the named insured.

2. Name El Dorado Irrigation District as Loss Payee as its interests may appear with respect to the All-Risk Course of Construction insurance.

3. Each such policy shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limit of the insurance company’s liability required under paragraphs A.1, A.2 and A.4 of this SECTION 00821.

4. Insurance shall be primary and no other insurance or self-insured retention carried or held by District shall be called upon to contribute to a loss covered by insurance for the named insured.

5. Workers’ Compensation and Employer's Liability insurance shall contain a provision requiring the insurance carrier to waive its rights of subrogation against District and all additional insureds, as well as other insurance carriers for the Work.

F. Declarations Pages Required. Contractor or its insurance broker shall submit a copy of the Declarations page for each policy under Sections A.1 and A.2 above. The page shall include the name of the carrier, the policy number, the types of coverage and limits, the effective dates of the policy, and the broker’s name and license number.

G. Certificates of insurance and endorsements shall have clearly typed thereon District Contract Number and title of Contract Documents. Written notice of cancellation, non-renewal, or reduction in coverage of any policy shall be mailed to District (Attention: Risk Analyst) at the address listed in SECTION 00520 (Agreement), 30 Days in advance of the effective date of the cancellation, non-renewal, or reduction in coverage. Contractor shall maintain insurance in full force and effect during entire period of performance of Contract Documents. Contractor shall keep insurance in force during warranty and guarantee periods, except that Contractor may discontinue All-Risk Course of Construction Insurance after Final Payment. At time of making application for extension of time, and during all periods exceeding the Contract Time resulting from any cause, Contractor shall submit evidence that insurance policies will be in effect during requested additional period of time. Upon District’s request, Contractor shall submit to District, within 30 Days, copies of the actual insurance policies or renewals or replacements.

H. Contractor shall pay all insurance premiums, including any charges for required waivers of subrogation or the endorsement of additional insureds. If Contractor fails to maintain insurance, District may take out comparable insurance, and deduct and retain amount of premium from any sums due Contractor under Contract Documents.

I. Unless otherwise covered by insurance, if injury occurs to any employee of Contractor, Subcontractor or sub-subcontractor for which the employee, or the employee’s dependents in the event of employee’s death, is entitled to compensation from District
under provisions of the Workers’ Compensation Insurance and Safety Act, as amended, or for which compensation of any kind is claimed from District, District may retain out of sums due Contractor under Contract Documents, amount sufficient to cover such compensation, as fixed by the Act, as amended, until such compensation is paid, or until it is determined that no compensation is due. If District is compelled to pay such compensation, District may, in its discretion, either deduct and retain from the Contract Sum the amount so paid, or require Contractor to reimburse District.

J. Nothing in this SECTION 00821 shall be construed as limiting in any way the extent to which Contractor or any Subcontractor may be held responsible for payment of damages resulting from their operations.

K. Except that Subcontractors need obtain only $1,000,000 of Comprehensive General Liability insurance, all Subcontractors shall maintain the same insurance required to be maintained by Contractor with respect to their portions of the Work, and Contractor shall cause the Subcontractors to furnish proof thereof to District within ten Days of District's request.

L. The following provisions apply to any licensed professional engaged by Contractor to perform portions of the Work (“Professional”). Each Professional shall maintain the following insurance at its sole cost and expense:

a. Provided such insurance is customarily required by District when professionals engaged in the profession practiced by Professional directly contract with District, Professional Liability Insurance, insuring against professional errors and omissions arising from Professional’s work on the Project, in an amount not less than $1,000,000 combined single limit for each occurrence. If Professional cannot provide an occurrence policy, Professional shall provide insurance covering claims made as a result of performance of Work on this Project and shall maintain such insurance in effect for not less than three years following Final Completion of the Project.

b. All insurance required by paragraphs A.1, A.2 and A.4 of this SECTION 00821. Professional shall satisfy all other provisions of paragraphs A, B, C, D, E, F, G, H and I of this SECTION 00821 relating to that insurance, including without limitation providing required insurance certificates (containing the required endorsements) and declarations pages before commencing its Work on the Project.
SECTION 00822

APPRENTICESHIP PROGRAM

Contractor and Subcontractors shall comply with the requirements of California Labor Code Sections 1776, 1777.5, and 1777.6 concerning the employment of apprentices by Contractor or Subcontractors. Willful failure to comply may result in penalties, including loss of the right to Bid on or receive public works contracts.

Section 1777.5, as amended, requires a Contractor or Subcontractor employing tradespersons in any apprenticeable occupation to apply to the joint apprenticeship committee nearest the site of a public works project and which administers the apprenticeship program in that trade for a certification of approval. The certificate shall also fix the ratio of apprentices to journeypersons that will be used in performance of the Contract. The ratio of work performed by apprentices to journeypersons in such cases shall not be less than one hour of apprentices work for every five hours of labor performed by journeypersons (the minimum ratio for the land surveyor classification shall not be less than one apprentice for each five journeypersons), except:

A. When unemployment for the previous three-month period in the area exceeds an average of 15 percent;

B. When the number of apprentices in training in the area exceeds a ratio of one to five;

C. When a trade can show that it is replacing at least 1/30 of its membership through apprenticeship training on an annual basis state-wide or locally; or

D. Assignment of an apprentice to any work performed under a public works contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyperson.

Contractor is required to make contributions to funds established for administration of apprenticeship programs if Contractor employs registered apprentices or journeypersons in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.

Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of the California Department of Industrial Relations, or from the Division of Apprenticeship Standards and its branch offices.

END OF SECTION
This Addendum No. ___ (“Addendum”) as dated above modifies certain Bidding Documents issued by the El Dorado Irrigation District (“District”) in connection with the District’s Outingdale Raw Water Pump Station Upgrade Project. All capitalized terms not otherwise defined herein shall have the meanings provided in the Bidding Documents. There are no other amendments to the Bidding Documents other than expressly contained in this and any other Addenda issued by the District.

Project Manager  
Date

[to be added during bidding phase]

[Sign-up on the District’s website at http://www.eid.org/about-us/advanced-components/enews-sign-up to be notified of addendum postings.]

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01100

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

Section includes summary of Work including:

1.1. Summary
1.2. Work Covered By Contract Documents
1.3. Work Under Other Contracts
1.4. Future Work
1.5. Work Sequence
1.6. Work Days and Hours
1.7. Cooperation of Contractor and Coordination with Other Work
1.8. Maintenance, Product Handling, and Protection
1.9. Partial Occupancy/Utilization Requirements
1.10. Contractor Use of Premises
1.11. Lines and Grades
1.12. Protection of Existing Structures and Utilities
1.13. Damage to Existing Property
1.14. Dust Control
1.15. Parking
1.16. Laydown/Staging Area
1.17. Permits
1.18. Punch List Verification
1.19. Unfavorable Construction Conditions
1.20. Construction Site Access
1.21. Specification Data Sheets and Schedules
1.22. Site Administration

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Work is comprised of: Complete replacement of the existing Raw Water Pump Station for the Outingdale Water Treatment Plant. This includes installation of new pumps, inlet, tank, and access.

B. Furnish all labor, materials, equipment, services, permits, temporary controls and construction facilities, and all general conditions, seismic requirements, general requirements and incidentals required to complete the Work in its entirety as described in the Contract Documents.
C. The Work of this Contract includes work covered by unit prices, allowances, and alternates as shown in SECTION 00400 (Bid Form).

D. The Work of this Contract comprises construction of all the Work indicated, described in the Specifications, or otherwise required by the Contract Documents.

E. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered by Contract Documents shall rest with Contractor until Final Acceptance of the Work.

F. Contractor’s use of the premises for Work and storage is limited to the area indicated.

G. Contractor shall be solely responsible for all utilities (including without limitation electricity, water, gas, etc.) at the Site.

H. Existing materials and equipment removed and not reused as a part of the Work shall be returned to the District. Contractor shall carefully remove, in a manner to prevent damage, all materials and equipment specified or indicated to be salvaged and reused or to remain the property of District. Contractor shall store and protect salvaged items specified or indicated to be reused in the Work.

Salvaged items not to be reused in the Work, but to remain District’s property shall be delivered by Contractor in good condition to District at:

Reservoir 7
2020 Pleasant Valley Road
Placerville, CA 95667

Any items specified or indicated to be salvaged which are damaged in removal, storage, or handling through carelessness or improper procedures shall be replaced by Contractor in kind or with new items.

Contractor may furnish and install new items instead of those specified or indicated to be salvaged and reused, in which case such removed items will become Contractor’s property.

Existing materials and equipment removed by Contractor shall not be reused in the Work, except where so specified or indicated.

1.3 WORK UNDER OTHER CONTRACTS

Work at the Site performed by others includes the following: N/A.
1.4 FUTURE WORK

N/A

1.5 WORK SEQUENCE

A. Construct Work in stages and at times to accommodate District operation requirements during the construction period; coordinate construction schedule and operations with District.

B. Contractor acknowledges that shoring may be required to maintain a safe excavation and protect facilities, including both existing and recently constructed under this Contract. All expenses for shoring of excavations shall be included in the appropriate bid items.

1.6 WORK DAYS AND HOURS

A. Normal working days and hours: Monday-Friday inclusive, 7:00 a.m.-5:00 p.m. local time.

B. In the case of Work by Contractor other than normal working hours, Contractor shall be responsible for any additional inspection costs incurred by the District. Such costs may be withheld from any succeeding monthly progress payment.

C. Connections to Existing Facilities. Unless otherwise specified or indicated, Contractor shall make all necessary connections to existing facilities, including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electric. In each case, Contractor shall receive permission from District or the owning utility prior to undertaking connections.

D. Contractor shall protect facilities against deleterious substances and damage.

1.7 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK

A. Coordinate with District and any District forces, or other contractors and forces, as required by SECTION 00700 (General Conditions), Article 6.

B. Contractor shall coordinate the construction schedule with the schedule of the District for normal power service installation.

C. Noise: Construction activities are to comply with applicable local noise ordinances.
1.8 MAINTENANCE, PRODUCT HANDLING, AND PROTECTION

A. Transport, deliver, handle, and store materials and equipment at the Site in such a manner as to prevent the breakage, damage or intrusions of foreign matter or moisture, and otherwise to prevent damage.

B. Packaging: Provide packaged material in manufacturer’s original containers with seals unbroken and labels intact until incorporated into the Work.

C. Remove all damaged or otherwise unsuitable material and equipment promptly from the Site.

D. Protection: Protect all finished surfaces.

E. Asbestos Removal (other than Naturally Occurring Asbestos, as to which SECTION 00801 applies, if applicable). If, during the progress of the Work, suspected asbestos-containing products are identified, Contractor shall stop work in the affected area and immediately notify the District, and engage an asbestos removal Subcontractor to verify the materials and, if necessary, encapsulate, enclose, or remove and dispose of all asbestos in accordance with current regulations of the Environmental Protection Agency and the U. S. Department of Labor – Occupational Safety and Health Administration, the state asbestos regulating agency, and any local government agency. Payment for such work will be made by Change Order.

Asbestos Removal Subcontractor’s Qualifications. The Subcontractor for asbestos removal shall be a registered Certified Asbestos Consultant in accordance with Title 8, Section 341.6 and .15 who is regularly engaged in this type of activity and shall be familiar with the regulations that govern this work. The Subcontractor shall demonstrate to the satisfaction of District that it has successfully completed at least three asbestos removal projects, that it has the necessary staff and equipment to perform the work, and that it has an approved site for disposal of the asbestos. Liability insurance covering the asbestos abatement work shall be provided as specified in the Supplementary Conditions.

Asbestos Removal Methods. The asbestos removal Subcontractor shall submit a work plan of its proposed removal procedure to District before beginning work and shall certify that the methods are in full compliance with Title 8, Sections 1529 and 5208 and other applicable governing regulations. The work plan shall cover all aspects of the removal, including health and safety of employees and building occupants, hygiene facilities, employee certification, clearance criteria, transportation and disposal, enclosure techniques, and other techniques appropriate for the proposed work.
F. Cost of maintenance of systems and equipment prior to either Substantial Completion or Final Completion will be considered as included in prices bid and no direct or additional payment will be made therefore.

1.9 PARTIAL OCCUPANCY/UTILIZATION REQUIREMENTS

A. Allow District to take possession of and use any completed or partially completed portion of the Work during the progress of the Work as soon as is possible without interference to the Work.

B. Possession, use of Work, and placement and installation of equipment by District shall not in any way evidence the completion of the Work or any part of it.

C. Contractor shall not be held responsible for damage to the occupied part of the Work resulting from District occupancy.

D. Make available, in areas occupied, on a 24-hour per day and 7-day per week basis if required, any utility services, heating, and cooling in condition to be put in operation at the time of occupancy.

   1. Responsibility for operation and maintenance of said equipment shall remain with Contractor.

   2. Make, and District shall certify, an itemized list of each piece of equipment so operated with the date operation commences.

   3. Itemized list noted above shall be basis for commencement of warranty period for equipment.

   4. District shall pay for utility cost arising out of occupancy by District during construction.

E. Use and occupancy by District prior to acceptance of Work does not relieve Contractor of its responsibility to maintain insurance and bonds required under the Contract until entire Work is completed and accepted by District.

F. Prior to date of Final Acceptance of the Work by District, all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor, as required in SECTION 00700 (General Conditions).

G. Use by District of Work or part thereof as contemplated by this Section 01100 Summary of Work shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any
responsibilities under Contract, nor act as waiver by District of any of the conditions thereof.

H. District may specify in the Contract Documents that portions of the Work, including electrical and mechanical systems or separate structures, shall be substantially completed on dates prior to substantial completion of all of the Work. Contractor shall notify District’s Representative and Engineer in writing when Contractor considers any such part of the Work ready for its intended use and substantially complete and request District to issue a Certificate of Substantial Completion for that part of the Work.

1.10 CONTRACTOR USE OF PREMISES

A. Confine operations at Site to areas permitted by Contract Documents, permits, ordinances, and laws.

B. Do not unreasonably encumber Project Site with materials or equipment.

C. Assume full responsibility for protection and safekeeping of products stored on premises.

D. Move any stored products that interfere with operations of District or other contractor.

E. Parking, storage, staging, and work areas shall be coordinated with the District, and comply with all other Contract documents requirements.

1.11 LINES AND GRADES

A. All Work shall be done to the lines, grades, and elevations indicated on the Drawings.

B. District shall provide basic horizontal and vertical control points to be used as datums for the Work. All additional survey, layout, and measurement work shall be performed by Contractor as a part of the Work.

C. Contractor shall provide at its cost an experienced instrument person, competent assistants, and such instruments, tools, stakes and other materials required to complete the survey, layout, and measurement work. In addition, Contractor shall furnish at its cost competent persons and such tools, stakes, and other materials as District (and/or any Engineer) may require in establishing or designating control points, or in checking survey, layout, and measurement work performed by Contractor.
D. Contractor shall keep District informed, a reasonable time in advance, of the
times and places at which it wishes to do Work, so that any checking deemed
necessary by District may be done with minimum inconvenience to District and
minimum delay to Contractor.

E. Contractor shall remove and reconstruct Work which is improperly located.

1.12 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. The Drawings may indicate existing above- and below-grade structures,
drainage lines, storm drains, sewers, water, gas, electrical, hot water, and other
similar items and utilities that are known to District.

B. Contractor shall locate these known existing installations before proceeding
with trenching or other operations which may cause damage, shall maintain
them in service where appropriate, and shall repair any damage to them
caused by the Work, at no increase in Contract Sum.

C. Additional utilities whose locations are unknown to District are suspected to
exist. Contractor must be alert to their existence. If additional utilities are
encountered, Contractor must immediately report to District for disposition.

D. In addition to reporting, if a utility is damaged, Contractor must take appropriate
action as provided in SECTION 00700 (General Conditions).

E. Additional compensation or extension of time on account of utilities not
indicated or otherwise brought to Contractor’s attention including reasonable
action taken to protect or repair damage shall be determined as provided in
SECTION 00700 (General Conditions).

1.13 DAMAGE TO EXISTING PROPERTY

A. Contractor will be responsible for any damage to existing structures, Work,
materials, or equipment because of its operations and shall repair or replace
any damaged structures, Work, materials, or equipment to the satisfaction of,
and at no additional cost to District.

B. Contractor shall protect all existing structures and property from damage and
shall provide bracing, shoring, or other work necessary for such protection.

C. Contractor shall be responsible for all damage to streets, roads, curbs,
sidewalks, highways, shoulders, ditches, embankments, culverts, bridges, or
other public or private property, which may be caused by transporting
equipment, materials, or workers to or from the Work. Contractor shall make
satisfactory and acceptable arrangements with the agency having jurisdiction
over the damaged property concerning its repair or replacement.
1.14 DUST CONTROL

Contractor shall take reasonable measures to prevent unnecessary dust and shall provide safety programs as outlined in Section 01340 (Safety Submittals).

1.15 PARKING

Contractor shall provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Project, as required to avoid any need for parking personal vehicles where they may interfere with public traffic, District’s operations, or construction activities.

1.16 LAYDOWN/STAGING AREA

Contractor shall identify and secure their own laydown and staging area necessary for the project. The size of the staging area shall not cause the size of the project to exceed 1-acre. The Contractor shall be responsible for all site security at all times during the contract duration.

The Contractor shall obtain a signed agreement with the property owner that hold the District, its staff, and Engineer harmless of any damages associated with the use of that project.

1.17 PERMITS

Applicable permits: Permits, agreements, or written authorizations that are known by the District to apply to this project are listed below:

A. All Permits as outlined in Section 01340 (Safety Submittals).

B. All other permits that may be required and have not been applied for shall be obtained by Contractor. Applicable permit fees will be reimbursed to the extent specified in SECTION 00700 (General Conditions).

1.18 PUNCH LIST VERIFICATION

A punch list examination will be performed upon Substantial Completion of Work. One follow-up review of punch list items for each discipline will be provided. If further Site visits are required to review punch list items due to incompleteness of the Work by Contractor, Contractor shall reimburse District for these visits.
1.19 UNFAVORABLE CONSTRUCTION CONDITIONS

During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall confine its operations to Work which will not be affected adversely by such conditions. No portion of the Work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or precautions are taken by Contractor to perform the Work in a proper and satisfactory manner. The Contractor will employ best practices to manage the construction site during inclement weather.

1.20 CONSTRUCTION SITE ACCESS

Contractor shall at all times limit access to the Site to necessary personnel only. All personnel associated with construction of the Project shall enter the site through Contractor’s access gate, at the location indicated on the Drawings. Access for construction personnel shall be limited to 7:00 a.m. to 5:00 p.m. local time. All mail and deliveries (Federal Express, equipment, etc.) shall be sent to a separate address, specifically arranged by Contractor for the Project. Contractor is responsible for providing adequate signage (subject to District approval) to alert delivery persons to the new address. The District will not receive or forward Contractor mail or deliveries.

1.21 SPECIFICATION DATA SHEETS AND SCHEDULES

Specifications may have data sheets and schedules as part of specific specification sections. Locations for data entries on the data sheets and schedules may be left blank intentionally. Each line where data may be entered on the data sheet has a selection box in the column ‘Chk’. When the box for a line is checked and no data is entered in the respective line, this indicates that no data is required for that line of the data sheet.

Other standard codes which apply to the Work are designated in the Specifications.

1.22 SITE ADMINISTRATION

Contractor shall be responsible for all areas of the Site used by it and by all Subcontractors in the performance of the Work. Contractor shall exert full control over the actions of all employees and other persons with respect to the use and preservation of property and existing facilities, except such controls as may be specifically reserved to District or others. Contractor shall have the right to exclude from the Site all persons who have no purpose related to the Work or its inspection, and may require all persons on the Site (except District’s employees) to observe the same regulations as Contractor requires of its employees.
PART 2 PRODUCTS

2.1 PRODUCTS ORDERED IN ADVANCE
N/A

2.2 DISTRICT-FURNISHED PRODUCTS N/A

PART 3 EXECUTION – NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01200

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SUMMARY

Section includes description of requirements and procedures for determining amount of Work performed and for obtaining payment for Work performed.

1.2 REFERENCES

A. California Public Contract Code
B. Code of Civil Procedures
C. Government Code

1.3 SCOPE OF WORK

Work under Contract Documents, or under any Bid Item, allowance, or alternate, shall include all labor, materials, taxes, transport, handling, storage, supervision, administration, and all other items necessary for the satisfactory completion of Work, whether or not expressly specified or indicated.

1.4 GENERAL REQUIREMENTS

Except as otherwise specified, the Contractor shall furnish and place all labor, materials, supplies, transportation, equipment, rentals, tools and incidentals required to complete the work ready for use in conformity with the drawings and specifications. The description of each item is provided for bidding and payment purposes and does not in any way limit the Contractor's responsibility to perform all the work as required by the specifications and drawings.

1.5 DETERMINATION OF QUANTITIES

Quantity of work to be paid for under any item for which a unit price is fixed in Contract Documents shall be number, as determined by District, of units of work satisfactorily completed in accordance with Contract Documents or as directed by District. Unless otherwise provided, determination of number of units of work so completed will be based, so far as practicable, on actual measurement or count within prescribed or ordered limits, and no payment will be made for work done outside of limits. Measurements and computations will be made by methods set forth in Contract Documents, including without limitation this Section 01200. If methods are not so set forth, measurements shall be made in any manner which District considers appropriate for class of Work measured (e.g., pre-assigned...
values, percentage completion, units completed or incremental milestones). Contractor must immediately inform District of any disputes regarding quantity measurements and shall immediately supply District with any documentation supporting the disputed measurements.

1.6 SCOPE OF PAYMENT

A. Except as otherwise expressly stated in Section 01100 (Summary), payment to Contractor at the unit price or other price fixed in Contract Documents for performing Work required under any item, or (if the Contract is on a single lump sum price basis) at the lump sum price fixed in the Contract Documents for performing all Work required under Contract Documents, and as either may be adjusted pursuant to any approved Change Order or Construction Change Directive, shall be full compensation for completing, in accordance with Contract Documents, all Work required under the item or under Contract Documents, and for all expense incurred by Contractor for any purpose in connection with the performance and completion of said Work, including all incidental work necessary for completion of the Work.

B. The Contract Sum, whether lump sum, unit price or otherwise, shall be deemed to include all costs necessary to complete required Work, all costs (if any) for loss or damage arising from nature of Work or prosecution of the Work, and from action of elements. Unless Contract Documents expressly provide otherwise, the Contract Sum shall be deemed to include:

1. Any and all costs arising from any unforeseen difficulties which may be encountered during, and all risks of any description connected with, prosecution of Work or prosecution of Bid Item (whether lump sum or unit price) until acceptance by District;

2. All expenses incurred due to suspension, or discontinuance of Work or discontinuance of Bid Item (whether lump sum or unit price) as provided in Contract Documents;

3. Escalation to allow for cost increases between time of Contract Award and completion of Work or completion of Bid Item (whether lump sum or unit price).

C. Whenever it is specified herein that Contractor is to do work or furnish materials of any class for which no price is fixed in Contract Documents, it shall be understood that Contractor is to do such work or furnish such materials without extra charge or allowance or direct payment of any sort, and that cost of doing work or furnishing materials is to be included in price Bid, unless it is expressly specified herein, in particular cases, that work or material is to be paid for as extra work.
D. Unit Prices shall apply to work covered by unit prices regardless of actual quantities performed on the Project.

E. No payment shall be made for materials or equipment not yet incorporated into the Work, except as specified in this Section 01200.

F. The District may, in its discretion, where Contractor requests payment on the basis of materials and equipment not incorporated in the Work, require Contractor to satisfy the following conditions:

1. The materials and/or equipment shall be delivered and suitably stored at the Site or at another local location agreed to in writing, for example, a mutually acceptable warehouse;

2. Full title to the materials and/or equipment shall vest in District at the time of delivery to the Site, warehouse or other storage location;

3. Obtain a negotiable warehouse receipt, endorsed over to District for materials and/or equipment stored in an off-site warehouse. No payment will be made until such endorsed receipts are delivered to District;

4. Stockpiled materials and/or equipment shall be available for District inspection, but District shall have no obligation to inspect them and its inspection or failure to inspect shall not relieve Contractor of any obligations under the Contract Documents. Materials and/or equipment shall be segregated and labeled or tagged to identify these specific Contract Documents;

5. After delivery of materials and/or equipment, if any inherent or acquired defects are discovered, defective materials and/or equipment shall be removed and replaced with suitable materials and/or equipment at Contractor’s expense;

6. At Contractor’s expense, insure the materials and/or equipment against theft, fire, flood, vandalism, and malicious mischief, as well as any other coverages required under the Contract Documents;

7. Contractor’s Application for Payment shall be accompanied by a bill of sale, invoice or other documentation warranting that District has received the materials and equipment free and clear of all liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect District’s interest therein, all of which must be satisfactory to District. This documentation shall include, but not be limited to, conditional releases of mechanics’ liens and stop notices from all those providing materials and equipment as to which the Application for Payment relates, as well as unconditional releases of the same from the
same as to the previous Application for Payment for which they have not already been provided.

8. Amounts previously paid for materials and equipment prior to incorporation into the Work shall be deducted from amounts otherwise due Contractor as they are incorporated.

1.7 BASIS OF PAYMENT

A. Unit Price Quantities: When estimated quantity for specific portions of Work is listed in Bid Form, quantity of Work to be paid for shall be actual number of units satisfactorily completed, as determined by District and certified by Contractor, in accordance with Contract Documents.

B. Lump Sum: When estimated quantity for specific portion of Work is not indicated and unit is designated as lump sum, payment will be on a lump sum basis for Work satisfactorily completed in accordance with Contract Documents.

C. Allowances: Allowance items (if any) will be paid for as provided in Section 01100 (Summary). Funds authorized for Allowance work will not be released for Contract payments unless District has authorized Allowance work in writing.

D. District does not expressly, or by implication, agree, warrant, or represent in any manner, that actual amount of Work will correspond with amount shown or estimated and reserves right to increase or decrease amount of any class or portion of Work, to leave out entire Bid Item or Items, or to add work not originally included in Bid or Contract Documents, when in its judgment such change is in best interest of District. No change in Work shall be considered a waiver of any other condition of Contract Documents. No claim shall be made for anticipated profit, for loss of profit, for damages, or for extra payment whatever, except as otherwise expressly provided for in Contract Documents, because of any differences between amount of work actually done and estimated amount as set forth herein, or for elimination of Bid Items.

1.8 BID ITEMS, ALLOWANCES, AND ALTERNATES

A. Any Bid Item may be deleted from the Work and Contract Sum, in total or in part, prior to or after award of Contract without compensation in any form or adjustment of other Bid Items or prices therefore.

B. Payment of all items is subject to provisions of Contract Documents, including without limitation Section 01200 (Measurement and Payment).

C. For all Bid Items, furnish and install all work indicated and described in Specifications and all other Contract Documents, including connections to
existing systems. Work and requirements applicable to each individual Bid Item, or unit of Work, shall be deemed incorporated into the description of each Bid Item (whether Lump Sum, or Unit Price).

The items below are broken down into lump sum and unit price items. The Contractor shall provide bid prices based on the descriptions, plans, and specifications with the understanding that all work must be included in the stipulated items. Payment for lump sum items will be made at the contract lump sum price upon completion, unless otherwise specified. Payment for unit price items will be made at the contract unit price for each unit installed or completed.

All items involving materials and installation are on a furnish and install basis.

In underground installations no extra compensation will be made for removal of surface improvements, excavation regardless of material, over excavation shown or placement and removal of temporary asphalt as required, disposal of surplus material in a lawful manner, bedding, backfill, and compaction, testing, or any other work specified or shown.

Compensation for safety measures, traffic control, cleanup and any site restoration necessary to pre-existing conditions shall be included in the prices of the various contract items of work unless specified elsewhere.

**Item 1 – Bonds and Insurance**

a. Measurement - Bonds and insurance will be measured on a lump sum basis per the estimated percentage of bonds and insurance in place.

b. Payment - Includes full compensation for acquiring and continuing all bonds and insurances necessary for the project for the duration of the project.

**Item 2 – Mobilization and Demobilization**

a. Measurement - Mobilization and demobilization shall be measured on a lump sum basis per the estimated percentage of equipment mobilized and/or demobilized.

b. Payment - Includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals involved in providing equipment necessary to perform the work as specified in the Contract Documents.

**Item 3 – Perform Clearing, Grubbing, Earthwork, Erosion Control, and Excavation**

a. Measurement - Clearing, grubbing, earthwork, erosion control, and excavation shall be measured on a lump sum basis per the estimated percentage of total work performed. Included in this bid item are all costs for labor, tools, and equipment associated with tree and stump removal, pier foundation excavation, concrete
landing subgrade preparation, trench excavation, rock relocation, erosion control, and rock excavation.

Rock Excavation: The Rock Excavation Allowance shall be used for rock excavation beyond which can be accomplished using and medium size excavator (e.g. 70,000 lbs. ISO or SAE machine per 6165 ISO) with digging bucket with teeth or tiger ripper attachment. This item will be monitored by the District’s Inspector, and invoicing shall be on a unit cost basis. Refusal to be considered as the inability of the following equipment to excavate rock as caused by the hardness of the rock: Tractor mounted excavator with digging bucket with rock teeth or tiger ripper attachment, 70,000 lbs. excavator per 6165 ISO. Refusal shall be demonstrated to Engineer prior to rock being deemed inexcavatable. All rock excavation shall be under one classification. This classification shall include solid ledge rock in its natural location that requires systematic quarrying, drilling and/or blasting for its removal and also boulders that exceed 0.25 CY in volume. When rock is encountered, strip free of earth. After verification by a representative of the Owner and/or Engineer that the material encountered is rock (as defined above), Contractor shall employ an independent surveyor to determine rock quantities before removal operation begins. In computing the volumetric content of rock excavation for payment, hydraulic hammering or alternative means approved by the Engineer shall be employed where refusal has been demonstrated and normal excavation procedures are not feasible.

Definition of Rock: Rock encountered during the course of excavation which is sufficiently hard to cause refusal to equipment specified below shall be deemed inexcavatable. Rock deemed inexcavatable shall be removed by substantial means such as reciprocating hydraulic hammers and shall conform to this specification.

b. Payment - Includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals involved in completing the earthwork and rock excavations as specified in the Contract Documents. Payment will be made per the percentage of total work completed approved by the District.

Item 4 – Furnish and Install Concrete Footings, Piers, Slabs, Landings, and Floors

a. Measurement - Concrete will be measured in cubic yards placed for all concrete systems including footings, piers, slabs, landings, floors, curbs, tie-beams, sidewalks, thrust blocks and any other system not listed here. Included in this bid item are all costs for labor, tools, materials and equipment associated with concrete installation. This includes forms, structural steel, and placement whether by tremies, pumps or other methods.

b. Payment - Includes the cubic yards furnished and installed as verified and approved by the District.
Item 5 – Furnish and Install Metal Staircase and Trolley

a. Measurement - The metal staircase and trolley shall be measured on a lump sum basis per the estimated percentage installed and approved according to line items listed in the Contractor’s schedule of values. Payment for the metal staircase and trolley includes all structural components including but not limited to posts, beams, treads, railings, landings, engineered trolley, and miscellaneous components not listed.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the staircase and trolley line items furnished and installed in the Contractor’s schedule of values.

Item 6 – Furnish and Install Metal Deck

a. Measurement - The metal deck shall be measured on a lump sum basis per the estimated percentage of the metal deck installed and approved according to line items listed in the Contractor’s schedule of values. Payment for the metal deck includes all structural components including but not limited to posts, beams, decking, railings and miscellaneous components not listed.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the metal deck line items furnished and installed in the Contractor's schedule of values.

Item 7 – Furnish and Install 8’x8’ Pump Building Structure and Building Appliances

a. Measurement - The 8’x8’ pump building and appliances shall be measured on a lump sum basis per the estimated percentage of the complete building system installed and approved according to line items listed in the Contractor’s schedule of values. Payment for the building includes all structural components including but not limited to framing, siding, insulation, interior finish, doors, hardware, openings, chain hoist, roofing, heating, and ventilation, and all miscellaneous components not listed.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the electrical building component line items furnished and installed in the Contractor’s schedule of values.

Item 8 – Furnish and Install 8’x12’ Electrical Building Structure and Building Appliances

a. Measurement - The 8’x12’ pump building and appliances shall be measured on a lump sum basis per the estimated percentage of the complete building system installed and approved according to line items listed in the Contractor’s schedule of values. Payment for the building includes all structural components including but
not limited to framing, siding, insulation, interior finish, doors, hardware, openings, roofing, AC, ventilation, and all miscellaneous components not listed.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the electrical building component line items furnished and installed in the Contractor's schedule of values.

Item 9 – Furnish and Install Conical Bottom HDPE Tank Components

a. Measurement - The conical bottom HDPE tank components shall be measured on a lump sum basis per the estimated percentage of the completed tank system installed and approved according to line items listed in the Contractor's schedule of values. Payment for the tank components includes engineered seismic tank stand, insulated HDPE tank, connections and flanged/threaded bulkheads, flexible joints, and OSHA ladder, and all other components not listed.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the HDPE tank components line items furnished and installed in the Contractor's schedule of values.

Item 10 – Furnish and Install 6” Ductile Iron Pipe and Fittings

a. Measurement - 6" DIP will be measured in linear feet of pipe complete in place along the centerline of the pipe from the points of connection to the end of new pipe. The length of pipe will be measured without deduction for valves or fittings installed by the Contractor. Payment for all tees, fittings, flanges, bolts, gaskets, mechanical joint restraints, and tie-ins will be included in the per linear foot price paid for 6" DIP.

b. Payment - Will be made by applying the contract unit price for the number of linear feet actually installed by the Contractor, including access, grading, excavation, backfill, concrete thrust blocks, tees, fittings and tie-ins, testing, and all other work for a complete pipe installation as specified in the Contract Documents.

Item 11 – Furnish and Install 4” Ductile Iron Pipe and Fittings

a. Measurement - 4” DIP will be measured in linear feet of pipe complete in place along the centerline of the pipe from the points of connection to the end of new pipe. The length of pipe will be measured without deduction for valves or fittings installed by the Contractor. Payment for all tees, fittings, flanges, bolts, gaskets, mechanical joint restraints, and tie-ins will be included in the per linear foot price paid for 4” DIP.
b. Payment - Will be made by applying the contract unit price for the number of linear feet actually installed by the Contractor, including access, grading, excavation, backfill, concrete thrust blocks, tees, fittings and tie-ins, testing, and all other work for a complete pipe installation as specified in the Contract Documents.

Item 12 – Furnish and Install 3” Welded Steel Pipe and Fittings Fusion-Bonded Epoxy Lined and Coated

a. Measurement - 3” welded steel pipe, fusion-bonded epoxy lined and coated, will be measured in linear feet of pipe complete in place along the centerline of the pipe from the points of connection to the end of new pipe. The length of pipe will be measured without deduction for valves or fittings installed by the Contractor. Payment for all tees, fittings, flanges, mechanical joint restraints, and tie-ins will be included in the per linear foot price paid for 3” welded steel pipe.

b. Payment - Will be made by applying the contract unit price for the number of linear feet actually installed by the Contractor, including access, grading, excavation, backfill, concrete thrust blocks, tees, fittings and tie-ins, testing, and all other work for a complete pipe installation as specified in the Contract Documents.

Item 13 – Furnish and Install 2-1/2” and 2” Brass Pipe and Fittings

a. Measurement - Brass pipe will be measured in linear feet of pipe complete in place along the centerline of the pipe from the points of connection to the end of new pipe. The length of pipe will be measured without deduction for valves or fittings installed by the Contractor. Payment for all tees, fittings, unions, nipples, bushings, and tie-ins will be included in the per linear foot price paid for brass pipe.

b. Payment - Will be made by applying the contract unit price for the number of linear feet actually installed by the Contractor, including access, grading, excavation, backfill, concrete thrust blocks, tees, fittings and tie-ins, testing, and all other work for a complete pipe installation as specified in the Contract Documents.

Item 14 – Furnish and Install 3” Fusible HDPE Intake Pipe

a. Measurement - 3” Fusible HDPE Intake Pipe will be measured in linear feet of pipe complete in place along the centerline of the pipe from the points of connection to the end of new pipe. The length of pipe will be measured without deduction for valves or fittings installed by the Contractor. Payment for all fused joint pipe and end-connections will be included in the per linear foot price paid for brass pipe.

b. Payment - Will be made by applying the contract unit price for the number of linear feet actually installed by the Contractor, including access, grading, excavation, backfill, concrete thrust blocks, tees, fittings and tie-ins, testing, and all other work for a complete pipe installation as specified in the Contract Documents.
Item 15 – Furnish and Install 3” Flexible HDPE Intake Hose

a. Measurement - The 3" flexible intake hose will be measured on a lump sum basis for the intake hose furnished and installed, complete. Payment for all connections to the connecting pipe and the floating suction strainer will be included in the lump sum price paid for flexible intake pipe.

b. Payment - Will be made by applying the contract unit price for the complete installation.

Item 16 – Furnish and Install LAKOS Sand Separator with Auto Purge System

a. Measurement - The LAKOS sand separator and auto purge system will be measured for each unit furnished and installed, complete. Payment includes any miscellaneous components or fittings to install the sand separator and auto purge system.

b. Payment - Will be made on a per unit price for each unit as listed in the Bid Item Schedule.

Item 17 – Furnish and Install Valves and Appurtenances

a. Measurement - Valves, fittings, appurtenances and miscellaneous piping will be measured on a percentage (%) completion for valves and fittings for the line items listed in the Contractor’s schedule of values. Payment includes all valves, fittings, appurtenances and miscellaneous piping includes gate valves, ball valves, check valves, pressure gauges, air release valves, valve boxes, flexible expansion joints, pipe supports, special fittings and any miscellaneous piping not included in other items.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the individual valves and appurtenance line items furnished and installed in the Contractor’s schedule of values.

Item 18 – Furnish and Install Horizontal Self-Priming Centrifugal Intake Pumps

a. Measurement - The intake pumps will be measured for each complete pump skid unit furnished and installed, complete. The skid assembly includes the pump, motor, V-belt drive, and miscellaneous connections and air release valve components. The unit must be verified to have been installed and mounted per the manufacturer requirements.

b. Payment - Will be made on the per unit price listed in the Bid Item Schedule for each unit installed complete.
Item 19 – Furnish and Install Vertical Multi-Stage Centrifugal Booster Pumps

a. Measurement - The booster pumps will be measured for each complete pump and motor furnished and installed, complete. The unit includes the pump, motor, and miscellaneous connections. The unit must be verified to have been installed and mounted per the manufacturer requirements.

b. Payment - Will be made on the per unit price listed in the Bid Item Schedule for each unit installed complete.

Item 20 – Furnish and Install 7.5-hp VFD Control Panels

a. Measurement - The 7.5-horsepower VFD control panels will be measured for each complete panel furnished and installed, complete. Payment for each item includes all internal wiring, components and panel assembly mounted and verified as designed.

b. Payment - Payment for this item will be made on the per unit price for each unit as listed in the Bid Item Schedule.

Item 21 – Furnish and Install PLC Control Panel

a. Measurement - The PLC control panel will be measured for each complete panel furnished and installed, complete. Payment for each item includes all internal wiring, components and panel assembly mounted and verified as designed.

b. Payment - Will be made on the per unit price listed in the Bid Item Schedule for each unit installed complete.

Item 22 – Furnish and Install Main Breaker Panel

a. Measurement - The main breaker panel will be measured for each complete panel furnished and installed, complete. Payment for each item includes all internal wiring, components and panel assembly mounted and verified as designed.

b. Payment - Will be made on the per unit price furnished and installed in the Bid Item Schedule for each unit installed complete.

Item 23 – Furnish and Install Instrumentation

a. Measurement - Instrumentation will be measured on a percentage (%) completion for each instrumentation line item listed in the Contractor’s schedule of values. Payment includes all flow meters, pressure transducers, pressure gauges, pressure and flow switches, level transducers, temperature sensors, vibration sensors, and automated valves.
b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the individual instrument line items furnished and installed in the Contractor’s schedule of values.

Item 24 – Furnish and Install Site Electrical

a. Measurement - Site electrical will be measured on a percentage (%) completion for site electrical line items listed in the Contractor’s schedule of values. Payment includes all labor, materials, and equipment to furnish and install conduits, wires, trench excavation, lighting, power, switches on the site and in the buildings.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the site electrical line items furnished and installed in the Contractor’s schedule of values.

Item 25 – PLC, OIT and SCADA Programming

a. Measurement - Programming will be measured on a percentage (%) completion for PLC, OIT and SCADA programming line items listed in the Contractor’s schedule of values. Payment includes all labor, materials, and equipment to program, provide functional descriptions, conduct factory and field testing as required in the Contract Documents.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the programming line items furnished and installed in the Contractor’s schedule of values.

Item 26 – Conduct Facility Performance Testing and Startup

a. Measurement - Performance testing and startup will be measured on a percentage (%) completion for line items listed in the Contractor’s schedule of values. Payment includes all labor, materials, and equipment to perform facility testing, flushing, startup and test procedures as required in the Contract Documents.

b. Payment - Will be made on a lump sum basis as a percentage (%) completion for performance testing and startup line items furnished and installed in the Contractor’s schedule of values.

Item 27 – Furnish Final Documentation and Project Closeout

a. Measurement - Final documental and project closeout will be measured on a percentage (%) completion for line items listed in the Contractor’s schedule of values. Payment includes furnishing all final operational and maintenance manuals, warranties, as-builts, spare parts, key cylinders, testing documentation and all other closeout documents required per the Contractor Documents.
b. Payment - Will be made on a lump sum basis as a percentage (%) completion for the line items furnished and installed in the Contractor’s schedule of values.

**Item 28 – Rock Excavation**

a. Measurement – Cubic yard. Unit price should take into consideration savings realized from the reduction in non-rock trench excavation as paid under the pipeline and tie-in items. Included in this bid item are all costs for labor, tools, equipment associated with rock excavation as defined below in this bid item. The cubic yards indicated in the bid schedule is an allowance. Payment will be made per the actual volume of rock excavation. This item quantity may change by as much as 100% without adjustment to the contract unit price, depending on field conditions.

Rock Excavation: The Rock Excavation Allowance shall be used for rock excavation beyond that excavation that can be accomplished using a medium size excavator (e.g. 70,000 lbs. ISO or SAE machine per 6165 ISO) with digging bucket with teeth or tiger ripper attachment. This item will be monitored by the District’s Inspector, and invoicing shall be on a unit cost basis. Refusal to be considered as the inability of the following equipment to excavate rock as caused by the hardness of the rock: Tractor mounted excavator with digging bucket with rock teeth or tiger ripper attachment, 70,000 lbs. excavator per 6165 ISO. Refusal shall be demonstrated to Engineer prior to rock being deemed inexcavatable. All rock excavation shall be under one classification. This classification shall include solid ledge rock in its natural location that requires systematic quarrying, drilling and/or blasting for its removal and also boulders that exceed 0.25 CY in volume. When rock is encountered, strip free of earth. After verification by a representative of the Owner and/or Engineer that the material encountered is rock (as defined above), Contractor shall employ an independent surveyor to determine rock quantities before removal operation begins. In computing the volumetric content of rock excavation for payment. Hydraulic hammering or alternative means approved by the Engineer shall be employed where refusal has been demonstrated and normal excavation procedures are not feasible.

Definition of Rock: Rock encountered during the course of excavation which is sufficiently hard to cause refusal to equipment specified below shall be deemed inexcavatable. Rock deemed inexcavatable shall be removed by substantial means such as reciprocating hydraulic hammers and shall conform to this specification.

b. Payment - Includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in completing the Rock Excavation as specified in the Contract Documents. Payment will be made per the cubic yardage of rock as reviewed and approved by the District.
Optional Bid Item

Item 29 – Temporary Intake Pumping System During Transition

a. Scope - As an optional bid item, the Contractor will furnish and install temporary intake pumping equipment to maintain raw water supply to the Water Treatment Plant while the existing pump station is taken offline for upgrades. The Contractor will furnish and install temporary pumping system to avoid trucking water to the facility during the pump station upgrade. The temporary pumping system will include temporary intake suction pipe, pump, motor, discharge piping connecting to the existing transmission main, power supply and controls. The pump system will be capable of supplying 75 gallons per minute at a total lift of approximately 180 feet. The pump system will be situated within the District’s easement and set away from construction activity to allow the decommissioning of the existing pump system. The Contractor will ensure the District personnel have access to the pumps for operation. The pump controls will need to be integrated to the facility, and the existing gear can be used if a small structure is constructed over the equipment to keep it out of the weather. Pumps will be used as needed to maintain water supply to the Outingdale customers. Material used for temporary piping and pumps must be suitable for drinking water operation. This item includes all necessary material to complete the temporary pump setup including any necessary piping, conduit, and other material to complete construction. The existing pumps in the current station can be used by the Contractor with an approved enclosure to be submitted. The Contractor shall remove the temporary pumping system equipment once the new station is operational.

b. Measurement - Temporary intake pump system will be measured on a percentage (%) completion for line items listed in the Contractor’s schedule of values.

c. Payment - Will be made on a lump sum basis as a percentage (%) completion for the line items furnished and installed in the Contractor’s schedule of values

D. Description of Items for which District may pay prior to incorporation onto the work (if any). See Section 01200 (Measurement and Payment), paragraphs 1.6E and 1.6F. N/A

E. Special Rules Regarding Rock. Notwithstanding any other provision in the Contract Documents, Contractor’s Unit Item price for Bid Item 28 will apply to all work covered by that Bid Item, regardless of actual quantities, and regardless of any geotechnical or other information provided by District or any investigation by Contractor.

F. Allowances:

1. Allowance work shall be done as Change Orders and as specified in Section 01250 (Modification Procedures).
The Amount given on SECTION 00400 (Bid Form) under each Allowance Item is the sum of money set aside for each Allowance Item. These amounts shall be included in the Contract Sum on the Bid Form.

If the cost of work done under any Allowance Item is less than the amount given on the Bid Form under that Allowance Item, the Contract Sum shall be reduced by the difference between the amount given in the Bid Form and the cost of work actually done.

G. Scope of Allowances (including Bid Item Numbers): N/A

H. Alternates: N/A

1.9 PROGRESS PAYMENTS

A. If requested by Contractor, progress payments will be made monthly.

B. Schedule of Values:

1. Within twenty eight Days from issuance of Notice of Award and prior to the Contractor’s first Application for Payment, submit a detailed breakdown of its Bid by scheduled Work items and/or activities, including coordination responsibilities and Project Record Documents responsibilities. Where more than one Subcontractor comprises the work of a Work item or activity, the Schedule of Values shall show a separate line item for each subcontract. Furnish such breakdown of the total Contract Sum by assigning dollar values (cost estimates) to each applicable Progress Schedule network activity, which cumulative sum equals the total Contract Sum. The format and detail of the breakdown shall be as directed by District to facilitate and clarify future progress payments to Contractor for direct Work under Contract Documents. This breakdown shall be referred to as the Schedule of Values.

2. Contractor’s overhead, profit, insurance, cost of bonds (except to the extent expressly identified in a Bid Item) and/or other financing, as well as “general conditions costs,” (e.g., Site cleanup and maintenance, temporary roads and access, off-Site access roads, temporary power and lighting, security, and the like), shall be prorated through all activities so that the sum of all the Schedule of Values line items equals Contractor’s total Contract Sum, less any allowances designated by District. Scheduling, record documents and quality assurance control shall be separate line items.

3. District will review the breakdown in conjunction with the Progress Schedule to ensure that the dollar amounts of this Schedule of Values are, in fact, fair market cost allocations for the Work items listed. Upon favorable review by
District, District will accept this Schedule of Values for use. District shall be the sole judge of fair market cost allocations.

4. District will reject any attempt to increase the cost of early activities, i.e., “front loading” resulting in an inaccurate allocation of moneys until such “front loading” is corrected. Repeated attempts at “front loading” may result in suspension or termination of the Work for default, or refusal to process progress payments until such time as the Schedule of Values is acceptable to District.

C. Applications for Payment: Contractor shall establish and maintain records of cost of the Work in accordance with generally accepted accounting practices. In addition:

1. On or before the last Day of each month (but after receipt of District's approval of the updated Schedule as required by Section 01320 (Progress Schedules and Reports)), Contractor shall submit to District five copies of an Application for Payment for the cost of the Work put in place during the period from the 20th Day of the previous month to the 20th Day of the current month. Such Applications for Payment shall be for the total value of activities completed or partially completed, including approved activity costs, based upon Schedule of Values prices (or Bid item prices if unit price) of all labor and materials incorporated in the Work up until midnight of the last Day of that one month period, less the aggregate of previous payments. Accumulated retainage shall be shown as separate item in payment summary. Contractor shall submit in a form acceptable to District an itemized cost breakdown of Contractor’s record of Cost of the Work together with supporting data and any certification required by District. If Contractor is late submitting it’s Application for Payment, that Application may be processed at any time during the succeeding one-month period, resulting in processing of Contractor’s Application for Payment being delayed for more than a Day for Day basis.

2. Applications for Payment may include, but are not necessarily limited to the following:

   a. Material, equipment, and labor incorporated into the Work, less any previous payments for the same;

   b. Up to 75 percent of the cost of equipment identified in paragraph 1.6F of this Section Measurement and Payment (if any), if purchased and delivered to the Site or stored off Site, as may be approved by District.

   c. Up to 50 percent of the cost of materials identified in paragraph 1.6F of this Section Measurement and Payment (if any), specifically fabricated for the Project that are not yet incorporated into the Work.
3. At the time any Application for Payment is submitted, certify in writing the accuracy of the Application and that Contractor has fulfilled all scheduling requirements of SECTION 00700 (General Conditions) and Section 01320 (Progress Schedules and Reports), including updates and revisions. A responsible officer of Contractor shall execute the certification.

4. No progress payment will be processed prior to District receiving all requested, acceptable schedule update information. Failure to submit a schedule update complying with Section 01320 justifies denying the entire Application for Payment.

5. Each Application for Payment shall list each Change Order and Construction Change Directive (“CCD”) executed prior to date of submission, including the Change Order/CCD Number, and a description of the work activities, consistent with the descriptions of original work activities. Submit a monthly Change Order/CCD status log to District.

6. If District requires substantiating data, submit information requested by District, with cover letter identifying Project, Application for Payment number and date, and detailed list of enclosures. Submit one copy of substantiating data and cover letter for each copy of Application for Payment submitted.

7. If Contractor fails or refuses to participate in work reconciliations or other construction progress evaluation with District, Contractor shall not receive current payment until Contractor has participated fully in providing construction progress information and schedule update information to District.

D. Progress Payments

1. District will review Contractor’s Application for Payment following receipt. If adjustments need to be made to percent of completion of each activity, District will make appropriate notations and return to Contractor. Contractor shall revise and resubmit. All parties shall update percentage of completion values in the same manner, i.e., express value of an accumulated percentage of completion to date.

2. Each Application for Payment may be reviewed by District and/or inspectors to determine whether the Application for Payment is proper, and shall be rejected, revised, or approved by District pursuant to the Schedule of Values prepared in accordance with paragraph 1.9B of this Section Measurement and Payment.
3. If it is determined that the Application for Payment is not proper and suitable for payment, District will return it to the Contractor as soon as practicable, but no later than seven Days after receipt, together with a document setting forth in writing the reasons why the Application for Payment is not proper. If District determines that portions of the Application for Payment are not proper or not due under the Contract Documents, then District may approve the other portions of the Application for Payment, and in the case of disputed items or defective Work not remedied, may withhold up to 150 percent of the disputed amount from the progress payment.

4. Pursuant to Public Contract Code Section 20104.50, if District fails to make any progress payment within 30 Days after receipt of an undisputed and properly submitted Application for Payment from Contractor, District shall pay interest to the Contractor equivalent to the legal rates set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure. The 30-Day period shall be reduced by the number of Days by which District exceeds the seven-Day return requirement set forth herein.

5. As soon as practicable after approval of each Application for Payment for progress payments, District will pay to Contractor in manner provided by law, an amount equal to 95 percent of the amounts otherwise due as provided in the Contract Documents, or a lesser amount if in conformance with Public Contract Code § 7201(b)(4), the District has adopted a finding that the project is substantially complex and requires a higher retention amount, provided that payments may at any time be withheld if, in judgment of District, Work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract, or to comply with stop notices or to offset liquidated damages accruing or expected.

6. Before any progress payment or final payment is due or made, Contractor shall submit satisfactory evidence that Contractor is not delinquent in payments to employees, Subcontractors, suppliers, or creditors for labor and materials incorporated into Work. This specifically includes, without limitation, SECTION 00640 (Conditional Waiver and Release on Progress Payment for the current progress payment and Unconditional Waiver and Release on Progress Payment for past progress payments) as authorized by Civil Code sections 8132 and 8134. District also may elect in its sole discretion to pay progress payments by joint check to Contractor and each Subcontractor having an interest in that progress payment in such amount. Civil Code sections 8132 and 8134 are hereby incorporated in full by this reference.

7. District reserves and shall have the right to withhold payment for any equipment and/or specifically fabricated materials that, in the sole judgment of District, are not adequately and properly protected against weather and/or damage prior to or following incorporation into the Work.
8. Granting of progress payment or payments by District, or receipt thereof by Contractor, shall not be understood as constituting in any sense acceptance of Work or of any portion thereof, and shall in no way lessen liability of Contractor to replace unsatisfactory work or material, though unsatisfactory character of work or material may have been apparent or detected at time payment was made.

9. When District shall charge any sum of money against Contractor under any provision of Contract Documents, amount of charge shall be deducted and retained by District from amount of next succeeding progress payment or from any other moneys due or that may become due Contractor under Contract. If, on completion or termination of Contract, such moneys due Contractor are found insufficient to cover District's charges against it, District shall have right to recover balance from Contractor or Sureties.

1.10 SUBSTITUTION OF SECURITIES IN LIEU OF RETENTION

A. In accordance with the provisions of Public Contract Code Section 22300, substitution of securities for any moneys withheld under Contract Documents to ensure performance is permitted under following conditions:

1. At request and expense of Contractor, securities listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and District which are equivalent to the amount withheld under retention provisions of Contract shall be deposited with Controller or with a state or federally chartered bank in California, as the escrow agent, who shall then pay such moneys to Contractor. Upon satisfactory completion of Contract, securities shall be returned to Contractor.

2. Alternatively, Contractor may request and District shall make payment of retentions earned directly to the escrow agent at the expense of Contractor. At the expense of Contractor, Contractor may direct the investment of the payments into securities and receive the interest earned on the investments upon the same terms provided for in this Section Measurement and Payment for securities deposited by Contractor. Upon satisfactory completion of Contract Documents, Contractor shall receive from escrow agent all securities, interest, and payments received by the escrow agent from District, pursuant to the terms of this Section Measurement and Payment. Pay to each Subcontractor, not later than 20 Days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount of retention withheld to insure the performance of Contractor.
3. Contractor shall be beneficial owner of securities substituted for moneys withheld and shall receive any interest thereon.

4. Enter into escrow agreement with Controller according to SECTION 00680 (Escrow Agreement for Security Deposits in Lieu of Retention), as authorized under Public Contract Code Section 22300, specifying amount of securities to be deposited, terms and conditions of conversion to cash in case of default of Contractor, and termination of escrow upon completion of Contract Documents.

5. Public Contract Code Section 22300 is hereby incorporated in full by this reference.

1.11 FINAL PAYMENT

A. As soon as practicable after all required Work is completed in accordance with Contract Documents, including punchlist, testing, record documents and Contractor maintenance after Final Acceptance, District will pay to Contractor, in manner provided by law, unpaid balance of Contract Sum of Work (including without limitation retentions), or whole Contract Sum of Work if no progress payment has been made, determined in accordance with terms of Contract Documents, less sums as may be lawfully retained under any provisions of Contract Documents or by law.

B. Prior progress payments shall be subject to correction in the final payment. District’s determination of amount due as final payment shall be final and conclusive evidence of amount of Work performed by Contractor under Contract Documents and shall be full measure of compensation to be received by Contractor.

C. Contractor and each assignee under an assignment in effect at time of final payment shall execute and deliver at time of final payment, and as a condition precedent to District’s obligation to make final payment, SECTION 00650 (Unconditional/Conditional Waiver and Release on Final Payment), as authorized by Civil Code sections 8136 and 8138, discharging District, its officers, agents, employees, and consultants of and from liabilities, obligations, and claims arising under Contract Documents. Civil Code sections 8136 and 8138 are hereby incorporated in full by this reference.

1.12 EFFECT OF PAYMENT

A. Payment will be made by District, based on District’s observations at the Site and the data comprising the Application for Payment. Payment will not be a representation that District has:
1. Made exhaustive or continuous on-Site inspections to check the quality or quantity of Work;

2. Reviewed construction means, methods, techniques, sequences, or procedures;

3. Reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by District to substantiate Contractor’s right to payment; or

4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS
SECTION 01250
MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY
A. Section includes:
   1. Description of general procedural requirements for alterations,
      modifications, and extras.
B. Reference

1.2 GENERAL
A. Any change in scope of Work or deviation from Contract Documents including,
   without limitation, extra work, or alterations or additions to or deductions from
   the original Work, shall not invalidate the original Contract, and shall be
   performed under the terms of the Contract Documents.
B. Only Contractor or District may initiate changes in scope of Work or deviation
   from Contract Documents.
   1. Contractor may initiate changes by submitting RFIs, Notice of Concealed or
      Unknown Conditions, or Notice of Hazardous Waste Conditions.
      a. RFIs shall be submitted to seek clarification of or request changes in the
         Contract Documents.
      b. Notices of Concealed or Unknown Conditions shall be submitted in
         accordance with SECTION 00700 (General Conditions).
      c. Notices of Hazardous Waste Conditions shall be submitted in
         accordance with SECTION 00700 (General Conditions).
   2. Contractor shall be responsible for its costs to implement and administer
      RFIs throughout the Contract duration. Regardless of the number of RFIs
      submitted, Contractor shall not be entitled to additional compensation.
      Contractor shall be responsible for both District and its Architect/Engineer’s
      administrative costs for answering RFIs where the answer could reasonably
      be found by reviewing the Contract Documents, as determined by District;
      at District’s discretion, such costs may be deducted from progress
      payments or final payment.
   3. District may initiate changes by issuing a Supplemental Instruction, which
      may revise, add to or subtract from the Work.
   4. District may initiate changes in the Work or Contract Time by issuing RFPs
      to Contractor. Such RFPs will detail all proposed changes in the Work and
      request a quotation of changes in Contract Sum and Contract Time from
      Contractor.
   5. District may also, by Construction Change Directive (“CCD”), order changes
      in the Work within the general scope of the Contract consisting of additions,
      deletions, or other revisions, the Contract Sum and Contract Time being
adjusted accordingly. A CCD shall be used in the absence of total agreement on the terms of a Change Order and may, upon notice, consist of a Change Order executed by District only.

1.3 PROCEDURES

A. Cost Proposal and Procedures: Whenever Contractor is required in this Section 01250 to prepare a Cost Proposal, and whenever Contractor is entitled to submit a Cost Proposal and elects to do so, Contractor shall prepare and submit to District for consideration a Cost Proposal using the form attached to this Section 01250. All Cost Proposals must contain a complete breakdown of costs of credits, deducts and extras; itemizing materials, labor, taxes, overhead and profit, and any requested changes to Contract Time. All Subcontractor Work shall be so indicated. Individual entries on the Cost Proposal form shall be determined as provided in paragraphs 1.4 and 1.5 of this Section 01250. After receipt of a Cost Proposal with a detailed breakdown, District will act promptly thereon.

1. If District accepts a Cost Proposal, District will prepare Change Order for District and Contractor signatures.

2. If Cost Proposal is not acceptable to District because it does not agree with cost and/or time included in Cost Proposal, District will submit in a response what it believes to be a reasonable cost and/or adjustment, if any. Except as otherwise provided in this Section 01250, Contractor shall have seven (7) Days in which to respond to District with a revised Cost Proposal.

3. When necessity to proceed with a change that does not allow the District sufficient time to conduct a proper check of a Cost Proposal (or revised Cost Proposal), District may order Contractor to proceed on a basis to be determined at the earliest practical date. In this event, the value of change, with corresponding equitable adjustment to Contract, shall not be more than the increase or less than the decrease proposed.

B. Request for Information: Whenever Contractor requires information regarding the Project or Contract Documents, or receives a request for information from a Subcontractor, Contractor may prepare and deliver an RFI to District. Contractor shall use RFI format provided by District. Contractor must submit time critical RFIs at least 30 days before scheduled start date of the affected Work activity. Contractor shall reference each RFI to an activity of Progress Schedule and shall note time criticality of the RFI, indicating time within which a response is required. Contractor’s failure to reference an RFI to an activity on the Progress Schedule and to note time criticality on the RFI shall constitute Contractor’s waiver of any claim for time delay or interruption to the Work resulting from any delay in responding to the RFI.

1. District will respond within seven (7) Days from receipt of RFI with a written response to Contractor. Contractor shall distribute response to all appropriate Subcontractors.

2. If Contractor is satisfied with the response and does not request change in Contract Sum or Contract Time, then the response shall be executed without a change.
3. If Contractor believes the response is incomplete, Contractor shall issue another RFI (with the same RFI number with the letter “A” indicating if it is a follow-up RFI) to District clarifying original RFI. Additionally, District may return the RFI, and request additional information, should original RFI be inadequate in describing condition.

4. If Contractor believes that the response results in change in Contract Sum or Contract Time, Contractor shall notify District in writing within seven Days after receiving the response. If District disagrees with Contractor, then Contractor may give notice of intent to submit a Claim as described in Article 12 of SECTION 00700 (General Conditions), and submit its Claim within 30 days. If District agrees with Contractor, then Contractor must submit a Cost Proposal within 21 Days of receiving the response to the RFI. Contractor’s failure to deliver either the foregoing notice and Claim or Cost Proposal by the respective deadlines stated in the foregoing sentences shall result in waiver of the right to file a Cost Proposal or Claim.

C. Supplemental Instruction: District may issue a Supplemental Instruction to Contractor.

1. If Contractor is satisfied with the Supplemental Instruction and does not request change in Contract Sum or Contract Time, then the Supplemental Instruction shall be executed without a Change Order.

2. If Contractor believes that the Supplemental Instruction results in change in Contract Sum or Contract Time, then Contractor must submit a Cost Proposal to District within 21 Days of receiving the Supplemental Instruction.

D. Construction Change Directives: If at any time District believes in good faith that a timely Change Order will not be agreed upon using the foregoing procedures, District may issue a CCD with its recommended cost and/or time adjustment. Upon receipt of a CCD, Contractor shall promptly proceed with the change of Work involved and concurrently respond to District’s CCD within 10 Days.

1. Contractor’s response must be any one of following:
   a. Return the CCD signed, thereby accepting District’s response, time and cost.
   b. Submit a (revised if applicable) Cost Proposal with supporting documentation (if applicable, reference original Cost Proposal number followed by letter A, B, etc. for each revision), if District so requests.
   c. Give notice of intent to submit a Claim as described in Article 12 of SECTION 00700 (General Conditions), and submit its Claim within 30 days.

2. If the CCD provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:
   a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
b. Unit prices stated in the Contract Documents or subsequently agreed upon.

c. Cost to be determined in a manner agreed.

3. CCD signed by Contractor indicates the agreement of Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

4. If Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by District on the basis of reasonable expenditures and savings of those performing the Work attributable to the change including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. If the parties still do not agree on the price for a CCD, Contractor may file a Claim per Article 12 of SECTION 00700 (General Conditions). Contractor shall keep and present, in such form as District may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this paragraph shall be limited to those provided in paragraphs 1.4 and 1.5 of this Section Modification Procedures.

5. Pending final determination of cost to District, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by Contractor to District for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by District. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

E. District Requested RFP: Contractor shall furnish a Cost Proposal within 21 Business Days of District’s RFP. Upon approval of the RFP, District will issue a Change Order directing Contractor to proceed with extra Work. If the parties do not agree on the price for an RFP, District may either issue a CCD or decide the issue per Article 12 of SECTION 00700 (General Conditions). Contractor shall perform the changed Work notwithstanding any claims or disagreements of any nature.

F. Differing Site Conditions: Contractor shall submit Notices of Differing Site Conditions to resolve problems regarding differing underground Site conditions encountered in the execution of the Work pursuant to paragraph 13.D of SECTION 00700 (General Conditions), which shall govern. If District determines that a change in Contract Sum or Contract Time is justified, District will issue RFP or CCD.

G. Hazardous Waste Conditions: Contractor shall submit Notices of Hazardous Waste Conditions to resolve problems regarding hazardous materials encountered in the execution of the Work pursuant to paragraph 13.E of SECTION 00700 (General Conditions), which shall govern. If District determines that a change in Contract Sum or Contract Time is justified, District will issue RFP or CCD.
H. All Changes:
   1. Documentation of Change in Contract Sum and Contract Time:
      a. Contractor shall maintain detailed records of Work performed on a time-
         and-material basis.
      b. Contractor shall document each proposal for a change in cost or time
         with sufficient data to allow evaluation of the proposal.
      c. Contractor shall, on request, provide additional data to support
         computations for:
            1) Quantities of products, materials, labor and equipment.
            2) Taxes, insurance, and bonds.
            3) Overhead and profit.
            4) Justification for any change in Contract Time and new Progress
               Schedule showing revision due, if any.
            5) Credit for deletions from Contract, similarly documented.
      d. Contractor shall support each claim for additional costs, and for Work
         performed on a cost-and-percentage basis, with additional information
         including:
            1) Credit for deletions from Contract, similarly documented.
            2) Origin and date of claim.
            3) Dates and times Work was performed and by whom.
            4) Time records and wage rates paid.
            5) Invoices and receipts for products, materials, equipment and
               subcontracts, similarly documented.
   I. Correlation of Other Items:
      1. Contractor shall revise Schedule of Values and Application for Payment
         forms to record each authorized Change Order or CCD as a separate line
         item and adjust the Contract Sum as shown thereon prior to the next
         monthly pay period.
      2. Contractor shall revise the Progress Schedules prior to the next monthly
         pay period.
      3. Contractor shall enter changes in Project Record Documents prior to the
         next monthly pay period.
   J. Responses: For all responses for which the Contract Documents, including
      without limitation this Section 1250, do not provide a specific time period,
      recipients shall respond within a reasonable time.
   K. Disputes: For all disputes arising from the procedures herein, Contractor shall
      follow Article 12 of SECTION 00700.

1.4 COST DETERMINATION

A. Total cost of extra Work or of Work omitted shall be the sum of labor costs,
   material costs, equipment rental costs and specialist costs as defined herein
   plus overhead and profit as allowed herein. This limit applies in all cases of
   claims for extra Work, whether calculating Cost Proposals, Change Orders or
   CCDs, or calculating claims of all types, and applies even in the event of fault,
   negligence, strict liability, or tort claims of all kinds, including strict liability or
   negligence. Contractor may recover no other costs arising out of or connected
   with the performance of extra Work, of any nature. No special, incidental or
consequential damages may be claimed or recovered against District, its representatives or agents, whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.

B. Overhead and Profit: (Overhead shall be as defined in paragraph 1.8 of this Section Modification Procedures)
   1. Overhead and profit on labor for extra Work shall be 15 percent.
   2. Overhead and profit on materials for extra Work shall be 15 percent.
   3. Overhead and profit on equipment rental for extra Work shall be 10 percent.
   4. When extra Work is performed by a first tier Subcontractor, Contractor shall receive a 5 percent markup on Subcontractors’ total costs of extra Work. First tier Subcontractor’s markup on its Work shall not exceed 15 percent.
   5. When extra Work is performed by a lower tier Subcontractor, Contractor shall receive a total of 5 percent markup on the lower tier Subcontractors’ total costs of extra Work. Contractor and first tier Subcontractors and lower tier Subcontractors shall divide the 5 percent markup as mutually agreed.
   6. Notwithstanding the foregoing, in no case shall the total markup on any extra Work exceed 20 percent of the direct cost, notwithstanding the actual number of contract tiers.
   7. On proposals covering both increases and decreases in Contract Sum, overhead, profit, and commission shall be allowed on the net increase only as determined in paragraph 1.4 above. When the net difference is a deletion, no percentage for overhead profit and commission shall be allowed, but rather a deduction shall issue.
   8. The markup shall include profit, small tools, cleanup, engineering, supervision, warranties, cost of preparing the cost proposal, jobsite overhead, and home office overhead. No markup will be allowed on taxes, insurance, and bonds.

C. Taxes:
   1. All State sales and use taxes, El Dorado County and applicable City sales taxes, shall be included.
   2. Federal and Excise tax shall not be included.

D. Owner-Operated Equipment: When owner-operated equipment is used to perform extra Work, Contractor will be paid for operator as follows:
   1. Payment for equipment will be made in accordance with paragraph 1.5C of this Section Modification Procedures.
   2. Payment for cost of labor will be made at no more than rates of such labor established by collective bargaining agreements for type of worker and location of Work, whether or not owner-operator is actually covered by such an agreement.

E. Accord and Satisfaction: Every Change Order and accepted CCD 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. Contractor may elect to reserve its rights to disputed claims arising from or relating to the changed Work at the time it signs
a Change Order or approves a CCD, but must do so expressly in a writing
delivered concurrently with the executed Change Order or approved CCD, and
must also submit a Claim for the reserved disputed items pursuant to Article 12
of SECTION 00700 no later than 30 days of Contractor’s first written notice of
its intent to reserve rights.

1.5 COST BREAKDOWN

A. Labor: Contractor will be paid cost of labor for workers (including forepersons
when authorized by District) used in actual and direct performance of extra
Work. Labor rate, whether employer is Contractor, Subcontractor or other
forces, will be sum of following:
1. Actual Wages: Actual wages paid shall include any employer payments to
or on behalf of workers for health and welfare, pension, vacation, and similar
purposes.
2. Labor surcharge: Payments imposed by local, county, state, and federal
laws and ordinances, and other payments made to, or on behalf of, workers,
other than actual wages as defined in paragraph 1.5A.1 of this Section
Modification Procedures, such as taxes and worker’s compensation
insurance. Such labor surcharge shall not exceed that set forth in California
Department of Transportation official labor surcharges schedule which is in
effect on date upon which extra Work is accomplished and which schedule
is incorporated herein by reference as though fully set forth herein.

B. Material: Only materials furnished by Contractor and necessarily used in
performance of extra Work will be paid for. Cost of such materials will be cost,
including sales tax, to purchaser (Contractor, Subcontractor or other forces)
from supplier thereof, except as the following are applicable:
1. If cash or trade discount by actual supplier is offered or available to
purchaser, it shall be credited to District notwithstanding fact that such
discount may not have been taken.
2. For materials salvaged upon completion of extra Work, salvage value of
materials shall be deducted from cost, less discounts, of materials.
3. If cost of a material is, in opinion of District, excessive, then cost of material
shall be deemed to be lowest current wholesale price at which material is
available in quantities concerned delivered to Site, less any discounts as
provided in paragraph 1.5B.1 of this Section Modification Procedures.

C. Equipment Rental: For Contractor- or Subcontractor-owned equipment,
payment will be made at the rental rates listed for equipment in California
Department of Transportation official equipment rental rate schedule which is
in effect on date upon which extra Work is accomplished and which schedule
is incorporated herein by reference as though fully set forth herein. If there is
no applicable rate for an item of equipment, then payment shall be made for
Contractor- or Subcontractor-owned equipment at the rental rate listed in the
most recent edition of the Association of Equipment Distributors (AED) book.
For rented equipment, payment will be made based on actual rental invoices.
Equipment used on extra Work shall be of proper size and type. If, however,
equipment of unwarranted size or type and cost is used, cost of use of
equipment shall be calculated at the rental rate for equipment of proper size
and type, as determined by District. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer’s ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of $100 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.

1. For equipment on Site, rental time to be paid for equipment shall be time equipment is in operation on extra Work being performed or on standby as approved by District. The following shall be used in computing rental time of equipment:
   a. When hourly rates are listed, less than 30 minutes of operation shall be considered to be ½ hour of operation.
   b. When daily rates are listed, less than four hours of operation shall be considered to be ½ Day of operation.

2. For equipment that must be brought to Site to be used exclusively on extra Work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:
   a. District will pay for costs of loading and unloading equipment.
   b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
   c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.
   d. District will not make any payment for transporting and loading and unloading equipment if equipment is used on Work in any other way than upon extra Work.

3. Rental period may begin at time equipment is unloaded at Site of extra Work and terminate at end of the performance of the extra Work or Day on which District directs Contractor to discontinue use of equipment, whichever first occurs. Excluding Saturdays, Sundays, and District’s legal holidays, unless equipment is used to perform extra Work on such Days, rental time to be paid per Day shall be four hours for zero hours of operation, six hours for four hours of operation and eight hours for eight hours of operation, time being prorated between these parameters. Hours to be paid for equipment that is operated less than eight hours due to breakdowns, shall not exceed eight less number of hours equipment is inoperative due to breakdowns.

D. Work Performed by Special Forces or Other Special Services: When District and Contractor, by agreement, determine that special service or item of extra Work cannot be performed by forces of Contractor or those of any Subcontractors, service or extra Work item may be performed by specialist. Invoices for service or item of extra Work on basis of current market price thereof may be accepted without complete itemization of labor, material, and
equipment rental costs when it is impracticable and not in accordance with 
established practice of special service industry to provide complete itemization. 
In those instances wherein Contractor is required to perform extra Work 
necessitating a fabrication or machining process in a fabrication or machine 
shop facility away from Site, charges for that portion of extra Work performed 
in such facility may, by agreement, be accepted as a specialist billing. District 
must be notified in advance of all off-Site Work. In lieu of overhead and profit 
provided in paragraph 1.4B of this Section Modification Procedures, 15 percent 
will be added to specialist invoice price, after deduction of any cash or trade 
discount offered or available, whether or not such discount may have been 
taken.

1.6 FORCE-ACCOUNT WORK

A. If it is impracticable because of nature of Work, or for any other reason, to fix 
an increase or decrease in price definitely in advance, the Contractor may be 
directed to proceed at a not-to-exceed (NTE) maximum price which shall not 
under any circumstances be exceeded. Subject to such limitation, such extra 
Work shall be paid for at actual necessary cost for Force-Account Work or at 
the negotiated cost, as determined by District. The cost for Force-Account Work 
shall be determined pursuant to paragraphs 1.4 and 1.5 of this Section 
Modification Procedures.

B. Force-Account Work shall be used when it is not possible or practical to price 
out the changed Work prior to the start of that Work. In these cases, Force-
Account Work will be utilized during the pricing and negotiation phase of the 
change. Once negotiations have been concluded and a bilateral agreement 
has been reached, the tracking of the Work under Force-Account is no longer 
necessary. Force-Account Work shall also be used when negotiations between 
District and Contractor have reached impasse and a bilateral agreement on the 
value of the changed Work cannot be reached. District may approve other uses 
of Force-Account Work.

C. Whenever any Force-Account Work is in progress, and there is not a definite 
price which has been agreed on in advance, Contractor shall report to District 
each Business Day in writing in detail amount and cost of labor and material 
used, and any other expense incurred in Force-Account Work on preceding 
Day, by using the Cost Proposal form attached hereto. No claim for 
compensation for Force-Account Work will be allowed unless report shall have 
been made.

D. Whenever Force-Account Work is in progress, definite price for which has not 
been agreed on in advance, Contractor shall report to District when 75 percent 
of the NTE amount has been expended.

E. Force-Account Work shall be paid as extra Work under this Section 
Modification Procedures. Methods of determining payment for Work and 
materials provided in this paragraph 1.6 shall not apply to performance of Work 
or furnishings of material that, in judgment of District, may properly be classified 
der items for which prices are otherwise established in Contract Documents.
1.7 DISTRICT-FURNISHED MATERIALS
A. District reserves right to furnish materials as it deems advisable, and Contractor shall have no claims for costs and overhead and profit on such materials.

1.8 OVERHEAD DEFINED
A. The following constitutes charges that are deemed included in overhead for all Contract Modifications, including Force-Account Work or CCD Work, whether incurred by Contractor, Subcontractors, or suppliers, and Contractor shall not invoice or receive payment for these costs separately:
   1. Drawings: field drawings, Shop Drawings, etc., including submissions of drawings
   2. Routine field inspection of Work proposed
   3. General Superintendence
   4. General administration and preparation of cost proposals, schedule analysis, change orders and other supporting documentation as necessary
   5. Computer services
   6. Reproduction services
   7. Salaries of project Architect/Engineer, superintendent, timekeeper, storekeeper and secretaries
   8. Janitorial services
   9. Temporary on-Site facilities:
      a. Offices
      b. Telephones
      c. Plumbing
      d. Electrical: Power, lighting
      e. Platforms
      f. Fencing, etc.
      g. Water
   10. Home office expenses
   11. Insurance and Bond premiums
   12. Procurement and use of vehicles and fuel used coincidentally in Work otherwise included in the Contract Documents
   13. Surveying
   14. Estimating
   15. Protection of Work
   16. Handling and disposal fees
   17. Final cleanup
   18. Other incidental Work

1.9 RECORDS AND CERTIFICATION
A. Force-Account (cost reimbursement) charges shall be recorded daily and summarized in a Cost Proposal form attached hereto. Contractor or authorized representative shall complete and sign a form each day. Contractor shall also provide with the form: the names and classifications of workers and hours worked by each; an itemization of all materials used; a list by size type and
identification number of equipment and hours operated; and an indication of all Work performed by specialists.

B. No payment for Force-Account Work shall be made until Contractor submits original invoices substantiating materials and specialists charges.

C. District shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor’s claims for modification of Contract, including Force-Account Work and CCD Work.

D. Further, District will have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, the Contract. If Contractor is a joint venture, this right of District shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member. This right shall be specifically enforceable, and any failure of Contractor to voluntarily comply shall be deemed an irrevocable waiver and release of all claims then pending that were or could have been subject to Article 12 of SECTION 00700.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

COST PROPOSAL FORM FOLLOWS ON NEXT PAGE
**COST PROPOSAL (CP)**

**OUTINGDALE RAW WATER PUMP STATION UPGRADE PROJECT**  
Contract Number E20-17

Date: ________________  
In Response To _________  
RFP #, etc.

To: El Dorado Irrigation District  
Attention: Patrick Wilson, P.E.  
2890 Mosquito Road  
Placerville, CA 95667  
Telephone (530) 642-4079

Subject Ref. No: _______  
(for Project Manager Use only)

From: [Insert Contractor’s Name/Address] ________________________________

This Cost Proposal is in response to the above-referenced _________ [insert RFP, etc. as applicable].  
Brief description of change(s): ________________________________________

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**REQUESTED CHANGE IN CONTRACT TIME (DAYS)**

By Contractor: ___________________  
Signature: ___________________  
Date: ___________________

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

Section includes descriptions of the required Project meetings for the Work. These meetings include:

a. 1.2 Preconstruction Conference
b. 1.3 Schedule Review Meetings
c. 1.4 Weekly Progress Meetings
d. 1.5 Progress Schedule and Billing Meetings
e. 1.6 Special Meetings

1.2 PRECONSTRUCTION CONFERENCE

A. District or its representative will call for and administer the Preconstruction Conference at a time and place to be announced (usually the week prior to start of Work at the Site).

B. Contractor, all major Subcontractors, and major suppliers shall attend the Preconstruction Conference.

C. Agenda will include, but not be limited to, the following items.
   1. Schedules
   2. Personnel and vehicle permit procedures
   3. Use of premises
   4. Location of the Contractor’s on-Site facilities
   5. Security
   6. Housekeeping
   7. Submittal and RFI procedures
   8. Inspection and testing procedures, on-Site and off-Site
   9. Control and reference point survey procedures
   10. Safety expectations and coordination procedures
   11. Contractor’s Initial Project Schedule
   12. Contractor’s Schedule of Values
   13. Contractor’s Schedule of Submittals
   14. Emergency Contact List

D. District will distribute copies of minutes to the attendees. Attendees shall have five (5) Days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the Preconstruction Conference.

1.3 SCHEDULE REVIEW MEETINGS

A. Contractor shall meet with District prior to the Start Date of the Work under Contract Documents and conduct an initial review of Contractor’s draft Shop Drawing and Sample Submittal Schedule, draft Schedule of Values, and Initial Schedule.
B. An authorized representative in Contractor’s organization, designated in writing, who will be responsible for working and coordinating with District relative to preparation and maintenance of Progress Schedule shall attend the initial schedule review meeting.

C. Contractor shall, within twenty (20) Days from the Notice to Proceed date, meet with District to review the Progress Schedule and construction schedule submittals.

1. Contractor shall have its manager, superintendent, scheduler, and key Subcontractor representatives, as required by District, in attendance. The meeting will take place over a continuous one-Day period.

2. District’s review will be limited to submittal’s conformance to Contract Documents requirements including, but not limited to, coordination requirements. District’s review may also include:
   b. Directions to include activities and information missing from submittal.
   c. Requests to Contractor to clarify its schedule.

3. Within five (5) Days of the Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by District at the meeting.

D. District will administer Schedule Review Meetings and shall distribute minutes of Schedule Review Meetings to attendees. Attendees shall have five (5) Days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of Schedule Review Meetings.

1.4 WEEKLY PROGRESS MEETINGS

A. District will schedule and administer weekly progress meetings throughout duration of Work. Progress meetings will be held weekly unless otherwise directed by District.

1. Meetings shall be held at Contractor’s on-Site office unless otherwise directed by District.

2. District or its representative will prepare an agenda and distribute it in advance of the meeting.

3. District or its representative will record meeting notes of the Weekly Progress Meeting. Within five (5) Days after the meeting, District or its representative will distribute minutes to Contractor though e-mail, who will distribute them to those affected by decisions made at meeting. Attendees can either submit comments or additions to the minutes prior to the next progress meeting, or may attend the next progress meeting and submit comments or additions there. Minutes will constitute final memorialization of results of the meeting.

B. Progress meetings shall be attended by Contractor’s job superintendent, major Subcontractors and suppliers, District, and others as are appropriate to the agenda topics for each meeting.

C. Each agenda will contain the following items, as appropriate:

1. Review of Work progress since the last meeting
2. Status of Construction Work Schedule, delivery schedules, and adjustments
3. Submittal, RFI, and Change Order status  
4. Review of the Contractor’s safety program activities and coordination with District operations (e.g. energized electrical work, lockout/tagout, confined space), including a report on all serious injury and/or damage accidents  
5. Other items affecting progress of Work  

1.5 PROGRESS SCHEDULE AND BILLING MEETINGS  
A. A meeting will be held monthly, or as otherwise agreed to, with the District (but no more than once every 30 days) to review the schedule update submittal and progress payment application.  
   1. At this meeting, at a minimum, the following items will be reviewed:  
      a. Percent complete of each activity;  
      b. Time impact evaluations for Change Orders and Time Extension Request;  
      c. Actual and anticipated activity sequence changes;  
      d. Actual and anticipated duration changes; and  
      e. Actual and anticipated Contractor delays.  
   2. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, Contractor’s General Superintendent and Scheduler shall attend these meetings.  
   3. Contractor shall set aside sufficient time to review the progress schedule and the monthly pay application.  

1.6 SPECIAL MEETINGS  
A. Any party may call special meetings by notifying all desired participants and District five (5) Days in advance, giving reason for meeting. Special meetings may be held without advance notice in emergency situations.  
B. At any time during the progress of Work, District shall have authority to require Contractor to attend meeting of any or all of the Subcontractors engaged in Work or in other work, and notice of such meeting shall be duly observed and complied with by Contractor.  
C. Contractor shall schedule and conduct coordination meetings as necessary to discharge coordination responsibilities in SECTION 00700 (General Conditions). Contractor shall give District five (5) Days written notice of coordination meetings. Contractor shall maintain minutes of coordination meetings. Attendees shall have five (5) Days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of coordination meetings.  

PART 2 PRODUCTS – NOT USED  

PART 3 EXECUTION – NOT USED  

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01320

PROGRESS SCHEDULES AND REPORTS

PART 1 GENERAL

1.1 SUMMARY

A. Perform scheduling of Work under this Contract in accordance with requirements of this Section Submittal Procedures.
   1. Development of schedule, cost, and resource loading of the Progress Schedule, monthly payment requests, and project status reporting requirements of the Contract Documents shall employ scheduling as required in this Section Submittal Procedures.
   2. The Schedule shall be cost-loaded based on Schedule of Values as approved by District.
   3. Submit schedules and reports as specified in 00700 (General Conditions).

B. Upon Award of Contract, immediately commence development of Initial Schedule to ensure compliance with schedule submittal requirements.

C. Contractor’s obligations under this Section 01320 are hereby deemed material obligations justifying District’s remedies for default if Contractor fails to perform. Nothing in this paragraph 1.1.C of this Section 01320 or the lack of an express statement that any other Contract Documents provision is or is not material shall be considered in determining whether any such other provision is material.

D. Employ competent scheduling personnel or a schedule consultant with experience performing scheduling required herein on two prior, similar projects.

1.2 GENERAL

A. Progress Schedule shall be based on and incorporate the milestone and completion dates specified in Contract Documents.

B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times in SECTION 00520 (Agreement), unless an earlier (advanced) time of completion is requested by Contractor and agreed to by District. A Change Order shall formalize any such agreement.
   1. District is not required to accept an earlier (advanced) schedule, i.e., one that shows early completion date(s) for the Contract Time.
   2. Contractor is not entitled to extra compensation in the event an agreement is reached on an earlier (advanced) schedule and Contractor completes its Work, for whatever reason, beyond the completion date shown in earlier (advanced) schedule but within the Contract Time.
   3. A schedule showing the Work completed in less than the Contract Time, which has been accepted by District, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of
the Work and Contract Substantial Completion. Project Float is a resource available to both District and Contractor.

4. **Float Ownership:** Neither District nor Contractor owns float. The Project owns the float. As such, liability for delay of any Substantial Completion or Final Completion date rests with the party whose actions, last in time, actually cause delay to a Substantial Completion or Final Completion date.
   a. For example, in the event of unexcused delay by Party A and Party B, and if Party A uses some, but not all of the float and Party B later uses remainder of the float as well as additional time beyond the float, Party B shall be liable for the time that represents a delay to the Substantial Completion date.
   b. Under this scenario, Party A would not be responsible for the time since it did not consume the entire float and additional float remained; therefore, the Substantial Completion Date was unaffected.

C. **Progress Schedule** shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing the Contract schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.

D. Failure of Progress Schedule to include any element of the Work or any inaccuracy in Progress Schedule will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. District’s acceptance of the Schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests, and shall not, in any manner, impose a duty of care upon District, or act to relieve Contractor of its responsibility for the means and methods of construction.

E. Transmit each item under form approved by District or following Section 01330.
   1. Identify Project with the District Contract number, and name of Contractor.
   2. Provide space for Contractor’s approval stamp and District’s review stamps.
   3. Submittals received from sources other than Contractor will be returned to Contractor without District’s review.

1.3 **INITIAL AND ORIGINAL PROGRESS SCHEDULE**

A. Initial Schedule submitted for review at the Preconstruction Conference shall serve as Contractor’s schedule for up to 30 Days after the Notice to Proceed.

B. Initial Schedule must indicate a detailed plan for the Work to be completed in first 30 Days of the Contract, including details of planned mobilization of plant and equipment; sequence of early operations; and procurement of materials and equipment. Initial Schedule shall show Work beyond 30 Days in summary form.

C. Contractor shall submit its Original Schedule for review no later than first progress payment. Original Schedule and all updates shall comply with all standards herein.

D. All Schedules shall be time-scaled.

E. All Schedules shall be cost and resource loaded. Accepted cost- and resource-loaded Schedule will be used as basis for monthly progress payments. Use of Initial Schedule for progress payments shall not exceed 30 Days.
F. Except as otherwise expressly provided in this Section 01320, Contractor shall meet with District to review and discuss the each Schedule (i.e., Initial, Original and updated) within seven Days after each Schedule has been submitted to District.
   1. District’s review and comment on any Schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements).
   2. Contractor shall make corrections to Schedule necessary to comply with Contract requirements, adjust Schedule to incorporate any missing information requested by District, and resubmit Initial Schedule if requested by District.

G. If Contractor is of the opinion that any of the Work included on its Schedule has been impacted, Contractor shall submit to District a written Time Impact Evaluation (TIE) in accordance with paragraph 1.8 of this Section Submittal Procedures. The TIE shall be based on the most current update of the Initial Schedule.

1.4 SCHEDULE FORMAT AND LEVEL OF DETAIL

A. Each Schedule (Initial, Original and updates) shall indicate all separate fabrication, procurement and field construction activities required for completion of the Work, including but not limited to the following:
   1. All Contractor, Subcontractor, and assigned Contractor work shall be shown in a logical work sequence that demonstrates a coordinated plan of work for all contractors. The intent is to provide a common basis of acceptance, understanding, and communication, as well as interface with other contractors.
   2. Activities related to the delivery of Contractor and District-furnished equipment to be Contractor-installed per Contract shall be shown.
   3. All activities shall be identified through codes or other identification to indicate the building (i.e. buildings, Site work) and Contractor/Subcontractor responsibility to which they pertain.
   4. Break up the Work schedule into activities of durations of approximately 21 Days or less each, except for non-field construction activities or as otherwise deemed acceptable by District.
   5. Show the critical path in red. For each activity, show early start, late start, early finish, late finish, durations measured in Days, float, resources, predecessor and successor activities, planned workday/week for the activity, man power loading, and scheduled/actual progress payments.

B. Seasonal weather conditions (which do not constitute a delay as defined herein) shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures or presence of high moisture for the completion of the Work within the allotted Contract Time.

C. Failure by Contractor to include any element of Work required for performance of the Work on the detailed construction schedule shall not excuse Contractor from completing all Work required within the Contract Time.

D. A two-week “look ahead,” detailed daily bar chart schedule shall be updated and issued weekly.
E. Utilize computer-scheduling software, such as Microsoft Project software or approved equivalent, for all scheduling including schedule updates.

1.5 SCHEDULE UPDATE SUBMITTALS

A. Following acceptance of Contractor’s Initial Schedule, Contractor shall monitor progress of Work and adjust Schedule each biweekly to reflect actual progress and any anticipated changes to planned activities.
   1. Each Schedule update submitted shall be complete, including all information requested for the Initial Schedule and Original Schedule submittal.
   2. Each update shall continue to show all Work activities, including those already completed. These completed activities shall accurately reflect “as built” information by indicating when activities were actually started and completed, and Contractor warrants the accuracy of as-built information as shown.

B. A meeting will be held biweekly or as needed to review the Schedule update submittal and progress payment application.
   1. At this meeting, at a minimum, the following items will be reviewed: Percent complete of each activity; TIEs for Change Orders and Time Extension Request; actual and anticipated activity sequence changes; actual and anticipated duration changes; and actual and anticipated Contractor delays.
   2. These meetings are considered a critical component of the overall schedule update submittal; have appropriate personnel attend. At a minimum, Contractor’s General Superintendent and Scheduler shall attend these meetings.

C. Within five Days after the Schedule update meeting, Contractor shall submit the updated Schedule.

D. Within five Days of receipt of above-noted revised submittals, District will either accept or reject schedule update submittal.
   1. If accepted, percent complete shown in the update will be the basis for Contractor’s Application for Payment. The schedule update shall be submitted as part of Contractor’s Application for Payment.
   2. If rejected, the update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.

E. Neither updating, changing nor revising of any report, curve, schedule or narrative submitted to District by Contractor under this Contract, nor District’s review or acceptance of any such report, curve, schedule or narrative shall have the effect of amending or modifying, in any way, the Contract Substantial Completion date or milestone dates or of modifying or limiting, in any way, Contractor’s obligations under this Contract.

1.6 SCHEDULE REVISIONS

A. Updating the Schedule (Initial and Original) to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, however, revisions to activity durations and sequences are expected on a biweekly basis.
B. To reflect revisions to the Schedule, Contractor shall provide District with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of Work, Contractor shall provide a schedule diagram that compares the original sequence to the revised sequence of Work. Contractor shall clearly show and discuss any changes in the critical path, and provide the written narrative and schedule diagram for revisions three Days in advance of the biweekly schedule update meeting.

C. Schedule revisions shall not be incorporated into any schedule update until District has reviewed the revisions. District may request further information and justification for schedule revisions and, within three Days, provide District with a complete written narrative response to District’s request.

D. If District does not accept Contractor’s revision, and Contractor disagrees with District’s position, Contractor has seven Days from receipt of District’s letter rejecting the revision, to provide a written narrative providing full justification and explanation for the revision. Contractor’s failure to respond in writing within seven Days of District’s written rejection of a schedule revision shall be contractually interpreted as acceptance of District’s position, and Contractor waives its rights to subsequently dispute or file a claim regarding District’s position. If Contractor files a timely response as provided in this paragraph, and the parties are still unable to agree, Contractor’s sole right shall be to file a claim as provided in SECTION 00700 (General Conditions), Article 12.

E. At District’s discretion, Contractor can be required to provide Subcontractor certifications of performance regarding proposed schedule revisions affecting said Subcontractors.

1.7 RECOVERY SCHEDULE

A. If a Schedule update shows a substantial completion date 14 Days beyond any Contract Substantial Completion date, or individual Milestone completion dates, Contractor shall submit to District within seven Days the proposed revisions to recover the lost time. As part of this submittal, Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of Work. If District requests, Contractor shall: show the intended critical path; secure appropriate Subcontractor and supplier consent to the recovery Schedule; submit a narrative explaining trade flow and construction flow changes, duration changes, added/deleted activities, critical path changes and identify all near critical paths and man hour loading assumptions for major Subcontractors.

B. The revisions shall not be incorporated into any Schedule update until District has reviewed the revisions.

C. If District does not accept Contractor’s revisions, District and Contractor shall follow the procedures in paragraphs 1.6C, 1.6D, and 1.6E of this Section Submittal Procedures.

D. At District’s discretion, Contractor can be required to provide Subcontractor certifications for revisions affecting said Subcontractors.
1.8 TIME IMPACT EVALUATION FOR CHANGE ORDERS AND OTHER DELAYS

A. When Contractor is directed to proceed with changed work, Contractor shall prepare and submit, within 14 Days from the direction to proceed, a TIE (Time Impact Evaluation) that includes both a written narrative and a schedule diagram depicting how the changed work affects other schedule activities. The schedule diagram shall show how Contractor proposes to incorporate the changed work in the schedule, and how it impacts the current Schedule update critical path or otherwise. Contractor is also responsible for requesting time extensions based on the TIE’s impact on the critical path. The diagram shall be tied to the main sequence of scheduled activities to enable District to evaluate the impact of changed work to the scheduled critical path.

B. Comply with the requirements of paragraph 1.8A of this Section 01320 for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, etc.

C. Contractor is responsible for all costs associated with the preparation of TIEs, and the process of incorporating TIEs into the current schedule update. Provide District with four copies of each TIE.

D. Once agreement has been reached on a TIE, the Contract Time will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Time may be extended in an amount District allows, and Contractor may submit a claim for additional time claimed by Contractor as provided in SECTION 00700 (General Conditions).

1.9 TIME EXTENSIONS

A. Contractor is responsible for requesting time extensions for time impacts that, in the opinion of Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accordance with SECTION 00700 (General Conditions).

B. Where an event for which District is responsible impacts the projected Substantial Completion date, Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. Contractor shall also include a detailed cost breakdown of the labor, equipment, and material Contractor would expend to mitigate District-caused time impact. Contractor shall submit the mitigation plan to District within 14 Days from the date of discovery of said impact. Contractor is responsible for the cost to prepare the mitigation plan.

C. Failure to request time, provide TIE, or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.

D. No time will be granted under the Contract Documents for cumulative effect of changes.

E. District will not be obligated to consider any time extension request unless requirements of Contract Documents are complied with.

F. Failure of Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.
G. Notwithstanding any other provision of this Section Submittal Procedures, if Contractor does not submit a TIE within the required 14 Days for any issue, Contractor hereby agrees that Contractor does not require a time extension for that issue.

1.10 PROJECT STATUS REPORTING

A. In addition to submittal requirements for scheduling identified in this Section Submittal Procedures, Contractor shall provide a biweekly project status report (i.e., written narrative report) to be submitted in conjunction with each Schedule as specified herein. Status reporting shall be in form specified in this paragraph 1.10 below.

B. Contractor shall prepare biweekly written narrative reports of status of Project for submission to District. Written status reports shall include:
1. Status of major Project components (percent complete, amount of time ahead or behind schedule) and an explanation of how Project will be brought back on schedule if delays have occurred.
2. Progress made on critical activities indicated on each Schedule, including inspections.
3. Explanations for any lack of work on critical path activities planned to be performed during last biweekly written narrative.
4. Explanations for any schedule changes, including changes to logic or to activity durations.
5. List of critical activities scheduled to be performed during the next 2 weeks.
6. Status of major material and equipment procurement.
7. Any delays encountered during reporting period.
8. Printed report indicating actual versus planned resource loading for each trade and each activity. This report shall be provided on a weekly and monthly basis.
   a. Actual resource shall be accumulated in field by Contractor, and shall be as noted on Contractor’s daily reports. These reports will be basis for information provided in monthly and weekly printed reports.
   b. Contractor shall explain all variances and mitigation measures.
9. Contractor may include any other information pertinent to status of Project. Include additional status information requested by District at no additional cost.
10. Status reports, and the information contained therein, shall not be construed as claims, notice of claims, notice of delay, or requests for changes or compensation.

C. At the close of each workday, Contractor shall provide District with a report of Contractor and its Subcontractors’ work activities for that day, including trades, equipment, work activities worked on, staff levels, and equipment deliveries.
PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS
SECTION 01330
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes general requirements for Submittals for the Work.

1.2 PROCEDURES

A. Contractor shall submit at Contractor’s expense, in duplicate sets, the following items (“Submittals”) required by the Contract Documents:
   1. Schedule of Shop Drawing and Sample Submittals
   2. Health and Safety Plan
   3. Progress Schedule
   4. Product Data; Shop Drawings
   5. Samples
   6. Coordination Drawings
   7. Quality Assurance Control Data
   8. Machine Inventory Sheets
   9. Installation, Operation, and Maintenance Manuals
  10. Computer Programs
  11. Project Record Documents

B. Contractor shall submit these Submittals to District for review and approval in accordance with accepted Schedule of Shop Drawings and Samples Submittals. If no such schedule is agreed upon, then all Shop Drawing, Samples, and product data Submittals shall be submitted within 14 Days after receipt of Notice of Award from District.

C. Contractor shall transmit each item with the appropriate Submittal transmittal form (attached to this Section Safety Submittals as Exhibits A and B). Identify Project, Contractor, Subcontractor, major supplier, pertinent Drawing sheet and detail number, and Specification Section number as appropriate. Where manufacturer’s standard drawings or data sheets are used, they shall be marked clearly to show those portions of the data that are applicable to this Project. Inapplicable portions shall be marked out. Submittals shall be submitted based on each Specification Section. Submittals containing information about more than one Specification Section will be returned for resubmittal. Submittals shall include all information requested by each Specification Section. (No partial Submittals.) Incomplete Submittals will be returned not reviewed by District.

D. The data shown on the Submittals shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show District the materials and equipment Contractor proposes to provide and to enable District to review the information for the limited purposes
specified in this Section 01330. Submittals shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as District may require to enable District to review the Submittal. The quantity of each Submittal to be submitted will be as required by individual Specification Sections or this Section 01330.

E. At the time of each submission, Contractor shall give District specific written notice of all variations, if any, that the submitted Submittal may have from the requirements of the Contract Documents, and the reasons therefore. This written notice shall be in a written communication attached to the Submittal transmittal form. In addition, Contractor shall cause a specific notation to be made on each Submittal submitted to District for review and approval of each such variation. If District accepts the deviation, District will note its acceptance on the returned Submittal transmittal form and, if necessary, issue an appropriate Contract Modification.

F. Submittal coordination and verification is Contractor’s responsibility; this responsibility shall not be delegated in whole or in part to Subcontractors or suppliers. Before submitting each Submittal, Contractor shall review and coordinate each Submittal with the other Submittals and with the requirements of the Work and the Contract Documents, and determine and verify:

1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;
2. All materials with respect to the intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work; and
3. All information relative to Contractor’s sole responsibilities and of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

G. Contractor’s submission to District of a Submittal shall constitute Contractor’s representation that it has satisfied its obligations under the Contract Documents, and as set forth immediately above in this paragraph 1.2 of Section 01330, with respect to Contractor’s review and approval of that Submittal.

H. Designation of work “by others,” if shown in Submittals, shall mean that work will be responsibility of Contractor rather than Subcontractor or supplier who has prepared Submittals.

I. After review by District of each of Contractor’s Submittals, one set of material will be returned to Contractor with actions defined as follows:

1. NO EXCEPTIONS TAKEN - Accepted subject to its compatibility with future Submittals and additional partial Submittals for portions of the Work not covered in this Submittal. Does not constitute approval or deletion of specified or required items not shown on the Submittal.
2. MAKE CORRECTIONS NOTED (NO RESUBMISSIONS REQUIRED) - Same as item 1 above, except that minor corrections as noted shall be made by Contractor.
3. REVISE AS NOTED AND RESUBMIT - Rejected because of major inconsistencies or errors that shall be resolved or corrected by Contractor prior to subsequent review by District.

4. REJECTED - RESUBMIT - Submitted material does not conform to Drawings and/or Specifications in major respect, i.e.: wrong size, model, capacity, or material.

J. Contractor shall make a complete and acceptable Submittal at least by second submission. District reserves the right to deduct monies from payments due Contractor to cover additional costs of review beyond the second submission. Illegible Submittals will be rejected and returned to Contractor for resubmission. Contractor shall be in breach of the Contract if Contractor’s first resubmittal, following a Submittal which District determines falls within categories 3 or 4 above, does not fall within categories 1 or 2 above.

K. Favorable review will not constitute acceptance by District of any responsibility for the accuracy, coordination and completeness of the Submittals. Accuracy, coordination, and completeness of Submittals shall be the sole responsibility of Contractor, including responsibility to back-check comments, corrections, and modifications from District’s review before fabrication or commencement of work. Contractor, Subcontractors, or suppliers may prepare Submittals, but Contractor shall ascertain that Submittals meet all requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. District’s review will be only to assess if the items covered by the Submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as indicated by the Contract Documents. Favorable review of Submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by District, or any officer or employee thereof, and Contractor shall have no claim under Contract Documents on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that District has no objection to Contractor using, upon Contractor’s own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.

L. District’s review will not extend to the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

M. Contractor shall submit complete initial Submittal for those items where required by individual Specification Sections. The complete Submittal shall contain sufficient data to demonstrate that items comply with Specifications, shall meet minimum requirements for submissions cited in Specification Sections, shall include motor data and seismic anchorage certifications, where required, and shall include necessary revisions required for equipment other than the first named. If Contractor submits incomplete initial Submittal when
complete Submittal is required, the Submittal may be returned to Contractor without review.

N. Contractor shall copy, conform, and distribute reviewed Submittals in sufficient numbers for Contractor’s files, Subcontractors, and vendors.

O. After District’s review of a Submittal, Contractor shall revise as noted and resubmit as required. Contractor shall identify changes made since the previous Submittal, and:

1. Begin no fabrication or work that requires Submittals until the return of Submittals not requiring resubmittal. Contractor shall not extrapolate from Submittals covering similar work.

2. Normally, Submittals will be processed and returned to Contractor within 14 Days of receipt.

P. Contractor shall distribute copies of reviewed Submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

Q. All Submittals shall be number-identified by Contractor, prior to submission to District, in accordance with the following:

1. Sequentially number each Submittal (i.e., “1”, “2”, “3”, etc.) as the basis for number identification of Submittals.

2. Affix the Submittal number under which each Submittal is made on every copy of each Shop Drawing, product data, sample, certification, etc.

3. Number Installation, Operation, and Maintenance Manuals with original root number of the approved Submittal for the item.

4. If the Submittal is a resubmittal (including without limitation after an initial Submittal is rejected, returned without review or marked ‘Revise as Noted and Resubmit’), add the suffix designation “A” (i.e., a resubmittal of Submittal 1 would be numbered 1A). Subsequent resubmittals would be identified by the Submittal number and sequential letters (i.e., “B”, “C”, “D”, etc.).

5. All Submittals shall include all information requested by each Specification Section. No partial Submittals will be accepted unless previously authorized by District. In the event a partial Submittal is authorized, each subsequent different Submittal (as opposed to resubmittal) is given a new number.

R. Submission Requirements:

1. Deliver Submittals to District at least 20 Days before dates reviewed Submittals will be needed.

2. Initial Submittal of Installation, Operation, and Maintenance Manuals shall be 45 Days after the date Submittals that pertain to the applicable portion of the Installation, Operation, and Maintenance Manual is satisfactorily reviewed.

3. The following table lists the number of initial Submittals required from Contractor for each type of submission, to whom Contractor shall distribute the information, and District’s distribution of reviewed submissions. If Contractor needs more copies of reviewed Submittals returned to it, then either submit additional copies or make copies from the returned Submittal. Submittals requiring resubmission will require the same quantity and distribution as an initial Submittal.
Accompany Submittals with Submittal transmittal form, in duplicate, containing:

a. Date, revision date, and Submittal log number.
b. Project name and District’s Contract number.
c. Contractor’s name, address, and job number.
d. Specification Section number clearly identified.
e. The quantity of Shop Drawings, Product Data, or Samples submitted.
g. Safety Data Sheet (SDS) for each item complying with Cal-OSHA’s Hazard Communication Regulation, Title 8, Section 5194.
h. Other pertinent data.

4. Submittal shall include:

a. Date and revision dates.
b. Revisions, if any, identified.
c. Project Name and Contract number.
d. The names of Contractor, Subcontractor, Supplier, Manufacturer, and separate detailer, when pertinent.
e. Identification of product material by location within the Project.
f. Relation to adjacent structure or materials.
g. Field dimensions, clearly identified as such.
h. Specification Section number and applicable detail reference number on the Drawings.
i. Applicable reference standards, such as ASTM, ANSI, FS, NEMA, SMACNA or ACI.
j. A blank space, on each Drawing or data sheet, 5” x 4” for the District’s stamp.
k. Identification of deviations from Contract Documents.
l. Contractor’s stamp, initialed or signed, with language certifying the review of Submittals, verification of field measurements, construction criteria and technical standards in compliance with Contract Documents.
S. Resubmission requirements:
1. Shop Drawings:
   a. Revise initial Shop Drawings as required and resubmit as specified for initial Submittals.
   b. Indicate on Shop Drawings any changes that have been made other than those requested by District.
2. Product Data and Samples:
   a. Submit new Product Data and Samples as required for initial Submittals.
3. Installation, Operation, and Maintenance Manuals:
   a. Revise initial Installation, Operation, and Maintenance Manual(s) as required and resubmit as specified for initial Submittals.
T. Number of resubmissions:
One reexamination of Contractor’s Submittals that have been returned for correction or replacement will be included in District’s budget. Any additional reexamination of Contractor’s Submittals will be considered additional scope services to be paid by Contractor through District. Contractor shall pay District (or District may deduct from any progress or final payment), for engineering personnel, on an hourly basis at 2.5 times direct payroll expenses, and for consultant personnel time at 1.25 times the amount billed District.

1.3 SCHEDULE OF SHOP DRAWING AND SAMPLE SUBMITTALS
A. Contractor shall submit preliminary Schedule of Shop Drawing and Sample Submittals as required by SECTION 00700 (General Conditions). Contractor shall submit two copies of final and accepted Schedule of Shop Drawings and Sample Submittals as required by paragraph 1.2A.1 of this Section.
B. Schedule of Shop Drawing and Sample Submittals will be used by District to schedule its activities relating to its review of Submittals. Schedule of Submittals shall indicate a spreading out of Submittals and early Submittals of long-lead-time items and of items that require extensive review.
C. Schedule of Shop Drawing and Sample Submittals will be reviewed by District and shall be revised and resubmitted until accepted by District.
D. Unless otherwise specified, Contractor shall make Submittals in groups containing all associated items to assure that information is available for checking each item when it is received. Contractor shall identify on the Submittal which Submittals should be reviewed together.

1.4 HEALTH AND SAFETY PLAN
A. Submit two hard-copy copies and an electronic copy (PDF format) of the Health and Safety Plan specific to these Contract Documents to District within 10 days of the Notice of Award and prior to the start of any Work.

1.5 PROGRESS SCHEDULE
A. See Section 01320 (Progress Schedules and Reports) for schedule and report requirements. Section 01320 shall control in any conflict with Section 01330.
1.6 **PRODUCT DATA**

A. Within 10 Days after Start Date of the Contract Time, Contractor shall submit two (2) copies of complete list of major products proposed for use, with name of manufacturer, telephone number, trade name, and model number of each product. Tabulate product data by Specification Section.

B. For products specified only by reference standards, Contractor shall give manufacturer, trade name, model or catalog designation, and reference standards.

C. Product or Catalog Data:
   1. Manufacturer’s standard drawings shall be modified to delete non-applicable data or include applicable data.
   2. For manufacturer’s catalog sheets, brochures, diagrams, schedules, charts, illustrations and other standard descriptive data, Contractor shall:
      a. Mark each copy to identify pertinent materials, products, or models.
      b. Show dimensions and clearances required, performance characteristics and capacities, wiring diagrams and controls.
      c. Include applicable SDS.

D. Supplemental Data:
   1. Contractor shall submit number of copies that Contractor requires, plus two copies that will be retained by District.
   2. Contractor shall mark each copy to identify applicable products, models, options, and other data, and supplement manufacturer’s standard data to provide information unique to Project.

E. Contractor shall provide copies for Project Record Documents described in Section 01770 (Contract Closeout).

1.7 **SHOP DRAWINGS**

A. Minimum Sheet Size: 8½ inches by 11 inches. All others: Multiples of 8½ inches by 11 inches, 34 inches by 44 inches maximum.

B. Original sheet or reproducible transparency will be marked with District’s review comments and returned to Contractor.

C. Mark each copy to identify applicable products, models, options, and other data; supplement manufacturers’ standard data to provide information unique to Work.

D. Include manufacturers’ installation instructions when required by Specification Section.

E. If Contractor submits Shop Drawings for items that Shop Drawings are not specified, District will not be obliged to review them.

F. Contractor is responsible for procuring copies of Shop Drawings for its own use as it may require for the progress of the Work.

G. Shop Drawings shall be drawn to scale and completely dimensioned, giving plan view together with such sectional views as are necessary to clearly show construction detail and methods.
1.8 SAMPLES

A. Contractor shall submit full range of manufacturers’ standard colors, textures, and patterns for District’s selection.

B. Contractor shall submit samples to illustrate functional and aesthetic characteristics of product, with integral parts and attachment devices, and coordinate Submittal of different categories for interfacing work.

C. Contractor shall include identification on each sample, giving full information.

D. Sizes: Unless otherwise specified, Contractor shall provide the following:
   1. Paint Chips: Manufacturers’ standard
   2. Flat or Sheet Products: Minimum 6 inches square, maximum 12 inches square
   3. Linear Products: Minimum 6 inches, maximum 12 inches long
   4. Bulk Products: Minimum 1 pint, maximum 1 gallon

E. Full size samples may be used in Work upon approval by District.

F. Field Samples and Mock-ups (if applicable):
   1. Contractor shall erect field samples and mock-ups at Site in accordance with the requirements of Specification Sections. If testing is conducted, Contractor shall record and certify results and full Contract compliance.
   2. Contractor shall modify or make additional field samples and mock-ups as required to provide appearance and finishes approved by District.
   3. Approved field samples and mock-ups may be used in Work upon approval by District.
   4. Contractor shall construct or prepare as many additional Samples as may be required, as directed by the District, until desired textures, finishes, and/or colors are obtained.
   5. Accepted Samples and mock-up shall serve as the standard of quality for the various units of work.

G. No review of a Sample shall be taken in itself to change or modify the requirements in the Contract Documents.

H. Finishes, materials, and workmanship in the completed Work shall match accepted Samples.

1.9 QUALITY ASSURANCE CONTROL SUBMITTALS

A. Test Reports:
   1. Submit a PDF; PDF will be marked with District’s review comments and returned to Contractor.
   2. Indicate that material or product conforms to or exceeds specified requirements.
   3. Reports may be from recent or previous tests on material or product, but shall be acceptable to District. Comply with requirements of each individual Specification Section.

B. Certificates:
   1. Contractor shall submit a PDF; PDF will be marked with District’s review comments and returned to Contractor.
   2. Contractor shall indicate that material or product conforms to or exceeds specified requirements.
3. Contractor shall submit supporting reference data, affidavits, and certifications as appropriate.
4. Certificates may be recent or from previous test results on material or product, but shall be acceptable to District.

C. Manufacturers’ Instructions:
1. Contractor shall submit PDF; PDF will be marked with District’s review comments and returned to Contractor.
2. Contractor shall include manufacturers’ printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.
3. Contractor shall identify conflicts between manufacturers’ instructions and Contract Documents.

D. Safety Data Sheets:
1. In addition to Safety Data Sheets (SDS) otherwise required by the Contract Documents, Contractor shall submit PDF document for any paints, solvents, thinners, varnish, lacquer, glues and adhesives, mastics, or other materials needed for the Project as required by the individual Specification Sections or as otherwise specified in the Contract Documents.
2. SDS required for a Submittal shall be submitted with product data in order for the Submittal to be reviewed.

1.10 INSTALLATION, OPERATIONS, AND MAINTENANCE MANUALS
A. Sheet Size: 8½ x 11 inch
B. Drawing Size: Contractor shall reduce drawings or diagrams to an 8½ x 11 inch or 11 x 17 inch size. However, where reduction is not practical to ensure readability, Contractor shall fold larger drawings separately and place in vinyl envelopes bound into the binder. Identify vinyl envelopes with drawing numbers.
C. Binding: Contractor shall bind in stiff, metal-hinged, three-ring binder(s) with standard three-hole punching.
D. Multiple Items: Multiple items may be combined into one binder; tab each section with plastic-coated dividers.
E. Page Protectors: Contractor shall provide plastic sheet lifters prior to first page and following last page.
F. Binder title: Contractor shall include the following title on front and spine of binder:

EL DORADO IRRIGATION DISTRICT
OUTINGDALE RAW WATER PUMP STATION UPGRADE
PROJECT NO. 16048.01, CONTRACT NO. E20-17
INSTALLATION, OPERATION, AND MAINTENANCE MANUAL, 20__

G. Contents:
1. Introductory Information shall include:
   a. Title page providing the same information as paragraph 1.10F above
   b. Contractor’s name, address, and telephone number
   c. Table of Contents
2. Contractor shall include, at a minimum, the following detailed information for each item as applicable and as required by individual Specification Sections:
   a. Equipment function, normal operating characteristics, limiting operations.
   b. Assembly, disassembly, installation, alignment, adjustment, and checking instructions.
   c. Operating instructions for startup, routine and normal operation, regulation and control, shutdown, and emergency conditions.
   d. Lubrication and maintenance instructions including specific type and amount of lubricant and recommended lubrication interval.
   e. Guide to "troubleshooting."
   f. Parts list and predicted life of parts subject to wear.
   g. Outline, cross-section, and assembly drawings; engineering data; and electrical diagrams, including elementary diagrams, labeled wiring diagrams, connection diagrams, word description of wiring diagrams and interconnection diagrams.
   h. Test data and performance curves.
   i. A list of recommended spare parts with a price list and a list of spare parts provided under this Contract.
   j. Copies of parts lists or other documents packed with equipment when delivered.
   k. Instrumentation or tag numbers relating the equipment back to the Contract Documents.

3. Index

H. Final Submittal: Upon favorable review of Installation, Operation, and Maintenance Manual(s) by District, Contractor shall deliver two additional hard copies and one electronic media format copy of the final approved Installation, Operation, and Maintenance Manual(s). Electronic media format copy shall include all tables, charts, AutoCAD drawings, Layers, Styles and reference files, Survey data, Aerials, and codes necessary to accurately duplicate the .pdf plan set, and all other matters reflected in hard copies. Contractor shall complete the Equipment and Tasks lists in digital format for each piece of equipment supplied.

I. Electronic Media Format: Adobe PDF with character recognition for Windows, Most Current AutoCAD Civil 3D (.dwg), Aerials (.tif), Photos (.tif or .jpg), Plan Sheet Sets (.pdf). All files shall be delivered on a unique USB Drive.

1.11 COMPUTER PROGRAMS

When any equipment requires operation by computer programs, Contractor shall submit copy of the programs on appropriate USB Drive, plus a hard-copy and an electronic copy (Adobe .PDF format) of all user manuals and guides for operating the programs and making changes in the programs for upgrading and expanding the databases. All such programs shall be Windows compatible.
Provide all required licenses to use the programs to District at no additional cost.

1.12 PROJECT RECORD DOCUMENTS

Contractor shall submit one copy of each of the Project Record Documents listed in Section 01770 (Contract Closeout).

1.13 DELAY OF SUBMITTALS

Delay of Submittals by Contractor is considered avoidable delay. Liquidated damages incurred because of late Submittals will be assessed to Contractor.

1.14 OPTIONAL REVIEW MEETING

At the Contractor’s request, in order to facilitate the timeliness of the review process, the District may schedule a meeting to review the materials submitted. See Section 01320 (Progress Schedules and Reports) for meeting schedule requirements. Section 01320 shall control in any conflict with Section 01330.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

TRANSMITTAL SHEETS AND MAINTENANCE SHEET FOLLOW THIS PAGE
SUBMITTAL No. 001
Specification Section: 01330

Project Name: Outingdale Raw Water Pump Station Upgrade
Project No.: 16048.01
Contract No.: E20-17

El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

Date Received:

Contractor: Log Page:

Contractor Address: District Address: 2890 Mosquito Road, Placerville, CA 95667

Attention: Attention: 1st Submittal Resubmittal No. ___

Date transmitted by contractor: Date previous transmitted:

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<th>Manufacturer</th>
<th>Dwg. No. or Page No.</th>
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* The action designated above is in accordance with the following legend:
A – No Exceptions Taken
B – Make Corrections Noted (No Resubmission Required)
C – Make Corrections Noted and Resubmit
D – Not Approved
E – District’s review not required

Comments:

Reviewed By: ____________________________ Date ____________

Distribution: [ ] Contractor [ ] File [ ] Inspection [ ] District [ ] Other _________
### Transmittal No. 001

#### Specification Section: 01330

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**Comments:**

Reviewed By: ________________________________ Date _______________

Distribution: [ ] Contractor [ ] File [ ] Inspection [ ] District [ ] Other _________
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01340

SAFETY SUBMITTALS

PART 1 GENERAL

1.1 SCOPE

Contractor shall submit a comprehensive written Health and Safety Plan (HSP) as specified herein within 10 days from the Notice of Award. The Health and Safety Plan required to be submitted herein must be favorably reviewed by District prior to Contractor starting Work.

1.2 DISTRICT’S REVIEW OF SUBMITTALS

Neither District's review of nor comments on any of the submittals shall constitute a representation or warranty as to compliance with any legal requirements. District reserves the right to reject all or portions of a submittal as inadequate to protect health, or safety. If conditions change, Contractor shall promptly update the Plan as appropriate, and submit the revised Plan to District at no additional charge to District. References are to Title 8 of the California Code of Regulations.

1.3 PLANS AND PROGRAMS

Contractor shall submit a copy of this contract section as a checklist with the submittals containing the following checked items, including document name and page number, prior to starting Work and in accordance with Document 00510 (Notice of Award):

☑ 1. Injury and Illness Prevention Program (§§1509, 3203)
   Document Name: ____________________________
   Note to Contractor: Supervisory safety meeting element 1.C is different from Labor/Management Safety Committee substantial regulatory requirement. Requirement of Title 8, Section 1509 (d)
   A. Page #_______ Code of Safe Practices (see §1938, Appendix A, Plate A-3)
   B. Page #_______ Weekly “Toolbox” or “Tailgate” safety meeting schedule
   C. Page #_______ Safety inspection schedule to identify unsafe conditions
   D. Page #_______ Procedures for identifying, reporting and correcting identified hazards
   E. Page #_______ Supervisory safety meetings defining the frequency and schedule to review accidents and improve safety

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Safety Submittals
2. Emergency Medical Services (§§ 1512, 3400, 2320.10)
   Document Name: ________________________________
   A. Page #________ Availability of compliant first aid supplies and
      inspection frequency to ensure expended items are replaced
   B. Page #________ Availability of a suitable number of first aid and
      CPR trained individuals on-site to provide 4-minute response
   C. Page #________ Availability of timely emergency medical
      services and prompt transportation

3. Fire Protection and Prevention (§1920 et. seq)
   Document Name: ________________________________
   A. Page #________ Firefighting equipment available during all
      phases of construction
   B. Page #________ All firefighting equipment conspicuously
      located, marked, with unobstructed access at all times
   C. Page #________ No delay in response as fire hazards occur
   D. Page #________ All firefighting equipment maintained in
      operating condition, and defective equipment immediately
      replaced
   E. Page #________ Temporary or permanent water supply, of
      sufficient volume, duration, and pressure to operate firefighting
      equipment as soon as combustible materials accumulate

4. Hazard Communication Program (§5194)
   Document Name: ________________________________
   A. Page #________ Safety Data Sheets (SDS) are readily
      available during each work shift in work area(s)
   B. Page #________ Employees are trained to know the location of
      SDSs
   C. Page #________ Product containers are properly labeled
   D. Page #________ Methods for contractor to provide other
      employers with access to written program, SDSs, and
      coordination on protective measures

5. Heat Illness Prevention Program (§3395)
   Document Name: ________________________________
   A. Page #________ Shade and water required at temperatures
      exceeding 80 degrees Fahrenheit at all times when employees
      are present
   B. Page #________ High-heat procedure at temperatures
      exceeding 95 degrees Fahrenheit
   C. Page #________ Supervisor and employee training prior to
      performing work
6. Electrical Safety Program (§§2299 et seq.)
Document Name: ___________________________________________________________________________
   A. Page #________ Explanation of Qualified Person(s) authorized to perform work on or near exposed energized parts
   B. Page #________ Procedures for working in the Minimum Approach Distance (MAD)
   C. Page #________ Energized electrical work permitting procedure
   D. Page #________ Competent supervision notification requirement of the District Representative prior to authorizing and performing energized electrical work

7. Lock-out/Tag-out/Block-out Program (§§2320.4-5, 3314)
Document Name: __________________________________________________________________________
   A. Page #________ Explanation of management responsibilities, “Authorized” and “Affected” employees
   B. Page #________ Requirement for use of suitable padlocks and tags by authorized employees
   C. Page #________ Explanation of preparation, notification, sequence, and restoration
   D. Page #________ Requirement to prepare separate written equipment-specific or process-specific hazardous energy control procedures containing procedural steps prior to each shutdowns, isolations, blockings and securing
   E. Page #________ Contractor coordination with other employers

8. Confined Space Program (§§5156 et seq., §§1950 et seq.)
   Note to Contractor: Submittals referencing calling 911 are unacceptable.
   El Dorado county emergency service agencies do not provide confined space entry rescue services.
   A. Page #________ Definition and method of identifying site-specific confined spaces
   B. Page #________ Explanation of safe entry roles and responsibilities
   C. Page #________ Evaluation of pre-entry and entry atmospheric conditions and engulfment evaluation procedures
   D. Page #________ Method to inform exposed employees of confined space dangers, and prevention of unauthorized entry
   E. Page #________ Explanation of permit-required procedures including rescue methods and services
   F. Page #________ Identification of individuals having current Red Cross-equivalent first aid and CPR training
   G. Page #________ Procedures for summoning emergency services in the event of failed non-entry rescue
   H. Page #________ Predetermination of the timely rescue and emergency services response summons
I. Page #________ Communication and coordination with other employers regarding hazards and precautions

☐ 9. Dive Operations (§§6050 et seq.)
   Written Manual for Diving Safety
   a. Page #________ Submit a copy of Title 8, §6050.
   b. For each dive mode engaged in submit:
      i. Page #________ Safety procedure for the dive operation
      ii. Page #________ Responsibilities of dive team members
      iii. Page #________ Equipment procedures
      iv. Page #________ Emergency procedures
      v. Page #________ Emergency evacuation and emergency treatment procedures
      vi. Page #________ Listing of operational recompression chambers and appropriate medical facilities
      vii. Page #________ For each dive location a procedures to transport a diver to an operational recompression chamber in the event of a diving accident

☑ 10. Trenching and Excavations (§§1539 et seq.)
   Document Name: __________________________________________
   A. Page #________ Submit a copy of annual excavation and trenching permit including Cal-OSHA notification requirements
   B. Page #________ Requirement for an on-site excavation competent person(s) having program responsibility
   C. Page #________ Installation of protective systems less than five feet in depth if an examination of the ground by a competent person reveals an indication of a potential cave-in
   D. Page #________ Installation of protective systems five feet or more in depth by a competent person
   E. Page #________ Protective systems not in accordance with the regulation (i.e., prescribed benching, sloping, vertical hydraulic shoring) shall be designed by a registered professional engineer
   F. Page #________ Requirement to notify the District representative prior to performing engineered protective systems and providing a copy of the design plan
11. Fall Protection Program (§§1669 et seq.)

Document Name: ____________________________

A. Conventional fall protection (guard rails, fall restraint, personal fall arrest, safety nets)
   i. Page #__________ Requirement for an on-site fall protection competent person(s) having program responsibility
   ii. Page #__________ Provision for prompt rescue of employees or self-rescue

Note to Contractor: If only conventional systems are used check “Not applicable” below

B. □ Not applicable. Non-conventional fall protection (rope access, controlled access zone)
   i. Page #__________ A job-site location-specific fall protection plan prepared by the qualified person documenting the reason why conventional systems are infeasible or why their use would create a greater hazard
   ii. Page #__________ Identification of qualified person that approved the fall protection plan
   iii. Page #__________ Identify the on-site fall protection competent person(s) having program responsibility
   iv. Page #__________ Submit an approved rescue plan

12. Scaffold Plan (§1637)

Document Name: ____________________________

A. Page #__________ Identification and certification documentation of the scaffold qualified person who determines the maximum intended working load, responsibility for erection and dismantling of scaffolds or falsework

B. Page #__________ Identification of the on-site competent person performing daily scaffolding inspections, identifying predictable hazards, and is authorized to take prompt corrective and elimination measures

C. Page #__________ Requirement to notify the District representative prior implementing the use of any special-duty scaffolds to be installed by a qualified person experienced in such design

□ Not applicable. No special duty scaffolding will be installed.

13. Work Near Water (§§1602 et seq.)

Document Name: ____________________________

Note to Contractor: This plan is not required when employees are continually protected by railings, nets, safety belts, or other applicable safety orders.

A. Page #__________ Submit plan outlining methods that protect employees where the danger of drowning exists

Document Name: ______________________________________

A. Page #_______ Submit current annual asbestos-cement pipe training certificates and documentation for employees that have received initial and/or annual recertification training from a Cal-OSHA approved trainer

B. Page #_______ Identification of the asbestos-cement pipe competent person(s)

C. A work plan to prevent asbestos fibers and debris from being dispersed from the work area into the environment, including:
   i. Page #_______ Staging of the project
   ii. Page #_______ Staging of waste materials
   iii. Page #_______ Weekly progress reports
   iv. Page #_______ Names and addresses of the construction landfill receiving asbestos-cement pipe construction waste
   v. Page #_______ Waste bills of lading submission to District Representative

15. Lead Compliance Program (§1532.1)

Document Name: ______________________________________

A. Page #_______ Submit training certificates and documentation for employees that have received lead certification training from a Cal-OSHA approved trainer, and are medically cleared to perform related work

B. Page #_______ Identification of the “Trained Supervisor”

C. Page #_______ Lab analyses and/or Safety Data Sheets for lead-containing materials

D. Page #_______ Names and addresses of the waste hauler and the landfill for hazardous and non-hazardous wastes

E. Page #_______ Waste bills of lading submission to District Representative

16. Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment (§§3649 et seq.)

Document Name: ______________________________________

A. Page #_______ Identification and certification documentation for employees authorized to operate equipment

17. Cranes and Other Hoisting Equipment (§§4884 et seq.)

Document Name: ______________________________________

A. Page #_______ Identification and certification documentation for employees authorized to operate equipment
18. Tunnel Safety (§§8400 et seq.)

Document Name: ____________________________

A. Page # __________ Cal-OSHA Mining and Tunneling Unit training certificate(s) and documentation for the employer designated on-site Safety Representative
B. Page # __________ Identification and certification documentation for employees authorized to access the work zone
C. Page # __________ Safety procedures relating to the scope of work and work to be performed consistent with the tunnel owner’s Cal-OSHA Mining and Tunneling Unit tunnel classification regarding “Safety Practices and Operations Code”
D. Page # __________ Required inspections frequency and processes
E. Page # __________ Schedule for any required pre-job safety conference with representatives from the Mining and Tunneling Unit, owner, and employees
F. Page # __________ Communication system
G. Page # __________ Emergency plan and exit protection
H. Page # __________ Ventilation plan
I. Page # __________ Gas detection procedures
J. Page # __________ Accident reporting to DOSH within 24 hours
K. Page # __________ Rescue plan

19. Helicopter Operations (§§1900 et seq.)

Document Name: ____________________________

A. Page # __________ Identification and Federal Aviation Administration pilot certification documentation for the performance of the planned operation
B. Page # __________ Requirement to conduct a thorough site survey of conditions and hazards between contractor and pilot or pilot's representative to ensure safe operation
C. Page # __________ Code of Safety Practices for helicopter operations
D. Page # __________ Requirement to conduct and document daily briefings with other employers including safeguards and escape procedures

20. Respirable Crystalline Silica (§1532.3)

Document Name: ____________________________

A. Page # __________ Identification and certification documentation of the on-site designated competent person to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control procedures(s)
B. Page # __________ Description of employee information and training to ensure employees can demonstrate knowledge and understanding
C. Page #________ Identification of Table 1 project-specific tasks and submission of written exposure control procedures containing requirement to implement effective engineering controls, work practices, housekeeping, access restrictions, and respiratory protection elements

D. Page #________ Requirement to review and update exposure control procedures annually

E. Page #________ Requirement to identify non-Table 1 project-specific tasks requiring exposure assessment using Alternative Control Methods and methods to minimize employee exposure until assessment completion

F. Page #________ Description of the procedures used to restrict access to work areas to minimize employee exposure, including exposures generated by other employers or sole proprietors

☑ 21. Working during a COVID-19 Pandemic
   1. All employees that will be working during a COVID-19 pandemic have reviewed EID’s SOP. Submit a signed copy of the SOP.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION
Section 1.01 Purpose

Provide procedural information and direction regarding required safety measures for contractors, consultants, or vendors (“Vendors”) who have a need to access District facilities and/or interact with District employees. These measures are intended to reduce the risk of exposure to COVID-19 and are in compliance with the pandemic emergency statewide face coverings mandate issued by Governor Newsom on June 18, 2020.

Section 1.02 Intent

This Standard Operating Procedure (SOP) is intended to provide District personnel with direction and information on the process and safety precautions required prior to allowing Vendors access to District facilities and/or to interact with District personnel. This SOP is supplements HR-120 (SOP). Therefore, Vendors must use non-traditional Personal Protective Equipment (i.e., face coverings) as required by state law when accessing District facilities or interacting with District personnel. This requirement is consistent with the State Health Officer’s order and guidance issued in response to COVID-19 (Order). This SOP will remain in effect until the District determines that Vendors do not pose a risk to District personnel related to the COVID-19 virus.

Section 1.03 Roles and Responsibilities

All District employees are subject to and responsible for ensuring a safe working environment as detailed in the District’s Injury and Illness Prevention Program (IIPP). When a potential or active hazard exist in the workforce, the District will develop, disseminate, and implement safe work practices to eliminate and/or mitigate the potential or active workplace hazard. As determined by federal, state and local authorities, COVID-19 is considered an active workplace hazard requiring action to mitigate. This by extension applies to all outside personnel (Vendors) accessing District facilities and or while providing services to the District which require interaction with District employees.

1 06/18/2020 State Public Health Officer order and guidance on required use of face coverings in public
Vendors performing work for the District will not interact with District personnel and/or ensure that if interaction is necessary, they will employ social distancing, minimum of six (6) feet and wear a face covering.

In addition, Vendors who interact with District employees and/or access District facilities in the commission of providing service to the District must take the following action if social distancing cannot be maintained at all time:

Use a face-cover, goggles sealed around the eyes and gloves when:

- Inside any District space;
- While in a District vehicle;
- Engaged in work for the District, when:
  - Interacting in-person with any District employee or members of the public;
  - Working in any space visited by District employees or members of the public, regardless of the presence of either at the time;
  - Working in or walking through common areas, such as hallways, stairways, elevators, and parking facilities;
  - In any room or enclosed area where other people are present when unable to physically distance.
  - While outdoors in District or public spaces when maintaining a physical distance of 6 feet from persons is not feasible.

The District will work in good faith with any Vendor who believes they may be exempt from wearing a face covering:²

Section 1.04  Scope

This SOP is separate from, and does not amend, revise and/or incorporate the District’s existing respiratory protection program, or any other OSHA/CalOSHA regulated District safety program(s). This SOP is however considered a District safe work practice and must be followed by all District employees as required under the Injury and Illness Prevention Program (IIPP) and the Order for all identified active workplace hazards. As such, District employees and Vendors shall adhere to this safe work practice.

Section 1.05  Required Non Tradition Personal Safety Equipment for Vendors

To be clear, when social distancing cannot be achieved, Vendors, and District personnel must wear a face-covering, goggles sealed around the eye and gloves

² Refer to § 1.07 of this SOP
(latex, Nitrile or similar) prior to the commencement of the work or interaction. Vendors should bring a sufficient supply of these resources to comply with this SOP.

In the event of unexpected circumstances, the District will provide the vendor with the necessary face coverings and/or gloves. This however should be the exception and not the norm as these resources are limited and reserved for District personnel.

**Section 1.06 Vendor Access To District Facilities**

District personnel assigned as project managers, and or who have secured the services of a Vendor, must obtain prior authorization and/or consult with affected supervisory District personnel before the commencement of work by the Vendor. This will allow District personnel to avoid such locations (preferred) and/or to ensure adequate social distancing strategies.

All projects and work that requires significant vendor/staff contact (donning of PPE or sustained onsite presence) must be reviewed and approved by the Department Director PRIOR to commencing. Those onsite Vendor activities that can be accomplished through avoidance of interaction or social distancing described above must be reviewed and approved by the Division Manager. Work plans shall be developed reviewed by Managers and Supervisors and affected staff. Once the plan is complete it must be submitted to the Division Manager or Director, as appropriate, by email for approval.

Once the work has been completed, EID staff should make sure that all surfaces that were contacted by anyone (Vendor or EID staff), are wiped down and disinfected following CDC Guidelines to prevent a possible secondary exposure risk.

**Section 1.07 Vendor Acknowledgement of this SOP**

These guidelines and requirements should be shared with all Vendors who require access to EID facilities or interaction with District personnel.

**Section 1.08 Standard Deliveries**

Standard deliveries such as chemicals and packages (USPS, UPS, and FedEx) do not require distinct approval for each event, however the principles of minimal contact and social distancing still apply. Drinking Water chemical deliveries that require testing should also follow this SOP.

**Section 1.09 Attachments / Reference Resources**
**Vendor Work Plan**

**Vendor:**

**Type of Work:**

**Vendor COVID-19 procedures:**

<table>
<thead>
<tr>
<th>Vendor Requirements</th>
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<th>☐ No</th>
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<tr>
<td>EID Vendor SOP Acknowledgement Signed</td>
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<td></td>
</tr>
<tr>
<td>EID Staff Required</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Authorizing Vendor Supervisor:**

**Authorizing Vendor Supervisor Signature:**

- District Injury and Illness Prevention Program
- California Department of Public Health Guidance for the use of face coverings dated, 06/18/2020
- SharePoint
PART 1 GENERAL

1.1 SUMMARY

A. Section includes: regulatory requirements applicable to Contract Documents.

B. Specific reference in the Specifications to codes and regulations or requirements of regulatory agencies shall mean the latest printed edition of each adopted by the regulatory agency in effect at the time of the opening of bids, except as may be otherwise specifically stated in the Contract Documents.

C. Should any conditions develop not covered by the Contract Documents wherein the finished Work will not comply with current codes, a change order detailing and specifying the required Work shall be submitted to and approved by District before proceeding with the Work.

1.2 REFERENCES TO REGULATORY REQUIREMENTS

A. Codes, laws, ordinances, rules and regulations referred to shall have full force and effect as though printed in full in these Specifications. Code, laws, ordinances, rules and regulations are not furnished to Contractor, because Contractor is assumed to be familiar with these requirements. The listing of applicable codes, laws, regulations and ordinances for hazardous waste abatement Work in the Contract Documents is supplied to Contractor as a courtesy and shall not limit Contractor’s responsibility for complying with all applicable laws, regulations or ordinances having application to the Work. Where conflict among the requirements of or with these Specifications occurs, the most stringent requirements shall be used.

B. Conform to all applicable codes, laws, ordinances, rules and regulations.

C. Precedence:
   1. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence.
   2. Where Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, Drawings and Specifications shall take precedence so long as such increase is legal.
   3. Where no requirements are identified on Drawings or in Specifications, comply with all requirements of applicable codes, ordinances and standards of governing authorities having jurisdiction.

1.3 CODES

A. Codes that apply to Contract Documents include, but are not limited to, the following:
   1. CBC (Part 2, Title 24, CCR, including, without means of limitation, Sections 16A, 102A.23, 308, 420A, 504-506, 904.2.6, 1019 and 1604)
   2. CEC (Part 3, Title 24, CCR)
   3. CMC (Part 4, Title 24, CCR)
4. CPC (Part 5, Title 24, CCR)
5. State Elevator Safety Regulations (Part 7, Title 24, CCR)
6. UBC
7. UPC
8. UMC
9. NEC

1.4 LAWS, STATUTES, ORDINANCES, RULES, AND REGULATIONS

A. During prosecution of Work to be done under Contract Documents, Contractor shall comply with applicable laws, ordinances, rules and regulations, including, but not limited to, the following:

1. Federal
   a. Americans With Disabilities Act of 1990
   b. 29 CFR, Section 1910.1001, Asbestos
   c. 40 CFR, Subpart M, National Emission Standards for Asbestos
   d. Executive Order 11246
   e. Federal Endangered Species Act
   f. Clean Water Act

2. State of California
   a. California Code of Regulations, Titles 5, 8, 19, 21, 22, 24 and 25
   b. California Public Contract Code
   c. California Health and Safety Code
   d. California Government Code
   e. California Labor Code
   f. California Civil Code
   g. California Code of Civil Procedure
   h. CPUC General Order 95, Rules for Overhead Electric Line Construction
   i. CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems
   j. Cal/OSHA
   k. OSHA: Hazard Communications Standards
   l. California Endangered Species Act
   m. Water Code
   n. Fish and Game Code

3. State of California Agencies
   a. State and Consumer Services Agency
   b. Office of the State Fire Marshall
   c. Office of Statewide Health Planning and Development
   d. Department of Fish and Game
   e. El Dorado County Air Quality Management District
   f. Central Valley Regional Water Quality Control Board

4. Local Agencies:
   a. County of El Dorado
   b. El Dorado County Fire Department

5. Other Requirements:
   b. References on Drawings or in Specifications to “code” or “building code” not otherwise identified shall mean the codes specified in this Section 01410,
together with all additions, amendments, changes, and interpretations adopted by code authorities of the jurisdiction.

B. Contractor shall have access to all of the foregoing within 24 hours.

C. Other Applicable Laws, Ordinances and Regulations:
   1. Work shall be accomplished in conformance with all applicable laws, ordinances, rules and regulations of federal, state, and local governmental agencies and jurisdictions having authority over the Project.
   2. Work shall be accomplished in conformance with all rules and regulations of public utilities and utility districts.
   3. Where such laws, ordinances rules, and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to the time of opening of the bids.

D. Change Orders and Claims:
   1. The California Public Contract Code, including but not limited to Section 7105(d)(2), and the California Government Code Section 930.2 et seq., apply to all contract procedures for changes, time extensions, change orders (time or compensation) and claims. Federal law (U.S. v. Holpuch (1946) 326 U.S. 234.) shall supplement but not supersede California law on these requirements.
   2. Any change, waiver, or omission to implement contract change order and claims procedures shall have no legal effect unless expressly permitted in a fully executed change order approved by District and approved in writing by District’s General Counsel.

1.5 CONFLICTS

A. If the conflict is between referenced regulatory requirements, Contractor shall comply with the one establishing the more stringent requirement.

B. If the conflict is between referenced regulatory requirements and the Contract Documents, Contractor shall comply with the one establishing the more stringent requirement.

1.6 REQUIRED PROVISIONS ON CONTRACT CLAIM RESOLUTION

A. The California Public Contract Code specifies required provisions on resolving contract claims less than $375,000, which are set forth below, and constitute a part of this Contract.

   1. For the purposes of this section, “Claim” means a separate demand by Contractor of $375,000 or less for (1) a time extension, (2) payment or money or damages arising from Work done by or on behalf of Contractor arising under the Contract Documents and payment of which is not otherwise expressly provided for or the Claimant is not otherwise entitled to, or (3) an amount the payment of which is disputed by District. In order to qualify as a Claim, the written demand must state that it is a Claim submitted under paragraph 12 of SECTION 00700 (General Conditions) and be submitted in compliance with all requirements of SECTION 00700 (General Conditions), paragraph 12. Separate Claims which total more than $375,000 do not qualify as a “separate demand of $375,000 or less,” as referenced above, and are not subject to this section.
2. A voucher, invoice, payment application, or other routine or authorized form of request for payment is not a Claim for purposes of this section. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a Claim under this section by submitting a separate claim in claim in compliance with Contract Documents claim submission requirements.

3. Caution. This section does not apply to tort claims and nothing in this section is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 and Chapter 2 of Part 3 of Division 3.6 of Title 1 of the California Government Code.

B. Procedure:

1. The Claim must be in writing, submitted in compliance with all requirements of SECTION 00700 (General Conditions), paragraph 12, including, but not limited to, the time prescribed by and including the documents necessary to substantiate the Claim, pursuant to SECTION 00700 (General Conditions), paragraph 12.3. Claims must be filed on or before the day of final payment. Nothing in this section is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth in SECTION 00700 (General Conditions), paragraph 12 or elsewhere in the Contract Documents.

2. For Claims of fifty thousand dollars ($50,000) or less
   a. District shall respond in writing within 45 days of receipt of the Claim, or
   b. District may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims District may have against Claimant.
      1) If additional information is thereafter required, it shall be requested and provided in accordance with this section upon mutual agreement of District and Claimant.
      2) District’s written response to the Claim, as further documented, shall be submitted to Claimant within 15 days after receipt of further documentation or within a period of time no greater than taken by Claimant in producing the additional information, whichever is greater.

3. For Claims over Fifty Thousand Dollars ($50,000) and less than or equal to $375,000:
   a. District shall respond in writing within 60 days of receipt of the Claim, or
   b. District may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims District may have against Claimant.
      1) If additional information is thereafter required, it shall be requested and provided in accordance with this section upon mutual agreement of District and Claimant;
      2) District’s written response to the Claim, as further documented, shall be submitted to Claimant within 30 days after receipt of further documentation or within a period of time no greater than taken by Claimant in producing the additional information, whichever is greater.

4. Meet and Confer:
   a. If Claimant disputes District’s written response, or District fails to respond within the time prescribed above, Claimant shall notify District, in writing, either within 15 days of receipt of District’s response or within 15 days of District’s failure to timely respond, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon demand District
will schedule a meet and confer conference within 30 days for settlement of the dispute.

b. Following the meet and confer conference, if the Claim or any portion remains in dispute, Claimant may file a claim as provided in 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 California 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 Claimant submits its written claim as set forth herein, 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.

1.7 COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT

A. Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a Contractor, must be accessible to the disabled public. Contractor shall provide the services specified in the Contract Documents in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under the Contract Documents and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns shall constitute a material breach of the Contract Documents.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01420

REFERENCES AND DEFINITIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Reference standards, abbreviations, symbols, and definitions used in Contract Documents.

B. Full titles are given in this Section for standards cited in other Sections of Specifications.

C. Material and workmanship specified by reference to number, symbol, or title of specific standard such as state standard, commercial standard, federal specifications, technical society, or trade association standard, or other similar standard, shall comply with requirements of standards except when more rigid requirements are specified or required by applicable codes.

D. Standards referred to, except as modified herein, shall have full force and effect as though printed in the Contract Documents. Standards are not furnished to Contractor because manufacturers and trades involved are assumed to be familiar with their requirements.

1.2 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES

A. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code, or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.

B. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual, or code or of any instruction of any supplier, Contractor shall report it in writing at once to District's Representative and Engineer, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by District.

C. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order, CCD, or Supplemental Instruction, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

1. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

2. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).
D. No provision of any such standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of District, District's Representative, Engineer or Contractor, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to District, Engineer, or any of their consultants, agents, representatives or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

E. Comply with the applicable portions of standards and specifications published by the technical societies, institutions, associations, and governmental agencies referred to in Specifications.
   1. Comply with referenced standards and specifications; latest revision in effect at the time of opening of Bids, unless otherwise identified by date.
      a. Exception: Comply with issues in effect as listed in governing legal requirements.

F. Referenced Grades, Classes, and Types: Where an alternative or optional grade, class, or type of product or execution is included in a reference but is not identified in Drawings or in Specifications, provide the highest, best, and greatest of the alternatives or options for the intended use and prevailing conditions.

G. Jobsite Copies:
   1. Obtain and maintain at the Site copies of reference standards identified on Drawings and in Specifications in order to properly execute the Work.
   2. At a minimum, the following shall be readily available at the Site:
      a. Safety Codes: State of California, Division of Industrial Safety regulations.

H. Edition Date of References:
   1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of opening Bids.
   2. All amendments, changes, errata and supplements as of the effective date shall be included.

I. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision, or amendment. It is presumed that Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.3 ABBREVIATIONS

A. Listed hereinafter are the various organizations or references which may appear in the Contract Documents, along with their respective acronyms and/or abbreviations:

   AA  Aluminum Association
   AABC  Associated Air Balance Council
   AAMA  Architectural Aluminum Manufacturers Association
   AAP  Affirmative Action Program
   AASHTO  American Association of State Highway and Transportation Officials
   ABMA  American Boiler Manufacturers Association
   ABPA  American Board Products Association
ACI  American Concrete Institute
AED  Association of Equipment Distributors
AGA  American Gas Association
AISC  American Institute of Steel Construction
AISI  American Iron and Steel Institute
AITC  American Institute of Timber Construction
AMCA  Air Moving and Conditioning Association, Inc.
ANSI  American National Standards Institute (formerly American Standards Association)
APA  American Plywood Association
ARI  Air-Conditioning and Refrigeration Institute
ASHRAE  American Society of Heating, Refrigeration, and Air-Conditioning Engineers
ASME  American Society of Mechanical Engineers
ASTM  American Society for Testing and Materials
AWCI  Association of the Wall and Ceiling Industries
AWPA  American Wood-Preservers Association
AWPB  American Wood Preservers Bureau
AWS  American Welding Society
AWWA  American Water Works Association
BIL  Basic Insulation Level
Cal/OSHA  California Occupational Safety and Health Administration
Caltrans  State of California, Department of Transportation
CBC  California Building Code
CCD  Construction Change Directive
CCR  California Code of Regulations
CEC  California Electric Code
CFR  Code of Federal Regulations
CISPI  Cast Iron Soil Pipe Institute
CLMFI  Chain Link Fence Manufacturers Institute
CMC  California Mechanical Code
CO  Change Order
CPC  California Plumbing Code
CPM  Critical Path Method
CPUC  California Public Utilities Commission
CRA  California Redwood Association
CRSI  Concrete Reinforcing Steel Institute
CS  Commercial Standards, U.S. Department of Commerce
CSA  Canadian Standards Association
CTI  Ceramic Tile Institute
DHI  Door and Hardware Institute
DSA  Division of State Architect (formerly known as the Office of the State Architect)
EPA  Environmental Protection Agency
FGMA  Flat Glass Marketing Association
FM  Factory Mutual
FS  Federal Specifications
GA  Gypsum Association
HPMA  Hardwood Plywood Manufacturers Association
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>HVAC</td>
<td>Heating, Ventilating and Air Conditioning</td>
</tr>
<tr>
<td>I.D.</td>
<td>Identification</td>
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<tr>
<td>IACS</td>
<td>International Annealed Copper Standards</td>
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<td>IAPMO</td>
<td>International Association of Plumbing and Mechanical Officials</td>
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<tr>
<td>IBC</td>
<td>International Building Code</td>
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<tr>
<td>ICBO</td>
<td>International Conference of Building Officials</td>
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<td>ICEA</td>
<td>Insulated Cable Engineers Association</td>
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<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronic Engineers, Inc.</td>
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<td>IES</td>
<td>Illuminating Engineering Society</td>
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<tr>
<td>ISA</td>
<td>Instrumentation Society of America</td>
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<tr>
<td>JATC</td>
<td>Joint Apprenticeship Training Committee</td>
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<tr>
<td>JV</td>
<td>Joint Venture</td>
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<tr>
<td>LBE</td>
<td>Local Business Enterprise</td>
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<tr>
<td>M.I.</td>
<td>Middle Initial</td>
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<tr>
<td>M/WBE</td>
<td>Minority and/or Woman-Owned Business Enterprise</td>
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<td>MBE</td>
<td>Minority Business Enterprise</td>
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<td>MIA</td>
<td>Masonry Institute of America</td>
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<tr>
<td>MIA</td>
<td>Marble Institute of America</td>
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<td>MLSFA</td>
<td>Metal Lath/Steel Framing Association</td>
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<td>MS</td>
<td>Military Specifications</td>
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<td>MSS</td>
<td>Manufacturers Standardization Society of the Valve &amp; Fitting Industry</td>
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<td>NAAMM</td>
<td>National Association of Architectural Metal Manufacturers</td>
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<td>NACE</td>
<td>National Association of Corrosion Engineers</td>
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<td>NBS</td>
<td>National Bureau of Standards</td>
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<td>NEC</td>
<td>National Electric Code</td>
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<td>NEMA</td>
<td>National Electric Manufacturers Association</td>
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<td>National Electrical Safety Code</td>
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<td>NFPA</td>
<td>National Fire Protection Association</td>
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<td>NFPA</td>
<td>National Forest Products Association</td>
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<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
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<tr>
<td>NIST</td>
<td>National Institute of Science and Technology (formerly the National Bureau of Standards)</td>
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<td>NOFMA</td>
<td>National Oak Flooring Manufacturers Association</td>
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<td>NSF</td>
<td>National Sanitation Foundation</td>
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<td>NTMA</td>
<td>National Terrazzo &amp; Mosaic Association</td>
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<td>NWWDA</td>
<td>National Wood Windows and Doors Association</td>
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<td>Office of Statewide Health Planning and Department</td>
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<td>Portland Cement Association</td>
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<tr>
<td>PCI</td>
<td>Prestressed Concrete Institute</td>
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<td>PDI</td>
<td>Plumbing and Drainage Institute</td>
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<td>Pacific Gas and Electric Company</td>
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<td>PM</td>
<td>Preventive Maintenance</td>
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<td>Proposal Request</td>
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<td>PS</td>
<td>Product Standard, U. S. Department of Commerce</td>
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<td>Qualified SWPPP Developer</td>
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<td>Qualified SWPPP Practitioner</td>
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<td>Request for Proposals</td>
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RFS Request for Substitution
RIS Redwood Inspection Service
SDS Safety Data Sheet
SDI Steel Deck Institute
SFM State of California, Office of State Fire Marshal
SIGMA Sealed Insulating Glass Manufacturers Association
SJI Steel Joint Institute
SMACNA Sheet Metal and Air Conditioning Contractors National Association
SPIB Southern Pine Inspection Bureau
SSPC Steel Structures Painting Council
SWI Steel Window Institute
SWPPP Storm Water Pollution Protection Plan
TCA Tile Council of America
TIE Time Impact Evaluation
UBC Uniform Building Code
UFC Uniform Fire Code
UL Underwriters’ Laboratories, Inc.
UMC Uniform Mechanical Code
UPC Uniform Plumbing Code
USA Underground Service Alert
USC United States Code
WCLIB West Coast Lumber Inspection Bureau
WHI Warnock Hersey International a testing lab
WIC Woodwork Institute of California
WWPA Western Wood Products Association

B. Abbreviations in Specifications:

AWG American Wire Gauge
accord Accordance
Co. Company
Corp. Corporation
cm. centimeter (centimeters)
cu. Cubic
Div. Division
dia. diameter
ft. foot (feet)
g./gr. gram (grams)
gal. gallon (gallons)
gpd gallons per day
gpm gallons per minute
hr. hour
kg. kilogram (kilograms)
in. inch (inches)
Inc. Incorporated
km. kilometer (kilometers)
Kw Kilowatt
l. liter (liters)
lbs. pounds
C. Abbreviations on Drawings:

Additional abbreviations, used only on drawings, are indicated thereon.

1.4 SYMBOLS

A. Symbols in Specifications:

: “shall be” or “shall” - where used within sentences or paragraphs
#1 Number
1# Pound
& And
% Percent
C Centigrade
F Fahrenheit
° Degree
/ per, except where used to combine words; example: power/fuel, and in that case it means and
“ inch (inches)
‘ foot (feet)
@ At

B. Symbols on Drawings:

Symbols, used only on Drawings, are indicated thereon.

1.5 DEFINITIONS

A. Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth. In the Contract Documents, the neutral gender includes the feminine and masculine, and the singular number includes the plural. While District has made an effort to identify all defined terms with initial caps, the following definitions shall apply regardless of case unless the context otherwise requires:
1. Addenda: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct, or change the bidding requirements or the Contract Documents. Addenda shall not include the minutes of the Pre-Bid Meeting and/or Site Visit.

2. Agreement (SECTION 00520): Agreement is the basic contract document that binds the parties to construction Work. Agreement defines relationships and obligations between District and Contractor and by reference incorporates Conditions of Contract, Drawings, and Specifications and contains Addenda and all Modifications subsequent to execution of Contract Documents.

3. Alternate: Work added to or deducted from the Base Bid, if accepted by District.

4. Application for Payment: Written application for monthly or periodic progress or final payment made by Contractor complying with the Contract Documents.

5. Approved Equal: Approved in writing by District as being of equivalent quality, utility and appearance.

6. Asbestos: Any material that contains more than one percent asbestosis and is friable or is releasing asbestos fibers into the air above current action levels established by OSHA or Cal/OSHA.

7. Bid: The offer or proposal of the Bidder submitted on the prescribed form(s) setting forth the prices for the Work to be performed.

8. Bidder: One who submits a Bid.

9. Bidding Documents: All documents comprising the Project Manual (including all documents and specification sections listed on SECTION 00010 [Table of Contents]), including documents supplied for bidding purposes only and Contract Documents.


11. Business Day: Any Day other than Saturday, Sunday, and the following days that have been designated as holidays by District. If a holiday falls on a Saturday, the preceding Friday will be the holiday. If a holiday falls on a Sunday, the following Monday will be the holiday. Refer to the District’s web site for a list of District observed holidays. Also, Each day appointed by the Governor of California and formally recognized by the El Dorado Irrigation District Board of Directors as a day of mourning, thanksgiving, or special observance.

12. By District: Work that will be performed by District or its agents at the District’s expense.

13. By Others: Work that is outside scope of Work to be performed by Contractor under this Contract, which will be performed by District, other contractors, or other means.

14. Change Order: A written instrument prepared by District and signed by District and Contractor, stating their agreement upon all of the following:
   a. a change in the Work;
   b. the amount of the adjustment in the Contract Sum, if any; and
   c. the amount of the adjustment in the Contract Time, if any.

15. Code Inspector: A local or state agency responsible for the enforcement of applicable codes and regulations.
16. Concealed: Work not exposed to view in the finished Work, including within or behind various construction elements.

17. Construction Change Directive: A written order prepared and signed by District, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both.


19. Construction Manager: See SECTION 00520 (Agreement) (if this term is used).

   a. General Conditions are general clauses that are common to the District Contracts, including SECTION 00700.
   b. Supplemental conditions modify or supplement General Conditions to meet specific requirements for this Contract, including SECTION 00800 and SECTION 00805 (if included).


22. Contract Modification: Either:
   a. a written amendment to Contract signed by Contractor and District; or
   b. a Change Order; or
   c. a Construction Change Directive; or
   d. a written directive for a minor change in the Work issued by District.

23. Contract Sum: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by District to Contractor for performance of the Work and the Contract Documents. The Contract Sum is also sometimes referred to as the Contract Price or the Contract Amount.

24. Contract Time: The number or numbers of Days or the dates stated in the Agreement
   a. to achieve Substantial Completion of the Work or designated milestones; and/or
   b. to complete the Work so that it is ready for final payment and is accepted.

25. Contractor: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neutral in gender. The term “Contractor” means the Contractor or its authorized representative.

26. Contractor’s Employees: Persons engaged in execution of Work under Contract as direct employees of Contractor, as Subcontractors, or as employees of Subcontractors.

27. County: The County of El Dorado.

28. Day: One calendar day of 24 hours measured from midnight to the next midnight, unless the word “day” is specifically modified to the contrary.

29. Defective: An adjective which, when modifying the word “Work,” refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that
does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including but not limited to approval of samples and “or equal” items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by District). District is the judge of whether Work is defective.


31. District-Furnished, Contractor-Installed: Items furnished by District at its cost for installation by Contractor at its cost under Contract Documents.

32. District’s Representative(s): See SECTION 00520 (Agreement).

33. Drawings: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

34. Engineer: If used elsewhere in the Contract Documents, “Engineer” shall mean a person holding a valid California State Engineer’s or Architect’s license representing the District in the administration of the Contract Documents. Engineer may be an employee of or an independent consultant to District. When Engineer is referred to within the Contract Documents and no Engineer has in fact been designated, then the matter shall be referred to District. The term Engineer shall be construed to include employees of Engineer and/or employees that Engineer supervises. When the designated Engineer is an employee of District, his or her authorized representatives on the Project will be included under the term Engineer. If Engineer is an employee of District, Engineer is the beneficiary of all Contractor obligations to District, including without limitation, all releases and indemnities.

35. Equal: Equal in opinion of District. Burden of proof of equality is responsibility of Contractor.

36. Exposed: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.

37. Final Acceptance or Final Completion: District’s acceptance of the Work as satisfactorily completed in accordance with Contract Documents. Requirements for Final Acceptance/Final Completion include, but are not limited to:
   a. All systems having been tested and accepted as having met requirements of Contract Documents.
   b. All required instructions and training sessions having been given by Contractor.
   c. All Project Record Documents having been submitted by Contractor, reviewed by District and accepted by District.
   d. All punch list work, as directed by District, having been completed by Contractor.
   e. Generally all Work, except Contractor maintenance after Final Acceptance, having been completed to satisfaction of District.

38. Force Account: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials,
equipment, taxes, and other costs, plus a specified percentage for overhead and profit.

39. Furnish: Supply only, do not install.

40. Indicated: Shown or noted on the Drawings.

41. Install: Install or apply only, do not furnish.

42. Latent: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under the General Conditions.

43. Law: Unless otherwise limited, all applicable laws including without limitation all federal, state, and local laws, statutes, standards, rules, regulations, ordinances, and judicial and administrative decisions.

44. Material: This word shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.

45. Milestone: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all Work.

46. Modification: Same as Contract Modification.

47. Naturally Occurring Asbestos (NOA): Asbestos naturally contained in serpentine or other rock, which may be released from the rock and become airborne when the rock is disturbed. See Section 801 (Supplementary General Conditions – Naturally Occurring Asbestos) (if that section is used).

48. Not in Contract: Work that is outside the scope of Work to be performed by Contractor under Contract Documents.

49. Notice of Completion: Shall have the meaning provided in California Civil Code Section 3093, and any successor statute.

50. Off Site: Outside geographical location of the Project.

51. Partial Utilization: Use by District of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all of the Work.

52. PCBs: Polychlorinated biphenyls.

53. Phase: A specified portion of the Work (if any) specifically identified as a Phase in SECTION 00520 (Agreement) or SECTION 01100 (Summary).

54. Product Data: That information (including brochures, catalogue cuts, SDS, etc.) supplied by the vendor describing the technical and commercial characteristics of the supplier equipment or materials, and accompanying commercial terms such as warranties, instructions and manuals.

55. Progress Report: A periodic report submitted by Contractor to District with progress payment invoices accompanying actual work accomplished to the Progress Schedule. See Section 01320 (Progress Schedules and Reports) and SECTION 00700 (General Conditions).

56. Project: Total construction of which Work performed under Contract Documents may be whole or part.

57. Project Float: As defined in Section 01320, paragraph 1.2.B.3.

58. Project Manager: See SECTION 00520 (Agreement) (if this term is used).

60. Project Record Documents: All Project deliverables required under Sections 01700 et seq., including without limitation, as-built drawings, operations and maintenance manuals, Installation, Operation, and Maintenance Manuals, and Machine Inventory Sheets.

61. Provide: Furnish and install.

62. Request for Information ("RFI"): A document prepared by Contractor requesting information regarding the Project or Contract Documents as provided in SECTION 01250 (Modification Procedures). The RFI system is also a means for District to submit Contract Document clarifications or supplements to Contractor.

63. Request for Proposals ("RFP"): A document issued by District to Contractor whereby District may initiate changes in the Work or Contract Time as provided in Contract Documents. See SECTION 01250 (Modification Procedures).

64. Request for Substitution ("RFS"): A document prepared by Contractor requesting substitution of materials as permitted and to the extent permitted in Contract Documents. See Section 01600 (Product Requirements).

65. RFI-Reply: A document consisting of supplementary details, instructions, or information issued by District that clarifies or supplements Contract Documents, and with which Contractor shall comply. RFI-Replies do not constitute changes in Contract Sum or Contract Time except as otherwise agreed in writing by District. RFI-Replies will be issued through the RFI administrative system.

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

67. Shop Drawings: All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

68. Shown: As indicated on Drawings.

69. Site: The particular geographical location of Work performed pursuant to Contract Documents.

70. Specifications: The written portion of the Contract Documents consisting of requirements for materials, equipment, construction systems, standards, and workmanship for the Work; performance of related services; and are contained in Divisions 1 through 16.

71. Specified: As written in Specifications.

72. Subcontractor: A person or entity that has a direct contract with Contractor to perform a portion of the Work at the Site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and neutral in gender and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

73. Substantial Completion: The Work (or a specified part thereof) has progressed to the point where, in the opinion of District as evidenced by a Certificate of Substantial Completion, the Work is sufficiently complete, in accordance with Contract Documents, so that the Work (or specified part) can be utilized for the
purposes for which it is intended; or if no such certificate is issued, when the Work (or specified part) is complete and ready for final payment as evidenced by written recommendation of District for final payment. The terms “Substantially Complete” and “Substantially Completed” as applied to all or part of the Work refer to Substantial Completion thereof.

74. Supplemental Instruction: A written directive from District to Contractor ordering alterations or modifications that do not result in change in Contract Sum or Contract Time, and do not substantially change Drawings or Specifications. See SECTION 01250 (Modification Procedures).

75. Supplier: See SECTION 00525 (Assignment and Novation Agreement) (if this term is used).

76. Supply: See SECTION 00525 (Assignment and Novation Agreement) (if this term is used).


78. Testing and Special Inspection Agency: An independent entity engaged by District to inspect and/or test the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes.

79. Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground to furnish any of the following services or materials: Electricity, gases, chemicals, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

80. Unit Price Work: Shall be the portions of the Work for which a unit price is provided in SECTION 00520 (Agreement) or Section 01100 (Summary).

81. Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents within the Contract Time. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents including everything shown in the Drawings and set forth in the Specifications. Wherever the word “work” is used, rather than the word “Work,” it shall be understood to have its ordinary and customary meaning.

B. Wherever words “as directed,” “as required,” “as permitted,” or words of like effect are used, it shall be understood that direction, requirements, or permission of District is intended. Words “sufficient,” “necessary,” “proper,” and the like shall mean sufficient, necessary, or proper in judgment of District. Words “approved,” “acceptable,” “satisfactory,” “favorably reviewed,” or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by District.

C. Wherever the word “may” or “ought” is used, the action to which it refers is discretionary. Wherever the word “shall” or “will” is used, the action to which it refers is mandatory.
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1.2 Temporary Water
   1.3 Fences
   1.4 Protection of Public and Private Property
   1.5 Temporary Sanitary Facilities
   1.6 Temporary Barriers and Enclosures
   1.7 Construction Aids
   1.8 Noise Control
   1.9 Removal of Temporary Facilities and Controls

1.2 TEMPORARY WATER

A. When feasible, a District metered temporary water use connection shall be used for water service for the Work. The temporary water use connection shall be installed by District. District shall pay all consumptive charges for water used in conjunction with the Work. Contractor shall follow all of the District’s Temporary Water Use Permit requirements. The Contractor is required to apply for a temporary meter through the District and pay all necessary deposits for the meter.

B. When a District temporary metered water use connection is not available, Contractor shall provide, maintain, and pay for suitable quality water service required for construction operations.

C. Unnecessary waste of water will not be permitted. Special hydrant wrenches shall be used for opening and closing fire hydrants; in no case shall pipe wrenches be used for this purpose.

1.3 FENCES

A. All existing fences affected by the Work shall be maintained by Contractor until Final Completion. Fences which interfere with construction operations shall not be relocated or dismantled until District gives written permission to do so, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.

B. On completion of the Work across any tract of land, Contractor shall restore all fences to their original or to a better condition and to their original locations.

1.4 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

A. Contractor shall protect, shore, brace, support, and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by its construction operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all sod and shrubs in yards, parkways, and
medians, shall be restored to their original condition, whether within or outside the easement. All replacements shall be made with new materials.

B. Contractor shall be responsible for all damage to streets, roads, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, which may be caused by transporting equipment, materials, or workers to or from the Work, Site or any part thereof, whether by Contractor or Subcontractors. Contractor shall make satisfactory and acceptable arrangements with the District, or the agency or authority having jurisdiction over the damaged property, concerning its repair or replacement or payment of costs incurred in connection with the damage.

C. All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

1.5 TEMPORARY SANITARY FACILITIES

A. Contractor shall provide and maintain required temporary buildings with sanitary toilets for use of all workers. At a minimum, sanitary facilities shall be located at trailer site, staging area, and adjacent to work area.

B. Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 20 persons. Contractor shall enforce the use of such sanitary facilities by all personnel at the Site.

C. Contractor shall comply with all minimum requirements of the Health Department or other public agency having jurisdiction, including maintaining Site in a sanitary condition at all times.

1.6 TEMPORARY BARRIERS AND ENCLOSURES

A. Contractor shall provide barriers to prevent unauthorized entry to construction areas to allow for District's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Contractor shall provide barricades required by governing authorities for public access to existing buildings.

C. Contractor shall protect vehicular traffic, stored materials, the Site, and structures from damage.

1.7 CONSTRUCTION AIDS

Contractor shall furnish, install, maintain, and operate all construction aids required by it and its Subcontractors in the performance of the Work, except as otherwise provided herein. Such construction aids shall include elevators and hoists, cranes, temporary enclosures, swing staging, scaffolding and temporary stairs. Construction aids shall be furnished without charge to the Subcontractors, and all necessary erection, maintenance, and operating personnel shall be included. In the event of conflict, the contractor furnishing the equipment shall determine priorities in the best interest of the Project.

1.8 NOISE CONTROL

A. When required by OSHA Standards, construction workers shall be provided with ear protection to operate equipment.
B. Contractor shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the Work. During construction activities on or adjacent to occupied buildings, and when appropriate, Contractor shall erect screens or barriers effective in reducing noise in the building and shall conduct its operations to avoid unnecessary noise which might interfere with the activities of building occupants.

C. Contractor shall ensure and provide certification to District that all construction equipment and vehicles used for the Work are:
   1. Maintained in good mechanical condition
   2. Equipped with properly installed engine mufflers

1.9 REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

A. Contractor shall remove temporary utilities, equipment, facilities, and materials prior to final inspection.
B. Contractor shall remove underground installations.
C. Contractor shall clean and repair damage caused by installation or use of temporary work.
D. Contractor shall restore existing facilities used during construction to original condition, and restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01540

SITE SECURITY AND SAFETY

PART 1 GENERAL

1.1 SUBMITTALS
   A. See Section 01330 (Submittal Procedures)
   B. See Section 01340 (Safety Submittals)

1.2 PROTECTION
   A. Contractor shall continuously maintain protection as necessary to protect the Work, as a whole and in part, and adjacent property and improvements from accidents, injuries or damage.
   B. Contractor shall properly protect the Work:
      1. With lights, guard rails, temporary covers and barricades.
      2. Enclose excavations with proper barricades.
      3. Brace and secure all parts of the Work against storm and accident.
      4. Provide such additional forms of protection that may be necessary under existing circumstances.
   C. Contractor shall provide and maintain in good condition all protective measures required to adequately protect the public from hazards resulting from the Work and to exclude unauthorized persons from the Work. When regulated by Building Code, Cal-OSHA, or other authority, such legal requirements for protection shall be considered as minimum requirements. Contractor shall be responsible for the protection in excess of such minimum requirements as required.

1.3 CONTROL OF SITE
   Contractor shall ensure that no pets, alcohol, firearms, weapons, or controlled substance enters or is used at the Site. Contractor shall immediately remove from the Site and terminate the employment of any employee found in violation of this provision.

1.4 SITE SECURITY
   A. As part of the Work included within the Contract Price, Contractor shall take and be fully responsible for all reasonably required measures to protect and maintain the security of persons, existing facilities and property at the Site, including without limitation preventing theft, loss, vandalism and improper concealment of personal property of the District and all persons lawfully present on the Site, and including times where workers are not present on the Site. Contractor's measures shall include, at a minimum, maintaining a log of all persons entering and leaving the Site and who they represent, what they are delivering and to whom.
   B. No claim shall be made against District by reason of any act of an employee or trespasser, and Contractor shall repair all damage to District's property resulting from Contractor's failure to provide adequate security measures.
   C. Contractor shall maintain a lock on the Construction access gate at all times. Contractor shall appoint one person to let people through the gate and maintain
the sign-in/out list, with person’s name, company, reason for entering, what they are delivering, time and date. Alternatively, Contractor shall provide a full-time guard at the gate at all times to control access and maintain the sign-in/out list. The sign in/out list shall be available to District at anytime upon request. If District determines that the gate has been left unlocked, Contractor shall if requested by District provide a full time guard at no additional expense to the District.

D. Contractor shall supply additional security fencing, barricades, lighting, and other security measures as required to protect and control the Site.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project identification sign.
   2. Project informational signs.
   4. Removal.

B. Related Sections
   1. Section 01100: Summary of Work

1.2 QUALITY ASSURANCE

A. Design sign and structure to withstand 50 miles/hr wind.
B. Sign Painter: Experienced as a professional sign painter for a minimum of five years.
C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.3 SUBMITTALS

A. Section 01330 Submittals, shop drawings and product data.
B. Show content, layout, lettering, color, structure, sizes, and proposed locations for signs.

PART 2 PRODUCTS

2.1 SIGN MATERIALS

A. Structure and Framing: New, wood, structurally adequate.
B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum ¾ -inch thick, standard large sizes to minimize joints.
C. Rough Hardware: Galvanized.
D. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
E. Lettering: Exterior quality paint, contrasting colors as selected.

2.2 PROJECT IDENTIFICATION SIGN

A. Two painted signs, 48 sq. feet, bottom 6 feet above ground.
B. Content:
   1. Project title and name of District.
   2. Names and titles of authorities.
3. Names and titles of Engineer and any consultants specified by District.
4. Name of Prime Contractor.

C. Graphic Design, Colors, Style of Lettering: Designated by District Architect.
D. Prior to ordering the sign the Contractor shall submit to the District a design
   submittal to be approved prior to the sign being ordered. The sign will need the
   RWA grant and necessary logos as well that the District can provide examples of
   during the submittal process.
E. Layout:

OUTINGDALE RAW WATER PUMP STATION UPGRADE PROJECT
EL DORADO IRRIGATION DISTRICT

BOARD OF DIRECTORS

George Osborne District #1
Pat Dwyer District #2
Michael Raffety District #3
Lori Anzini District #4
Alan Day District #5

______________________________
GENERAL CONTRACTOR

PART 3 EXECUTION

3.01 INSTALLATION
   A. Install project identification sign within thirty (14) days after date of Notice to
      Proceed.
   B. Erect one Project sign at Rivermist Drive and Outingdale Road. Final location is
      to be reviewed with District before installation.
   C. Erect supports and framing on secure foundation, rigidly braced and framed to
      resist wind loadings.
   D. Paint exposed surfaces of sign supports and framing.

3.02 MAINTENANCE
   A. Maintain signs and supports, keep clean repair deterioration and damage.

3.03 REMOVAL
   A. Remove signs, framing, supports and foundations at completion of Project and
      restore area.

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products
B. Product Options and Substitutions
C. Product Delivery Requirements
D. Shipping Requirements
E. Product Storage and Handling Requirements

1.2 PRODUCTS

A. Products: Include new material, machinery, components, equipment, fixtures, and systems forming the Work. Term does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
B. Contractor shall not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
C. For similar components, Contractor shall provide interchangeable components of the same manufacturer.

1.3 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Summary: This paragraph 1.3 describes procedures for selecting products and for requesting substitutions of unlisted materials in lieu of materials named in the Specifications or approved for use in Addenda that were not already the subject of a SECTION 00660 (Substitution Request Form) submittal as provided in SECTION 00200 (Instructions to Bidders).
B. Contractor’s Options:
   1. For products specified only by reference standard: Select any product meeting that standard.
   2. For products specified by naming one or more products or manufacturers:
      a. Select products of any named manufacturer meeting specifications.
      b. If product becomes unavailable due to no fault of Contractor, submit Request for Substitution (RFS), including all information contained in this Section 01600 and a fully executed SECTION 00660 (Request for Substitution), but using the term "Contractor" each place the term "Bidder" appears in that form.
C. Substitutions:
   1. Except as provided in SECTION 00200 (Instructions to Bidders) with respect to "or equal" items, District will consider Contractor’s substitution requests only when product becomes unavailable due to no fault of Contractor. Requests for review of proposed substitute items will not be accepted from anyone other than Contractor. The RFS shall state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor’s achievement of Substantial Completion on time, and whether or not acceptance of the substitute
for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with District for work on the Project).

2. Contractor shall submit separate RFS (and four copies) for each product and support each request with:
   a. Product identification.
   b. Manufacturer’s literature.
   c. Samples, as applicable.
   d. Name and address of similar projects on which product has been used, and dates of installation.
   e. Name, address, and telephone number of manufacturer’s representative or sales engineer.
   f. For construction methods: Detailed description of proposed method; drawings illustrating methods.

3. Where required, Contractor shall itemize a comparison of the proposed substitution with product specified and list significant variations including, but not limited to dimensions, weights, service requirements, and functional differences. If variation from product specified is not pointed out in submittal, variation will be rejected even though submittal was favorably reviewed. Identify all variations of the proposed substitute from that specified in the RFS and indicate available maintenance, repair, and replacement service.

4. Contractor shall state whether the substitute will require a change in any of the Contract Documents (or provisions of any other direct contract with District for work on the Project) to adapt the design of the proposed substitute, and whether or not incorporation or use of the substitute in connection with Work is subject to payment of any license fee or royalty. Contractor shall also submit data relating to changes in construction schedule.

5. Contractor shall include accurate cost data comparing proposed substitution with product and amount of net change in Contract Sum including, but not limited to, an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by District in evaluating the proposed substitute. District may require Contractor to furnish additional data about the proposed substitute.

6. District will not consider substitutions for acceptance (or, in District’s sole discretion, District may make Contractor solely responsible for all resulting costs, expenses and other consequences) when a substitution:
   a. Results in delay meeting construction Milestones or completion dates.
   b. Is indicated or implied on submittals without formal request from Contractor.
   c. Is requested directly by Subcontractor or supplier.
   d. Acceptance will require substantial revision of Contract Documents.
   e. Disrupts Contractor’s job rhythm or ability to perform efficiently.

7. Substitute products shall not be ordered without written acceptance of District.

8. District will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.

9. Accepted substitutions will be evidenced by a Change Order. All Contract Documents requirements apply to Work involving substitutions.
D. Contractor's Representation and Warranty:
Contractor's RFS constitute a representation and warranty that Contractor:
1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
2. Will provide the same warranty for substitution as for specified product.
3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
4. Waives claims for additional costs which may subsequently become apparent.
5. Will compensate District for additional redesign costs associated with substitution.
6. Will be responsible for Construction Schedule slippage due to substitution.
7. Will be responsible for Construction Schedule delay due to late ordering of available specified products caused by requests for substitution that are subsequently rejected by District.
8. Will compensate District for all costs; including extra costs of performing Work under Contract Documents, extra cost to other contractors, and any claims brought against District, caused by late requests for substitutions or late ordering of products.

E. District's Duties:
1. District shall review Contractor's RFS with reasonable promptness.
2. District shall notify Contractor in writing of decision to accept or reject requested substitution.

F. Administrative Requirements:
Specified products, materials, or systems for Project may include engineering or on-file standards required by the regulatory agency. Contractor's substitution of products, materials or systems may require additional engineering, testing, reviews, approvals, assurances, or other information for compliance with regulatory agency requirements or both. Contractor shall provide all agency approvals or other additional information required and pay additional costs for required District services made necessary by the substitution at no increase in Contract Sum or Contract Time, and as a part of substitution proposal.

1.4 PRODUCT DELIVERY REQUIREMENTS
A. Contractor shall deliver products in accordance with manufacturer's instructions.
B. Contractor shall promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

1.5 SHIPPING REQUIREMENTS
A. Preparation for Shipment. All equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.
1. Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of District.
2. Grease and lubricating oil shall be applied to all bearings and similar items.
B. Shipping. Before shipping each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

1.6 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Contractor shall store products only in staging area per provisions of Section 01100 (Summary).
B. Contractor shall handle, store, and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.
C. For exterior storage of fabricated products, Contractor shall place on appropriate supports, above ground.
D. Contractor shall cover products subject to deterioration with impervious sheet covering, and provide ventilation to avoid condensation.
E. Contractor shall store loose granular materials on solid flat surfaces in a well-drained area.
F. Contractor shall provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
G. Contractor shall arrange storage of products to permit access for inspection, and periodically inspect to assure products are undamaged and are maintained under specified conditions.
H. Without limiting the foregoing:
   1. Contractor shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the Site and shall comply with the requirements specified herein and provide required information concerning the shipment and delivery of the materials specified in Contract Documents. These requirements also apply to any subsuppliers making direct shipments to the Site. Acceptance of the equipment shall be made only after it is installed, tested, placed in operation and found to comply with all the specified requirements.
   2. All items shall be checked against packing lists immediately on delivery to the Site for damage and for shortages. Damage and shortages shall be remedied with the minimum of delay.
   3. No metalwork (miscellaneous steel shapes and reinforcing steel) shall be stored directly on the ground. Masonry products shall be handled and stored in a manner to hold breakage, chipping, cracking, and spalling to a minimum. Cement, lime, and similar products shall be stored off the ground on pallets and shall be covered and kept completely dry at all times. Pipe fittings and valves may be stored out of doors, but must be placed on wooden blocking. PVC pipe, geomembranes, plastic liner, and other plastic materials shall be stored off the ground on pallets and protected from direct sunlight.
   4. Electrical equipment, and all equipment with antifriction or sleeve bearings shall be stored in weathertight structures maintained at a temperature above 60°F. Electrical equipment, controls, and insulation shall be protected against moisture and water damage. All space heaters furnished in equipment shall be connected and operated continuously.
   5. Equipment having moving parts such as gears, bearings, and seals, shall be stored fully lubricated with oil, grease, etc., unless otherwise instructed by the manufacturer. Manufacturer’s storage instructions shall be carefully followed by Contractor.
6. When required by the equipment manufacturer, moving parts shall be rotated a minimum of twice a month to ensure proper lubrication and to avoid metal to metal “welding”. Upon installation of the equipment, Contractor shall, at the discretion of District, start the equipment at one-half load for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.

7. When required by the equipment manufacturer, lubricant shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment by Contractor at the time of acceptance.

8. Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.

9. In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be for export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.

10. Handling. Stored items shall be laid out to facilitate their retrieval for use in the Work. Care shall be taken when removing the equipment for use to ensure the precise piece of equipment is removed and that it is handled in a manner than does not damage the equipment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01740

CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES
   A. Progress Cleaning
   B. Final Cleaning

1.2 PROGRESS CLEANING
   A. Contractor shall perform periodic cleaning to ensure that any streets and other District and public properties are maintained free from accumulation of waste materials, dust, mud, and debris.
   B. Where required, Contractor shall wet down surfaces to lay dust and prevent the blowing of dust to nearby residences or public properties.
   C. Contractor shall keep all streets clean and free of dust, mud, and debris resulting from Contractor’s operations. Daily cleanup throughout the job will be necessary as Contractor progresses with its Work, but extra attention to cleanup shall be made prior to weekends and holidays. Without limiting the foregoing, Contractor shall remove trench spoil along traveled ways daily; grade and vacuum broom surfaces initially where applicable and later water flush with high-pressure sprays, being careful to avoid downstream contamination.
   D. All dust, mud, spoils, and construction debris shall be removed daily from all roadways, ditches, shoulders, and private property (fills or spoils placed on private property at private property owner's written request excepted).
   E. Disposal of Materials:
      1. As part of the scope of Work included within the Contract Sum, Contractor shall be fully responsible for disposing of all construction debris, dirt and spoils resulting from the Work.
      2. All waste materials, debris, dirt and rubbish shall be disposed of at sites to be chosen by Contractor in accordance with applicable local, state, and federal regulations.
      3. Contractor is cautioned that the County and cities within the county have regulations governing the disposal of rubble, broken pavement, and similar materials.
      4. Contractor shall become familiarized with the requirements of the agency having jurisdiction over any contemplated disposal site and shall comply with all such requirements.
      5. Contractor will estimate and report to the District, an estimate of quantities (e.g. tonnage) of waste materials disposed of for compliance with AB75. Reporting requirements include the nature of materials, destination, volume and tonnage.
   F. All excess soil from performance of Work shall be disposed at sites to be chosen by Contractor in accordance with applicable local, state, and federal regulations. If Contractor elects to dispose of soil on any private property, prior to any dumping, a letter allowing such dumping shall be obtained from the property owner and
presented to District. Contractor is advised that the property owner is required to obtain a fill permit from the applicable government agency(ies). In addition, placement of fill in wetland areas is subject to permit procedures of the US Army Corps of Engineers. At the completion of Work, a letter from each affected property owner will be required releasing Contractor, District and any District consultant from future liability.

G. If Contractor does not properly clean the Site, in the opinion of District, then District shall have the option of using outside equipment to perform the cleanup and such cost will be withheld from the Contract Sum.

1.3 FINAL CLEANING

A. Contractor shall execute final cleaning prior to final inspection, using only properly skilled workers.
B. Contractor shall remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from exposed interior and exterior finished surfaces.
C. Contractor shall repair, patch, and touch up marred surfaces to match adjacent finishes.
D. Contractor shall clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
E. Contractor shall clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.
F. Contractor shall clean Site; mechanically sweep paved areas.
G. Contractor shall remove waste and surplus materials, rubbish, and construction facilities from Site.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS

SECTION 01750

STARTING AND ADJUSTING

PART 1 GENERAL - NOT USED

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CHECKOUT PROCEDURES

A. Upon completion of installation, Contractor shall conduct an initial inspection and checkout of all mechanical and electrical equipment and devices. Without limiting the foregoing, Contractor shall:

1. Clean the interior of piping, pumps, and other equipment and make free of foreign material. If applicable, lubricate equipment in accordance with the manufacturer’s instructions.

2. To the extent practicable, turn rotating equipment, operate valves and gates, and operate other equipment by hand to check for binding, and interference.

3. Check incoming electric power for voltage amplitude and voltage balance.

4. Check electric motor-driven equipment for correct rotation.

5. Check all safety guards to insure they are in place.

B. Contractor shall conduct field tests including visual and mechanical inspection of the following:

1. Proper grounding.

2. Blockage of ventilating passageways.

3. Integrity of engine cooling and fuel supply systems.

4. Mechanical and electrical noise in excess of specified levels.

5. Installation of vibration isolators.

6. Cooling liquid type and level.

7. Operation of meters and instruments.

END OF SECTION
PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

   Description of contract closeout procedures including:

   1.2 Removal of Temporary Construction Facilities
   1.3 Substantial Completion
   1.4 Final Completion
   1.5 Final Cleaning
   1.6 Material, Equipment and Finish Data
   1.7 Project Guarantee
   1.8 Warranties
   1.9 Turn-In
   1.10 Release of Claims
   1.11 Fire Inspection Coordination
   1.12 Building Inspection Coordination

1.2 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.
B. Clean and repair damage caused by installation or use of temporary facilities.
C. Restore permanent facilities used during construction to specified condition.
D. Comply with paragraph 1.12 of Section 1500 (Temporary Facilities and Controls).

1.3 SUBSTANTIAL COMPLETION

A. When Contractor considers Work or designated portion of the Work as Substantially Complete, submit written notice to District’s Representative and Engineer, with list of items remaining to be completed or corrected.
B. Within reasonable time, District’s Representative and/or Engineer will inspect to determine status of completion.
C. Should District determine that Work is not Substantially Complete, District will promptly notify Contractor in writing, listing all defects and omissions.
D. Remedy deficiencies and send a second written notice of Substantial Completion. District will reinspect the Work. If deficiencies previously noted are not corrected on reinspection, then Contractor shall pay District’s cost of the reinspection.
E. When District determines that Work is Substantially Complete, District will issue a Certificate of Substantial Completion, accompanied by Contractor’s list of items to be completed or corrected as verified by District.
F. Manufactured units, equipment and systems that require startup must have been started up and run for periods prescribed by District before a Certificate of Substantial Completion will be issued.
G. A punch list examination will be performed upon Substantial Completion. One follow-up review of punch list items for each discipline will be provided. If further Site visits are required to review punch list items due to incompleteness of the Work by Contractor, Contractor will reimburse District for costs associated with these visits.

1.4 FINAL COMPLETION

A. Final Completion occurs when Work meets requirements for District’s Final Acceptance. When Contractor considers Work is Finally Complete, submit written certification that:
   1. Contractor has inspected Work for compliance with Contract Documents, and all requirements for Final Acceptance have been met.
   2. Except for Contractor maintenance after Final Acceptance, Work has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected. Equipment and systems have been tested in the presence of District, and are operative.
   3. Work is complete and ready for final inspection.

B. In addition to submittals required by Contract Documents, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

C. When District finds Work is acceptable and final closeout submittals are complete, District will issue final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order. Should District determine that Work is incomplete or defective:
   1. District promptly will so notify Contractor, in writing, listing the incomplete or defective items.
   2. Promptly remedy the deficiencies and notify the District when it is ready for reinspection.
   3. When District determines that the Work is acceptable under the Contract Documents, District will request Contractor to make closeout submittals.

D. Final adjustments of accounts:
   1. Submit a final statement of accounting to District, showing all adjustments to the Contract Sum and complete and execute SECTION 00650 (Agreement and Release of Any and All Claims).
   2. If so required, District shall prepare a final Change Order for submittal to Contractor, showing adjustments to the Contract Sum that were not previously made into a Contract Modification.

1.5 FINAL CLEANING

Contractor shall comply with all applicable requirements in Section 01740 (Cleaning).

1.6 MATERIAL, EQUIPMENT AND FINISH DATA

Submit two sets of data for primary materials, equipment, and finishes as required under each Specification Section prior to final inspection, bound in 8-½ inches by 11 inches three-ring binders with durable plastic covers to District for District’s records.

1.7 PROJECT GUARANTEE

A. Requirements for Contractor’s guarantee of completed Work are included in Article 9 of SECTION 00700 (General Conditions). Guarantee Work done under Contract against failures, leaks, or breaks or other unsatisfactory conditions due to defective
equipment, materials, or workmanship, and perform repair work or replacement required, at Contractor's sole expense, for period of one year from date of Final Acceptance.

B. Neither recordation of Final Acceptance nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by District shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.

C. District may make repairs to defective Work as set forth in SECTION 00700 (General Conditions), paragraph 9.C.

D. If, after installation, operation, or use of materials or equipment to be provided under Contract proves to be unsatisfactory to District, District shall have right to operate and use materials or equipment until said materials and equipment can, without damage to District, be taken out of service for correction or replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

E. Nothing in this Section shall be construed to limit, relieve, or release Contractor's, Subcontractors', and equipment suppliers' liability to District for damages sustained as result of latent defects in equipment caused by negligence of suppliers' agents, employees, or Subcontractors. Stated in another manner, warranty contained in the Contract Documents shall not amount to, nor shall it be deemed to be, waiver by District of any rights or remedies (or time limits in which to enforce such rights or remedies) it may have for defective workmanship or defective materials under laws of this State pertaining to acts of negligence.

1.8 WARRANTIES

A. Execute Contractor's submittals and assemble warranty documents, and installation, operations and maintenance manuals described in Section 01330 (Submittal Procedures), executed or supplied by Subcontractors, suppliers, and manufacturers.

1. Provide table of contents and assemble in 8½ inches by 11 inches three-ring binder with durable plastic cover, appropriately separated and organized.

2. Include contact names and phone numbers for District personnel to call during warranty period.

3. Assemble in Specification Section order.

B. Submit material prior to final application for payment.

1. For equipment put into use with District’s permission during construction, submit within 14 Days after first operation.

2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within 14 Days after acceptance, listing date of acceptance as start of warranty period.

C. Warranties are intended to protect District against failure of Work and against deficient, defective and faulty materials and workmanship, regardless of sources.

D. Limitations: Warranties are not intended to cover failures that result from the following:

1. Unusual or abnormal phenomena of the elements.

2. Vandalism after Substantial Completion.

3. Insurrection or acts of aggression including war.
E. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.

F. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than one year after corrected Work was done, whichever is later.

G. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

H. Warranty Forms: Submit drafts to District for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.
   1. Warranty shall be countersigned by manufacturers.
   2. Where specified, warranty shall be countersigned by Subcontractors and installers.

I. Rejection of Warranties: District reserves right to reject unsolicited and coincidental product warranties that detract from or confuse requirements or interpretations of Contract Documents.

J. Term of Warranties: For materials, equipment, systems, and workmanship, warranty period shall be one year minimum from date of Final Completion of entire Work except where:
   1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.
   2. Materials, equipment or systems are put into beneficial use of District prior to Final Completion as agreed to in writing by District.

K. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to District free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of District.

1.9 TURN-IN

Contract Documents will not be closed out and final payment will not be made until all personnel Identification Media, vehicle permits, keys issued to Contractor during prosecution of Work, and letters from property owners pursuant to paragraph 1.2.F of SECTION 01740 (Cleaning) are turned in to District.

1.10 RELEASE OF CLAIMS

Contract Documents will not be closed out and final payment will not be made until SECTION 00650 (Agreement and Release of Any and All Claims) is completed and executed by Contractor and District.
1.11 FIRE INSPECTION COORDINATION
Coordinate fire inspection and secure sufficient notice to District to permit convenient scheduling (if applicable).

1.12 BUILDING INSPECTION COORDINATION
Coordinate with District a final inspection for the purpose of obtaining an occupancy certificate (if applicable).

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION
DIVISION 1 GENERAL REQUIREMENTS
SECTION 01780
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

A. This section specifies general, administrative and procedural requirements for Project Record Documents. Contractor shall have complete responsibility for preparation of marked-up Documents.

B. Project Record Documents required include:

1. Marked-up copies of Contract Plans
2. Marked-up copies of Shop Drawings, including Contractor's design documents and drawings
3. Newly prepared Drawings
4. Marked-up copies of Specifications, Addenda and Change Orders
5. Marked-up Project Data submittals
6. Record Samples
7. Field records for variable and concealed conditions
8. Record information on Work that is recorded only schematically

C. Specific Project Record Documents requirements that expand requirements of this Section are included in Section 01780 of Division 1.

D. General Project closeout requirements are included in Section 01770 (Contract Closeout).

E. Maintenance of Documents and Samples:

1. Store Project Record Documents and samples in the field office apart from Contract Documents used for construction.
2. Not permit Project Record Documents to be used for construction purposes.
3. Maintain Project Record Documents in good order, and in a clean, dry, legible condition.
4. Make documents and samples available at all times for inspection by District.
1.2 PROJECT RECORD DRAWINGS

A. Mark-up Procedure: During the construction period, maintain a set of blueline or blackline prints of Contract Plans and Shop Drawings for Project Record Document purposes. Label each document (on first sheet or page) ‘PROJECT RECORD’ in 2 in. high printed letters. Keep record documents current. Note: A reference by number to a Change Order, RFI, RFQ, Field Order or other such document is not acceptable as sufficient record information on any record document. Do not permanently conceal any Work until required information has been recorded.

1. Mark these Drawings to indicate the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

   a. Dimensional changes to the Drawings
   b. Revisions to details shown on the Drawings
   c. Depths of various elements of foundation in relation to main floor level or survey datum.
   d. Horizontal and vertical location of underground duct banks, utilities and appurtenances referenced to permanent surface improvements.
   e. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
   f. Establish locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stubouts, invert elevations, and similar items.
   g. Provide actual numbering of each electrical circuit.
   h. Field changes of dimension and detail.
   i. Revisions to routing of piping and conduits
   j. Revisions to electrical cuitry
   k. Actual equipment locations
   l. Duct size and routing
   m. Changes made by Change Order
   n. Details not on original Contract Plans

2. Mark completely and accurately Project Record Drawing prints of Contract Plans or Shop Drawings, whichever is the most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Plans location.

3. Mark Project Record Drawing sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.

4. Mark important additional information that was either shown schematically or omitted from original Drawings.

5. Note Construction Change Directive numbers; alternate numbers; Change Order numbers and similar identification.
6. Responsibility for Mark-up: Where feasible, the individual or entity who obtained Project Record Drawing data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on Project Record Drawings.

   a. Accurately record information in an understandable and legible drawing technique.

   b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.

A. Shop Drawings and Samples: Maintain as record documents; legibly annotate Shop Drawings and Samples to record changes made after review.

1.3 PROJECT RECORD SPECIFICATIONS

During the construction period, Contractor shall maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.

A. Mark the Project Record Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and Modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, change order work, and information on concealed installation that would be difficult to identify or measure and record later.

   1. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

   2. Record the name of the manufacturer, catalog number, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with Project Record Product Data submittals and maintenance manuals.

   3. Note related Project Record Product Data, where applicable, for each principal product specified, indicate whether Project Record Product Data has been submitted in maintenance manual instead of submitted as Project Record Product Data.

B. Upon completion of mark-up, submit Project Record Specifications to District for District's records.

1.4 PROJECT RECORD PRODUCT DATA

A. During the construction period, Contractor shall maintain one copy of each Project Record Product Data submittal for Project Record Document purposes.
1. Mark Project Record Product Data to indicate the actual product installation where the installation varies from that indicated in Project Record Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.

2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

3. Note related Change Orders and mark-up of Project Record Drawings, where applicable.

4. Upon completion of mark-up, submit a complete set of Project Record Product Data to District for District's records.

5. Where Project Record Product Data is required as part of maintenance manuals, submit marked-up Project Record Product Data as an insert in the manual, instead of submittal as Project Record Product Data.

6. The prime Contractor is responsible for mark-up and submittal of record Project Record Product Data for its own Work.

B. MATERIAL, EQUIPMENT AND FINISH DATA

1. Provide data for primary materials, equipment and finishes as required under each specification section.

2. Submit two sets prior to final inspection, bound in 8-1/2 inches by 11 inches three-ring binders with durable plastic covers; provide typewritten table of contents for each volume.

3. Arrange by Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:
   a. Trade names.
   b. Model or type numbers.
   c. Assembly diagrams.
   d. Operating instructions.
   e. Cleaning instructions.
   f. Maintenance instructions.
   g. Recommended spare parts.
   h. Product data.

1.5 MISCELLANEOUS PROJECT RECORD SUBMITTALS

Refer to other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to District for District's records.
Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

a. Field records on excavations and foundations
b. Field records on underground construction and similar work
c. Survey showing locations and elevations of underground lines
d. Invert elevations of drainage piping
e. Surveys establishing building lines and levels
f. Authorized measurements utilizing unit prices or allowances
g. Records of plant treatment
h. Ambient and substrate condition tests
i. Certifications received in lieu of labels on bulk products
j. Batch mixing and bulk delivery records
k. Testing and qualification of tradespersons
l. Documented qualification of installation firms
m. Load and performance testing
n. Inspections and certifications by governing authorities
o. Leakage and water-penetration tests
p. Fire resistance and flame spread test results
q. Final inspection and correction procedures

PART 2 PRODUCTS

Not applicable to this section.

PART 3 EXECUTION

3.1 RECORDING

Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project. District may periodically review Project Record Documents to assure compliance with this requirement.

3.2 SUBMITTAL

A. At completion of Project, deliver record documents to District.

B. Accompany submittal with transmittal letter containing:

   Date
   Project title and number
   Contractor's name and address
   Number and title of each record documents
   Certification that each document as submitted is complete and accurate, and signature of Contractor, or Contractor's authorized representative.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE

A. This section covers the work necessary to demolish, clear, grub, strip and prepare the project site of the trees, shrubs, rock boulders, pump building, underground utilities, and other items existing on the site within the designated areas of the new facilities.

1.02 RELATED WORK

A. SECTION 01740 – PRESERVATION AND CLEANUP

1.03 SITE CONDITIONS

A. The Contractor shall conduct site visits as needed to determine the extent of the work required to demolish, clear, grub and strip the site.

PART 2 - MATERIALS (Not Used)

PART 3 - EXECUTION

3.01 CLEARING AND GRUBBING

A. All isolated surface vegetation and any miscellaneous surface obstructions shall be removed from the project area, prior to any site grading. Surface stripping should not be incorporated into fill unless they can be sufficiently blended to result in an organic content less 3 percent by weight (ASTM D2974). Stripped topsoil, with all organic content between 3 and 12 percent by weight, may be stockpiled and used as non-structural fill (i.e. landscaped areas). If used in landscaped areas, soil with an organic content between 3 and 12 percent should be placed within 2 feet of finished grade and at least 5 feet outside the perimeter of buildings or improvements. Soil with an organic content greater than 12 percent by weight should be excluded from fill.

B. Where clearing or partial clearing of the right-of-way is necessary, complete prior to the start of construction of facilities or structures. Remove and dispose of all vegetation designated for removal as indicated on the Drawings and as flagged in the field. Include shrubs, brush, downed timber, rotten wood, heavy growth of grass and
weeds, vines, rubbish and debris. Vegetation removal shall include the root ball and all surface roots larger than one-half (1/2") inch in diameter. Areas where trees and shrubs have been removed shall be thoroughly cross-ripped to a depth of twelve (12") inches to expose any remaining rubble, debris, and root structures. Cross ripping operations shall be performed in the presence of the Engineer. Cut trees and brush as near to the surface to the ground as practical, remove all stumps, and pile for disposal. Do not permit excavated materials to cover brush or trees prior to disposal.

C. Excavations and depressions resulting from the removal of such items, as well as any existing excavations or loose soil deposits, as determined by the Engineer, shall be cleaned out to firm, undisturbed soil and backfilled with suitable material in accordance with these Specifications.

D. Protect from damage the existing trees and other vegetation that are to remain, as specified in this section and in SECTION 01740 – PRESERVATION AND CLEANUP. Do not smother trees by stockpiling construction materials or excavated materials within the drip line and provide temporary protection as required.

E. Do not remove existing trees or tree limbs over two (2) inches in diameter whether on public or private property unless they are within four (4) feet of the pipe centerline or pump station building without permission from the Engineer. Limb removal shall be performed only when directed by the Engineer. All authorized limb removal shall be in accordance with the International Society of Arboriculture “Tree Pruning Guidelines.” “Heading” of any tree will not be permitted nor the use of climbing spurs on trees that are to remain.

F. Protect from damage, unless otherwise marked by the Engineer, all trees, shrubs, or plants within the limits of the easement on private or public property. Ornamental and exotic trees and shrubs that interfere with trenching shall be replaced in kind and size or may be removed intact with their root system upon approval of the Engineer. Ball the root system of the trees, shrubs, or plants, bind in burlap, heel into topsoil, and keep watered as required. Upon completion of the pipe laying and backfilling of the trench, replant the trees, shrubs, or plants in their original position. The Contractor shall record the location of any plant prior to its removal. Should any tree, shrub, or plant that has been disturbed as a result of its removal, or otherwise damaged by the Contractor, die within one (1) year after the acceptance of the project, it shall be replaced in kind and size by the Contractor at his expense.

G. The Contractor shall remove all unknown underground structures or debris that may be encountered within the limits of construction.

H. In the event that underground tanks, or stained or discolored soil, or oily or odorous water or materials that could present a threat to human health or the environment are discovered during construction, activities in that immediate area shall cease. A qualified environmental consultant shall be hired by the District to evaluate the find and make recommendations. The expenses to the Contractor for performing any
required mitigation measures will be added to the Contract Price as a change order. However, if the Contractor is the cause of the environmental spill or hazard then the Contractor shall be responsible for all costs associated with hiring a consultant and any clean-up costs, including disposal.

3.02 DISPOSAL

A. The Contractor shall bear all costs of disposing of all demolished materials including but not limited to trees, stumps, brush, roots, limbs, and other organic/inorganic waste materials from the demolition, clearing and grubbing operation. Debris shall be disposed of in such a manner as to meet all requirements of the State, County, and local regulations regarding health, safety, and public welfare, and shall be properly disposed of off-site. Burning or burying of debris is not permissible and shall not be allowed.

END OF SECTION
DIVISION 02 EXISTING CONDITIONS

EARTHWORK

SECTION 02300

PART 1 - GENERAL

1.01 SCOPE

A. The work shall consist of performing all operations necessary to excavate all materials, regardless of character, subsurface conditions and of whatever nature, necessary for the construction of the footings and foundation for the structures. This section includes work necessary to excavate, place, fill, remove and dispose of all excess and unsuitable materials as required by the Engineer, and to establish site grades as shown on the Contract Drawings. Excavation includes grading for earthen embankments, facilities, pads, roadways, and areas adjacent to structures, slope rounding, and removal of unsuitable material from the roadbed and beneath fill areas. All work shall be in accordance to the recommendations provided in the Geotechnical Report (Appendix A).

B. Contractor shall conform to EID Standard Specifications 31 23 33 TRENCH EXCAVATION, BACKFILL AND COMPACTION for all trench work.

1.02 RELATED WORK

A. SECTION 02200 – DEMOLITION, CLEARING, GRUBBING, AND STRIPPING

1.03 GEOTECHNICAL REPORT

A. A Geotechnical Engineering Report, Geotechnical Investigation, El Dorado Irrigation District WTP Intake Outingdale Improvements, September 6, 2019, has been prepared for this site by Geocon Consultants, Inc.. A copy is located in Appendix A. The Contractor is responsible for any conclusions the Contractor draws from the report; should the Contractor prefer not to assume such risk, the Contractor shall employ his own experts to analyze available information or undertake additional subsurface exploration, at no cost to the District. The Contractor shall notify the Engineer and receive the Engineers’ approval for any subsurface exploration a minimum of one week prior to beginning any such work. In addition, the Contractor shall notify USA a minimum of 48-hours prior to beginning any subsurface explorations. If there is any discrepancy between the Contractor’s experts and the District’s Geotechnical representative, the Contractor shall promptly notify the Engineer, prior to beginning any work.
B. In resolving conflicts resulting from errors or discrepancies between this specification and the Geotechnical Report, the Geotechnical Report shall govern over this specification.

1.04 DEFINITIONS

A. Relative Compaction (ASTM Method)
The ratio expressed as a percentage, of the dry density of the backfill material as compacted in the field, to the maximum dry density of the same material determined in the laboratory by ASTM D1557.

B. Optimum Moisture Content (ASTM Method)
The ratio, expressed as a percentage, of the weight of water in the solid material to the weight of the solids, which occurs at the maximum dry density as determined by ASTM D1557.

C. Optimum Moisture Content (CALTRANS Method)
The ratio, expressed as a percentage, of the weight of water in the solid material to the weight of the solids, which occurs at the maximum dry density as determined by CALTRANS Test Method 219.

D. Well-Graded
Well-graded as used in this section defines a mixture of particle sizes that have no specific concentration or lack thereof of one or more sizes. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity or any other specific grain size distribution parameters. Well-graded is used to help define a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

1.05 SUBMITTALS

A. The Contractor shall provide Certifications that all materials to be used on the project meet the requirements of the standards referenced.

B. Samples and a list of the source of the samples of all imported materials to be used shall be submitted two (2) weeks in advance of use. Samples shall consist of one-half cubic feet (0.5 ft³) of each type of material.

C. Filter fabric data submitted shall include:

1. A 12-inch square of fabric
2. Manufacturer’s descriptive product data
3. Installation instructions
1.06 PROJECT CONDITIONS

A. Maintain fills, slopes, and ditches within the limits of the new construction until final acceptance. Repair areas damaged as a result of storms or construction. Take necessary precautions to prevent the entrance of soils and other materials into streambeds, lakes, or watercourses.

1.07 NOTIFICATION

A. Earthwork shall not be performed without the notification and approval of the Engineer. The Contractor shall notify the Engineer at least two (2) working days prior to the commencement of any aspect of the site earthwork.

1.08 CORROSIVE SOILS

A. If the Geotechnical Report states that the native soils on the project site have moderate to severe corrosion potential, any imported fill material to be used shall be tested by the Contractor at no cost to the District, prior to acceptance to ensure that the soil is non-corrosive.

PART 2 – MATERIALS

2.01 NATIVE MATERIAL

A. Native material is the on-site, unclassified material or soil. When used it shall be free from peat, wood, roots, bark, and other debris and extraneous material. The native soil may be used as Imported Fill Soil in accordance with the Geotechnical Report. The native soil used shall not contain rock or cemented clods in excess of three inches (3") in diameter. The Contractor may be required to moisture condition (i.e. drying and/or wetting of soil) the native soil to achieve the specified compaction. Moisture conditioning and compaction requirements are found in the Geotechnical Report, located in the Appendix, and shall be adhered to in order to reduce the potential for differential movement resulting from the expansive soils to normally tolerable levels. Any work/costs related to drying, wetting, and compacting the native material shall be the responsibility of the Contractor and of no expense to the District.

2.02 IMPORTED FILL SOIL

A. Imported fill soils shall conform all criterions found in the Geotechnical Report. The soil shall have the following properties:

1. All fill particles shall be less than three inches (3") in size.

2. The fill material shall have a Plasticity Index (PI) no greater than 15.
3. The fill material shall contain less than three percent (3%) by weight of organics, in accordance with ASTM D2974 and shall be free of other objectionable material (concrete, plastic, metal, and other wastes).

4. Recycled material (crushed asphalt pavement and concrete) may be used in areas more than two feet (2') from finish grade of buildings and roadways, as stated in the Geotechnical Report.

2.03 SUBGRADE

A. The subgrade shall be Class 3, in accordance with CALTRANS Standard Specification, Section 25 and as specified herein.

2.04 IMPORTED TOPSOIL

A. Imported topsoil shall be suitable sandy loam from an approved source, which possesses friability and a high degree of fertility. It shall be free of clods, roots, gravel, and other foreign material. It shall be free of noxious vegetation and seed. Imported topsoil shall be obtained and transported at the Contractor’s expense.

2.05 STRUCTURAL BACKFILL

A. The material used to backfill footings, foundations, walls, pipes, culverts and conduits shall conform to the following requirements.

1. The material shall have a Sand Equivalent of at least 20.

2. The backfill must be free of organic or unsatisfactory material as deemed by the Engineer.

3. The backfill shall conform to the following grading:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>100%</td>
</tr>
<tr>
<td>No. 4</td>
<td>35%-100%</td>
</tr>
<tr>
<td>No. 30</td>
<td>20%-100%</td>
</tr>
<tr>
<td>No. 200</td>
<td>2%-5%</td>
</tr>
</tbody>
</table>

2.06 STABILIZATION MATERIAL

A. Stabilization material shall be three inch (3") minus crushed rock, well graded from course to fine, containing less than twenty five percent (25%) by weight particles passing the No. 200 sieve, and free from clay lumps, consolidated masses and organic material.
2.07 CRUSHED ROCK

A. Crushed rock shall consist of durable rock and gravel that is free of deleterious material and free of slaking or decomposition under the action of wetting or drying and meet the following requirements:

1. The crushed rock must have a minimum Cleanliness Value of 60 as determined by California Test Method 227.

2. Material shall contain at least seventy five percent (75%) of particles having 2 or more fracture faces.

3. The durability index shall be 40 or greater.

4. The crushed rock shall conform to the following gradation:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>100%</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>75%-100%</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>5%-55%</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>0%-15%</td>
</tr>
<tr>
<td>No. 4</td>
<td>0%-10%</td>
</tr>
<tr>
<td>No. 200</td>
<td>0%-2%</td>
</tr>
</tbody>
</table>

2.08 AGGREGATE BASE

A. Aggregate base shall be Class 2, meet the requirements of ASTM D2940, CALTRANS Section 26, and conform to the following requirements:

1. The aggregate base shall be free from organic matter and other deleterious substances, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base.

2. Aggregate may include material processed from reclaimed asphalt concrete, Portland cement concrete, lean concrete base, cement treated base or a combination of any of these materials. The amount of reclaimed material shall not exceed 50 percent of the total volume of the aggregate used.

3. The aggregate must have a minimum 22 Sand Equivalent, minimum 35 Durability Index, and minimum 78 Resistance (R-Value).
4. The aggregate base shall conform to the following gradation:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1”</td>
<td>100%</td>
</tr>
<tr>
<td>¾”</td>
<td>87%-100%</td>
</tr>
<tr>
<td>No. 4</td>
<td>35%-60%</td>
</tr>
<tr>
<td>No. 30</td>
<td>20%-30%</td>
</tr>
<tr>
<td>No. 200</td>
<td>0%-12%</td>
</tr>
</tbody>
</table>

2.09 FILTER FABRIC

A. Filter fabric shall be a non-woven material consisting of polyester, nylon, and polypropylene, filaments formed into a stable network. The fabric shall be permeable, not act as a wicking agent, be inert to commonly encountered chemicals, be rot-proof, and resistant to ultraviolet light. The filter fabric shall be Tencate Mirafi FW700, or equal.

2.10 ANCHOR PINS

A. Anchor pins shall be of steel, a minimum of 3/16” in diameter, and at least fifteen inches (15”) in length, or equivalent pins recommended by the manufacturer of the filter fabric.

PART 3 - EXECUTION

3.01 GENERAL

A. All work shall comply with the CALTRANS Standard Specification, Section 19 and unless otherwise noted in the following provisions:

1. Stabilization
   Where the undisturbed condition of natural soils is inadequate for support of the planned construction, the Engineer will direct the Contractor to over-excavate to adequate supporting soils. The excavated space shall be filled to the specified elevation with stabilization material wrapped with filter fabric. Place stabilization material in maximum eight inch (8”) loose layers and compact.

2. Surplus Material
   Unless otherwise noted, surplus excavated material shall be disposed of off-site in accordance with applicable ordinances, environmental requirements, and in accordance with CALTRANS Standard Specification Section 19-2.03B. All costs related to the hauling and disposal of surplus material shall be at no additional cost to the District.
3. **Hauling**  
When hauling is done over highways or city streets, the loads shall be trimmed and the vehicle shelf areas shall be cleaned after each loading. The loads shall be watered after trimming to eliminate dust, tarped, and transported pursuant to local requirements.

4. **Erosion Control**  
The Contractor shall maintain earthwork surfaces true and smooth and protected from erosion. Where erosion occurs, the Contractor shall provide fill or shall excavate as necessary to return earthwork surfaces to the grade and finish specified.

5. **Ground Water**  
The geotechnical investigation of the site did not encounter groundwater.

6. **Control of Water**  
If water is encountered, the Contractor shall furnish, install, maintain and operate all necessary machinery, appliances and equipment to keep the excavation reasonably free from water until the placing of the bedding material, pouring of concrete, and placing of the backfill has been completed, inspected and approved, and all danger of flotation and other damage is removed. Ground water pumped from the excavation shall be disposed of in such a manner as to not cause injury to public or private property or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the Engineer.

   Surface water shall be diverted or otherwise prevented from entering excavations to the greatest extent possible without causing damage to adjacent property.

   The Contractor shall be responsible for the condition of any pipe or conduit which they may use for drainage purposes, and all such pipe or conduit shall be left clean and free of sediment.

7. **Seasonal Limits**  
Fill material shall not be placed, spread or rolled during unfavorable weather conditions, as determined by the Engineer. If work is interrupted by heavy rains, fill operations shall not resume until field tests indicate that the moisture content of the subgrade and fill materials are satisfactory.

8. **Finish Grading**  
Finished grading shall be smooth, compacted and free from irregularities. The degree of finish shall be that normally obtainable with a blade-grader.

   Finished grade shall be as specified in the Drawings plus or minus 0.10 feet except where a local change in elevation is required to match sidewalks, curbs, manholes, and catch basins, or to ensure proper drainage. Allowance for topsoil
and grass cover, and sub base and pavement thickness shall be made so that the specified thickness of topsoil or pavement can be applied to attain the finished grade.

If the soil is to be cultivated or straw is to be incorporated into the surface, rocks larger than shall be removed and disposed of prior to cultivation or placement of straw.

9. Classification of Excavated Materials
No classification of excavated materials will be made. Excavation shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the work, regardless of the type, character, composition, or condition thereof.

3.02 COMPACTION TESTING
A. The Contractor shall make all necessary excavations for compaction tests. Costs of excavation, backfilling, and compacting in connection with compaction testing shall be borne by the Contractor. The District will pay for compaction testing. The Contractor shall be responsible for payment of any corrective work and testing resulting from an initial failed test.

B. After areas has been excavated and scarified, the area shall be diced or bladed until uniform and free from large clods, and brought to the proper moisture content before compaction. Measurement of compaction will be determined by using the ASTM D1557 Compaction Test Method.

C. Field tests of compacted density will be in accordance with CALTRANS 216 (sand cone) or 231 (nuclear gage) at the Engineer’s option.

3.03 EXCAVATION
A. Initial site grading should include a reasonable search to locate soil disturbed by previous activities, any undocumented fill soils, abandoned underground structures, or existing utilities that may exist within the area of construction. Any areas or pockets of soft or loose soils, saturated soils, void spaces made by burrowing animals, or other disturbed soil that are encountered, shall be excavated to expose firm native material. Excavations for removal of any unsuitable conditions should be backfilled with Imported Fill Soil or Structural Backfill.

B. The native soils at the project site should provide adequate bearing strength for the proposed scope of construction, therefore, the recommendations provided in the Geotechnical Report and those included herein are followed, no general over-excavation is needed.
C. The bottoms of all areas to receive fill shall be scarified to a minimum depth of eight inches (8”), uniformly moisture conditioned, proof rolled to detect soft or pliant areas, and compacted to the requirements for Imported Fill Soil or Structural Backfill in accordance with the Geotechnical Report.

D. When the moisture content of the sub grade is below the optimum moisture content, water shall be added until the proper moisture content is reached. When the moisture content is too high to permit the specified compaction to be achieved, then the sub grade shall be aerated by blading or other methods until the moisture content is satisfactory for compaction.

E. Compaction operations shall be performed in the presence of the Engineer who will evaluate the performance of the materials under compactive load. Unstable soil deposits, as determined by the Engineer, shall be excavated to expose a firm base and the grades restored with Imported Fill Soil or Structural Backfill in accordance with these Specifications.

3.04 ROCK EXCAVATION

A. Rock excavation shall include removal and disposal of all exposed granite rocks in excavations of developed areas. Any granite rocks encountered in the excavations for foundations shall be removed or used for anchoring footings as prescribed in the Geotechnical Report.

B. It is expected that nearly all rock excavation can be accomplished using conventional heavy equipment and ripping methods for rock excavation.

   1. For general excavation, a D-9N Caterpillar tractor with an integral bulldozer-mounted, single-tooth ripper, with or without the use of a hydraulic hammer, or equivalent equipment, is considered conventional rock excavation equipment.

   2. For trench excavation, a 235C Caterpillar excavator with a medium stick and a rock ripping bucket, with or without the use of a hydraulic hammer, or equivalent equipment, is considered conventional rock excavation equipment.

C. If material is encountered which the Contractor believes cannot be excavated by conventional equipment, the Engineer shall be immediately notified. The Contractor shall provide performance tests of the specified conventional or equivalent equipment. If the Engineer confirms in writing that the specified conventional equipment cannot perform the rock excavation at suitable rates, the Contractor may elect to perform rock blasting for the remainder of the excavation, as specified below.

D. Payment for rock excavation by conventional heavy equipment shall be included in the Lump Sum price for Earthwork in the Bid Item Schedule. A separate payment will be provided for blasting, if required, as specified below.
E. Excavated rocks may be re-located onsite if requested by the Contractor, and shall be placed at designated locations by the Engineer.

F. **ROCK BLASTING (IF REQUIRED)**

1. **General:** It is not anticipated that blasting will be required for this project. Should the Contractor exhaust conventional equipment and methods for rock excavation and removal and desire to use explosives to accomplish this work it shall comply with the following:

   a. The Contractor shall make every effort to identify all locations in the excavation that require blasting to complete the rock removal.

   b. Blasting and storage and handling of explosives shall be in accordance with the Construction Safety Orders of the Division of Industrial Safety of the California Department of Industrial Relations, Federal Safety Requirements, the Tulare County Sheriff, and other authorities which have jurisdiction.

   c. The Contractor shall obtain all necessary permits and furnish copies to the Engineer before explosives are transported to the site. The Contractor shall pay for permits at no additional cost to the Owner.

   d. Blasting shall be done only by skilled operators under the direction of a licensed foreman.

   e. The Contractor shall identify all property, structures, and persons which may be affected by blasting and shall take all safety precautions and protective measures to prevent damage or injury to same. All personal injury or damage to persons or property of any nature, whether in the work or appurtenant to it, shall be the responsibility of the Contractor.

   f. The Contractor agrees by submission of a bid to indemnify and hold the Owner, its officers, agents, employees, and the Engineer harmless from any and all liability claims, costs, expenses including expenses of investigation and defending against same in regard thereto.

   g. Blasting shall only be permitted between 9:00 AM and 4:00 PM, Monday through Friday, unless otherwise approved by the Engineer and regulatory agencies having jurisdiction. Blasting will not be permitted on legal holidays.

2. **Pre-Blasting**

   a. The Contractor and Engineer shall confirm the blasting locations for measurement and payment.
b. Inspections of all structures within 300-feet of the blast site shall be made more than 2 weeks prior to commencement of blasting. A qualified independent inspector shall perform the inspections for the purpose of detecting and documenting any visible or reasonable recognizable pre-existing defects or damages in structures.

c. Waiver of inspections shall be in writing, signed by structure owners or persons with control or custody of the structures.

d. Complete inspection reports listing findings with photographs or waivers shall be signed by the inspector. One copy of inspection reports and waivers, shall be submitted to the Engineer before blasting commences.

e. The Contractor shall give 30 and 5-day notices to all residence and businesses, and utility owners which may be affected by blasting.

3. **Blasting**

   a. The Contractor shall perform instrumented seismographic monitoring on blasting. A seismograph shall be placed at the nearest structure to the blast to monitor the ground motion particle velocity and frequency during each blast. One copy of each daily seismograph chart shall be furnished to the Engineer.

   b. Fly rock from blasting shall be contained within the project site and shall not represent a hazard to persons, vehicles, existing improvements, or vegetation.

   c. The blasting site shall be cleaned of all debris at the end of each day.

   d. No blasting shall be done within 100-feet of concrete which has been placed in less than 7 days, except by permission of the Engineer.

4. **Post-Blasting**

   a. The independent inspector shall investigate each complaint of property damage and a written report shall be furnished to the Engineer within 30 days of receipt of the complaint.

5. **Suspend blasting activities if any of the following conditions occurs:**

   a. Overshooting
   b. Endangerment to the public
   c. Destruction of property or natural features
3.05 EMBANKMENTS

A. Embankments shall be constructed of native or imported material. Prior to placing embankment material the area shall be cleared of all brush and trees and stripped of all organic sod, grass, roots, debris and other objectionable material. The Engineer shall determine the depth of stripping. After clearing and stripping the area to receive embankment material, the area shall be rolled and compacted to a firm and unyielding condition as directed by the Engineer.

B. Embankments shall be moisture conditioned to within zero to three percent (0%-3%) of optimum moisture content. The embankments shall be placed in horizontal lifts that do not exceed eight inches (8") in thickness prior to compaction. Embankments shall be compacted to not less than ninety percent (90%) relative compaction.

3.06 UNSUITABLE MATERIAL

A. When unsuitable material is encountered during the grading operation, which would prevent the material from being compacted as specified, the Engineer may order the site to be ripped a minimum of one foot (1’) deep and three feet (3’) wider than the finish lines, where applicable, and left to dry. In this event a time extension shall be granted for every working day delay for drying. No other consideration or cost shall be given for ripping, delay or stand-by and shall be considered as included in this item of work and no additional compensation will be allowed therefore.

B. Once underground installations are completed and prior to placing imported material on the site, the grading and compaction of the top half foot (0.5’) of subgrade and any other material and area’s disturbed by trenching, backfilling and/or other work shall be reworked, graded, and compacted to meet the above site grading requirements to receive the imported material.

3.07 AREA BACKFILL

A. Area Backfill is defined for all areas not covered under trench backfill, structural backfill, or roadway backfill. Area Backfill shall be constructed to the lines and grades as shown on the Drawings as directed by the Engineer, and shall conform to Section 19 of the CALTRANS Standard Specifications and these Specifications, except that ponding and jetting shall not be allowed. Backfill shall consist of on-site or imported engineered fill and shall be brought to the optimum moisture content.

B. On-site or imported engineered fill shall be placed in horizontal lifts not to exceed six-inches in compacted thickness. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to promote uniformity of material in each layer.
C. When the moisture content of the fill material is below the optimum moisture content, water shall be added until the proper moisture content is reached. When the moisture content is too high to permit the specified compaction to be achieved, then the fill material shall be aerated by blading, discing, or other methods until the moisture content is satisfactory for compaction.

D. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to a minimum of ninety percent (90%), as determined by ASTM D1557. Compaction shall be accomplished while the fill material is at the required moisture content. Moisture content shall be uniform throughout each layer. Each layer shall be compacted over its entire area until the desired density has been obtained.

E. Compaction tests and acceptance by the Engineer will be required prior to the starting of trenching or excavating for placing any underground facilities.

**3.08 STRUCTURAL BACKFILL**

A. Place structural backfill around structures. Do not exceed loose lifts of eight inches (8”). Compact each lift to at least ninety five percent (95%) relative compaction. Stop structural backfill six inches (6”) below finished grade in all areas where topsoil is to be placed. Place material in a manner that avoids segregation.

B. Any subsequent damage to slabs, piping, concrete structures, facilities, or structures caused by settlement of structural backfill shall be corrected and repaired by the Contractor at no cost to the District.

**3.09 FINAL SUBGRADE PREPARATION**

A. Prepare final subgrade and compaction in accordance with the Geotechnical Report (Appendix A).

**3.10 PLACEMENT OF AGGREGATE BASE**

A. Final subgrade compaction shall be performed just prior to placement of the subgrade base.

B. Placing of aggregate base shall comply with CALTRANS Standard Specifications Section 26 and in conformity with the lines, grades, and dimensions shown on the Drawings. Aggregate base shall be brought to the optimum moisture content and compacted to a minimum of ninety five percent (95%) in accordance with ASTM D1557 and California Standard Test Method No. 231. Where the required final thickness is six inches (6”) or less, the aggregate base may be spread and compacted in one layer. Where the required final thickness is more than six inches (6”), the aggregate base shall be spread and compacted in lifts not to exceed six inches (6”) of thickness. Place sufficient aggregate base on the subgrade to obtain
the specified thickness shown after compaction. The surface of the finished aggregate base at any point shall not vary more than 0.05 feet above or below the grade established by the Engineer.

3.11 REMOVAL AND REPLACEMENT OF TOPSOIL

A. Where excavation crosses lawns, garden areas, pasture lands, cultivated fields, orchards, or other areas on which reasonable topsoil conditions exist, remove the topsoil for a minimum depth of fifteen inches (15") for the full width of the excavation. Stockpile this topsoil to one side of the right-of-way and do not mix with the remaining excavated material. Replace the topsoil in the top twelve inches (12") in the backfilled excavation. In lieu of stockpiling and replacing the topsoil, imported topsoil may be substituted in the top twelve inches (12") at no additional cost to the District.

B. Maintain the finished grade of the topsoil level with the area adjacent to the excavation or mounded until final acceptance by the Engineer. Repair damage to adjacent topsoil caused by work operations. Remove all rock, gravel, clay, and any other foreign materials from the surface, re-grade, and add topsoil as required.

3.12 FILTER FABRIC

A. Preparation of Subgrade
The surface to be lined with filter fabric shall be graded to obtain smooth side and bottom surfaces so that the cloth will not bridge cavities in the soil or be damaged by projecting rock. Filter fabric should be placed between native soil and fill material.

B. Installation of Filter Fabric
The filter fabric shall be laid flat, but not stretched on the soil, and shall be secured with anchor pins spaced not more than ten feet (10’) on centers. Overlaps shall be a minimum of eighteen inches (18") wide. The filter fabric shall be held in place with anchor pins at the overlaps and corners to maintain the position of the fabric during placement of fill material.

C. Protection From Exposure To Sun
Prior to and during installation, the filter fabric may be exposed to sunlight not more than twenty (20) days.

D. Inspection
All filter fabric installations shall be inspected and approved by the Engineer before backfilling. If any defective or damaged areas are found, the fabric shall be removed and replaced with new fabric or the damaged area may be repaired at the Contractor’s option by covering damaged area with new fabric.
3.13 SHORING, SHEETING, AND BRACING

A. Except where banks are cut back on a stable slope if approved and as directed by the Engineer, excavations for structures and trenches shall be supported as necessary to prevent caving or sliding.

B. Sheet and brace the excavation when necessary for safety to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workers, and the public. Increase trench widths accordingly by the thickness of the sheeting, shoring, or trench box. Maintain shoring in place until the pipe has been placed and backfilled at the pipe zone. The trench box shall be raised as the backfilling is done in a manner that will not damage the pipe or permit voids in the backfill. Shoring or sheeting shall be removed after placing the pipe zone.

C. All sheeting, shoring, and bracing of trenches and other excavations shall conform to the safety requirements of the Geotechnical Engineering Report, Federal, State, or local public agency having jurisdiction. The most stringent of these requirements shall apply.

3.14 DRAINAGE DITCH, PIPELINES, AND CULVERT RESTORATION

A. Except where banks are cut back on a stable slope if approved and as directed by the Engineer, excavations for structures and trenches shall be supported as necessary to prevent caving or sliding.

B. Roadside drainage ditches and all other ditches shall be graded to drain and prevent ponding. Cross-sections and location of ditches shall be as shown in the Drawings. The Contractor shall repair drainage ditches damaged either directly or indirectly by his operations. Drainage ditches shall be compacted to ninety percent (90%) relative compaction. No ponding of surface water near foundations shall be allowed. The Contractor shall correct any drainage ditch breaches occurring as a result of his operations at no cost to the District.

C. Replace in kind drainage pipelines and culverts, which are removed or damaged. Replace pipelines and culverts to the existing lines and grades. Do not replace pipelines and culverts until the work in the immediate area has been completed, unless otherwise directed by the Engineer. At the inlet and outlet of all culverts the ditch shall be sloped and graded to drain without ponding.

END OF SECTION
DIVISION 03 CONCRETE

CONCRETE

SECTION 03300

PART 1 - GENERAL

1.01 SCOPE

A. This section covers the work necessary for furnishing and placing of all concrete for construction of the slabs, footings, piers, floors, landings, sidewalks, thrust blocks, and other miscellaneous concrete structures including forms, reinforcing steel, cement finishing, fence footings and all other miscellaneous related work, complete. The Contractor shall determine the mix proportions for concrete in conformance with these specifications.

B. Contractor shall conform with EID Standard Specifications 03 00 00 CONCRETE AND REINFORCING STEEL.

1.02 SUBMITTALS

A. The Contractor shall submit complete data on the concrete mix for approval of all materials used in the mixture, in conformance with ASTM C94, as last amended.

B. The Contractor shall make the following submittals for the Engineers approval:

1. Complete data on each concrete mix including aggregate gradations and admixtures in conformance with ASTM C94.

2. Submit either data compiled by a certified Testing Laboratory from a minimum of 30 previous compression tests or a batch test for each proposed mix design.

3. Curing compound, joint filler, and joint sealant data, including the manufacturer’s application instructions.


1.03 TESTING

A. The District reserves the right to have test cylinders taken and tested by an approved testing laboratory to verify strength of the concrete. Acceptance and evaluation of the concrete strengths shall be by the District in accordance with ACI 318, current edition.
1.04 STANDARDS

A. All work in this section shall conform to the requirements in the Specifications set forth herein, in the Drawings, with Section 90 of the CALTRANS Standard Specifications, and in accordance with the applicable ACI, ASTM, and CRSI Standards.

PART 2 - MATERIALS

2.01 PORTLAND CEMENT

A. Portland cement shall be Type II-V low alkali. Milling data sheet shall be provided with submittal demonstrating compliance with ASTM C150, as last amended.

2.02 FLY ASH

A. Class F coal fly ash as a raw or calcined natural pozzolan may be used to replace up to 25% by mass of Portland cement in concrete mixtures. Materials data sheet shall be provided with submittal demonstrating compliance with ASTM C618, as last amended.

2.03 SLAG CEMENT

A. Ground granulated blast furnace slag, Grade 100 minimum, may be used to replace up to 25% by mass of Portland cement in concrete mixtures containing fly ash. If no fly ash is used in the mixture, up to 50% slag cement, by mass, may be used to replace Portland cement. Milling data sheet shall be provided with submittal demonstrating compliance with ASTM C989, as last amended.

2.04 AGGREGATE

A. Fine aggregates shall be clean, hard, natural and free from all foreign matter. Coarse aggregate shall be sound, crushed rock or gravel, free from adherent coating, organic water or injurious amounts of flat or friable pieces. All aggregates shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.

B. Fine and coarse aggregate shall conform to ASTM C33 or CALTRANS Standard Specifications Section 90-1.02(4)(d), as shown below. The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed for use in the concrete that meets the grading requirements below:
2.05 WATER

A. Water for washing aggregate, mixing, and for curing shall be free from oil and deleterious amounts of acids, alkalis, and organic materials; shall not contain more than 1,000 mg/L of chlorides as Cl, nor more than 1,300 mg/L of sulfates as SO₄; and shall not contain an amount of impurities that may cause a change of more than twenty five percent (25%) in the setting time of the mix nor a reduction of more than five percent (5%) in the compressive strength of the mix at 14 days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the mix.

2.06 CHEMICAL ADMIXTURES

A. To facilitate concrete construction applications, Water-Reducing (Normal, Mid-Range, and High-Range) and Set-Controlling Admixtures such as Type A or F, (water-reducing); Type B, (retarding); or Type D or G, (water-reducing and retarding) admixtures, meeting ASTM C494, as last amended, are permitted for use.

2.07 AIR-ENTRAINING ADMIXTURES

A. Air entraining admixtures shall meet the requirements of ASTM C260 as last amended.

2.08 REINFORCING STEEL

A. Reinforcing bars shall meet the requirements of ASTM A615 as last amended, for structural grade, deformed bars, (except that 1/4" shall be plain rounds). No. 5 bars and smaller shall be minimum Grade 40, No. 6 bars and larger shall be Grade 60. Welded wire fabric shall meet the requirements of ASTM A185. All reinforcements shall be clean and free of paint, loose rust, scale, and shall be securely held in place and tied at all intersections, corners, and splices with #16 gauge minimum annealed wire. Provide concrete blocks of same strength as the concrete mix to support reinforcing bars. Do not use broken concrete brick or stone.

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**GRADING LIMITS OF COMBINED AGGREGATES**

<table>
<thead>
<tr>
<th>Sieve Sizes</th>
<th>1&quot; Max.</th>
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<tbody>
<tr>
<td>1 1/2&quot;</td>
<td>100%</td>
</tr>
<tr>
<td>1&quot;</td>
<td>90%-100%</td>
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<tr>
<td>3/4&quot;</td>
<td>55%-100%</td>
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<tr>
<td>3/8&quot;</td>
<td>45%-75%</td>
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<tr>
<td>No. 4</td>
<td>35%-60%</td>
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<tr>
<td>No. 8</td>
<td>27%-45%</td>
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<tr>
<td>No. 16</td>
<td>20%-35%</td>
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<tr>
<td>No. 30</td>
<td>12%-25%</td>
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<tr>
<td>No. 50</td>
<td>5%-15%</td>
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<tr>
<td>No. 100</td>
<td>1%-8%</td>
</tr>
<tr>
<td>No. 200</td>
<td>0%-4%</td>
</tr>
</tbody>
</table>
2.09 FORMS

A. Forms shall be accurately constructed of clean lumber. The surface of forms against which concrete is placed shall be smooth and free from irregularities, dents, sags or holes. Forms shall be a minimum size of 1 inch thick, or other suitable material spaced with spreaders, and tied together, all subject to the Engineer’s approval. Removal of forms shall be as directed with all debris removed, in, under, or around the structures. Forms shall be mortar-tight, true to the dimensions, lines and grades of the structure, and of sufficient strength to prevent dislocation of the formwork during the placement of the concrete. Forms shall follow the recommendations of ACI 347, unless otherwise specified.

2.10 FORM TIES

A. Form ties on exposed surfaces shall be located in a uniform pattern or as indicated on the Drawings. Form ties shall be constructed so that the tie remains embedded in the wall, except for a removable portion at each end. Form ties shall have conical or spherical type inserts, inserts shall be fixed so that they remain in contact with forming material, and shall be constructed so that no metal is within 1 inch of the concrete surface when the forms, inserts, and tie ends are removed. Wire ties will not be permitted. Ties shall withstand all pressures and limit deflection of forms to acceptable limits.

2.11 BITUMINOUS TYPE PREMOLDED JOINT FILLER

A. Bituminous type pre-molded joint filler shall conform to ASTM D994 or D1751, as last amended, unless otherwise shown or specified on the Drawings.

2.12 JOINT SEALANT

A. Joint sealant shall be a two-component, traffic grade polyurethane, elastomeric sealant, and shall conform to ASTM C920, Type M, Grade NS.

2.13 CURING COMPOUND

A. The curing compound to be used shall be Non-Pigmented-Chlorinated Rubber Base-Clear, as listed in CALTRANS Standard Specifications Section 90-1.03B(3) conforming to ASTM C309, Type 1, Class B, as last amended.

2.14 BONDING COMPOUNDS

A. Bonding compounds shall be recommended by manufacturer as suitable to meet job requirements with regard to surface, pot life, shelf life, set time, vertical or horizontal application, forming restrictions, etc. Furnish manufacturer’s specific instructions for this job application, and obtain Engineer’s review prior to purchase.
B. Epoxy resin bonding compounds shall be used for wet areas and shall be Adhesive Engineering, Concreasive Nos. 1001, 1001-LPL or 1180 as applicable; Sika Chemical Corporation, Sikadur 35, Hi-Mod LV, Sikadur 32, Hi-Mod, or Sikadur 31, Hi-Mod Gel as applicable; Burke Company 881 LPL Epoxy; or equal.

C. Non-epoxy bonding compounds shall be used for dry areas and shall be Burke Company, Acrylic Bondcrete; Imperial Chemical Industrial, Inc., Thoro System Products, Acryl 60; Thorobond; or equal. Bonding compounds shall be applied in accordance with the manufacturer’s instructions.

PART 3 - EXECUTION

3.01 CONCRETE

A. Mixing
Concrete may be ready-mixed or batch mixed at the site. Ready mix concrete shall conform to ASTM C94, as last amended. Concrete shall be placed within 1-1/2 hours after cement has been added to the mix. A delivery ticket shall be furnished to the Engineer with the following information:

1. Name of concrete supplier
2. Serial number of ticket
3. Date
4. Truck number
5. Mix Identification #
6. Amount of concrete
7. Time loaded
8. Water added
9. Time unloaded

On-site batch mixing shall be performed upon written approval of Engineer. After all ingredients are in the mixer, concrete shall be mixed for a minimum of 1-1/2 minutes.

B. Slump
Slump shall be tested to meet the requirements of ASTM C143, as last amended. Slump range shall be 4 ± 1 inches for ring wall, pump stations, slabs, utility pads, pipe embedment, pipe and fence encasements, and thrust blocks. Slump range shall be 9 ± 1 inches for control density fill applications such as trench backfill, pipe bedding, or pipe filling for abandonment in place.

C. Compressive Strengths

1. Structural Concrete
Unless otherwise specified on the Drawings, the minimum allowable 28-day compressive strength for structural concrete (used for slabs, foundations, footings,
piers, floors, landings, sidewalks, pump pedestal, thrust blocks, etc.) shall be 3,000 psi when cured and tested in conformance with ASTM C31 and C39, as last amended.

2. **Control Density Fill**  
   Unless otherwise specified on the Drawings, the minimum allowable 28-day compressive strength for control density fill concrete shall be 50-150 psi when cured and tested in conformance with ASTM C31 and C39, as last amended.

3. **Water/Cementitious Materials Ratio**  
   Cementitious materials include, but are not limited to, Portland cement, Slag Cement, and Fly Ash. The maximum allowable water-cementitious materials ratio (w/cm) for minor and structural concrete mixtures is 0.5 unless otherwise specified on the contract drawings. The maximum allowable w/cm for control density fill is not limited unless otherwise specified on the contract drawings. The water content of all admixtures and aggregates shall be taken into account in the determination of the w/cm.

### 3.02 FORMS

A. Concrete structures shall be constructed as shown on the Drawings. Construct forms accurately to dimensions and elevations required and to be strong and unyielding. Construct forms with tight joints to prevent the escape of mortar and to avoid the formation of fins. Brace as required to prevent distortion and to fully support all loads during concrete placement and curing. The inside surfaces of forms shall be cleaned of all dirt, mortar, and foreign material prior to placing concrete. Forms shall be kept wet before concrete is placed.

### 3.03 PLACING REINFORCING STEEL

A. Place reinforcing steel, when required, in accordance with the Drawings, ACI 301, and Concrete Reinforcing Steel Institute’s (CRSI) “Recommended Practice for Placing Reinforcing Bars,” except as modified herein. The reinforcement shall be so secured in position that it will not be displaced during the placement of concrete. All reinforcing steel, welded wire reinforcement, and tie wire shall be completely encased in concrete. Reinforcing steel shall not be welded unless specifically required by the Drawings or otherwise directed by the Engineer. Bars shall not be straightened or re-bended in a manner that will damage the material; all reinforcing steel shall be cold bent. All reinforcements shall be clean and free of paint, loose rust, and scale.

B. Minimum length of splices shall be as herein specified. Top bars shall be defined as any horizontal bar placed such that twelve inches (12”) of fresh concrete is cast below in any single pour. Horizontal wall bars are considered top bars. All top bars shall have 42 diameter lap with minimum of 24 inches. All other bars shall have 30 diameter lap with minimum of 18 inches. Tie splices with #16 gauge minimum annealed wire as specified in the referenced CRSI standard.
3.04 PLACING CONCRETE

A. Prior to placing concrete, remove water from excavation and all debris and foreign material from forms. Check the reinforcing steel, if required, for proper placement and correct any discrepancies. Before depositing new concrete on old concrete, clean surface and pour a cement sand grout to a minimum depth of 1 inch over the surface.

B. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, minimizing splashing on forms or steel above, and in layers not over 2 feet deep. The vertical drop to final placement shall not exceed 6 feet. Placement shall conform to the requirements of ACI 301 and ACI 318, except as modified herein. No concrete shall be placed or used after it has begun to set, and no tempering shall be allowed. Chuting will be permitted only if means are taken to prevent segregation.

C. Do not place concrete when the ambient temperature is below 40 degrees F or approaching 40 degrees F and falling, without special protection as approved by the Engineer. Concrete that has been frozen or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at no additional cost to the District. The Contractor shall conform to the requirements of “Hot Weather Concreting” as reported by ACI Committee 305R when placing concrete in hot weather.

D. Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage.

E. All concrete shall be vibrated during placement to assure a dense and homogeneous set. Apply concrete vibrator at points spaced not farther apart than vibrator’s effective radius. Apply close enough to forms to vibrate surface effectively but not damage form surfaces. Vibrate until concrete becomes uniformly plastic. Vibrator must penetrate the fresh placed concrete and into the previous layer of fresh concrete layer below.

3.05 PLACING CONCRETE PAVEMENT

A. Portland cement concrete pavement shall conform to Section 40 “Portland Cement Concrete Pavement” of the CALTRANS Standard Specifications, ASTM C94, ACI 304R, and these Specifications. The Portland cement concrete shall be constructed in conformance with the requirements of Section 90 “Portland Cement Concrete” of the CALTRANS Standard Specifications. Portland cement concrete pavement shall be constructed to the dimensions, lines and grades shown on the Plans.

B. The Contractor shall make adequate advance arrangements to prevent delay in delivery and placing of concrete. An interval of more than forty-five (45) minutes between placing of any two (2) consecutive batches or loads shall constitute cause for stopping paving operations, and the Contractor shall make a construction joint, in the concrete already placed, at the location and of the type directed by the Engineer. Such construction joint shall be made at the Contractor’s expense.
C. Slip-form paving and finishing equipment shall be properly adjusted and in satisfactory operating condition. Prior to placing concrete, the Contractor shall demonstrate proper adjustment of all screeds and floats on slip-form pavers by measurement from grade stakes driven to known elevations. Satisfactory operation and adjustment of all propulsion and control equipment, including pre-erected grade and alignment lines, shall be demonstrated by moving slip-form pavers and finishing machines over a five-hundred-foot (500’) length of prepared subgrade with all propulsion and control equipment fully operational.

D. All pavement concrete shall be placed while fresh. The use of water for re-tempering any concrete will not be permitted. The temperature of the concrete mix at the time of placement shall not exceed 90-degrees F. Pavement shall be placed, finished, textured, cured, protected, and repaired in accordance to Section 40 “Portland Cement Concrete Pavement” of the CALTRANS Standard Specifications, except that final texturing with a spring steel tine will not be required and pavements shall be finished by ACI certified finishers and also in compliance with ACI 121R.

3.06 CONSTRUCTION JOINTS

A. Locate as shown or as approved, except that maximum spacing between construction joints shall be 10 feet.

A. The pre-molded joint filler shall be of sufficient width to completely fill the joint space.

3.07 FINISHING

A. Concrete work for the pump station slab and deck floor shall be ball floated with a wood float and finished with a light broom finish. All exposed edges shall be finished with a steel-edging tool.

B. Sidewalks and exterior slabs available to foot traffic shall be ball floated with a wood float, wood troweled, and lightly troweled with a steel trowel, and finished with a coarse broom to obtain a nonskid surface.

C. All other concrete work shall be ball floated with wood float and troweled with steel trowel to a smooth finish free from trowel marks. Do not absorb wet spots with neat cement.

3.08 REMOVAL OF FORMS

A. Remove forms after concrete has set sufficiently to carry the dead load and construction load it has to sustain and when approved by the Engineer. The minimum time or strength allowed before backfilling is allowed against concrete slabs and walls shall be three (3) days or 2,000 psi, unless otherwise approved by the Engineer. Remove forms with care to prevent scarring and damaging the surface.
B. Immediately upon the removal of forms, voids shall be neatly filled with cement mortar, non-shrink grout, or epoxy bonding agent and repair mortar as required for the application and as directed by the Engineer.

3.09 PROTECTION AND CURING

A. Protect fresh concrete from direct rays of the sun, drying winds, and wash by rain, when possible. Cure formed surfaces with an approved curing compound applied in conformance with the manufacturer’s directions as soon as the forms are removed and finishing completed.

B. The curing compound shall be uniformly applied immediately after the finishing operation, before the moisture sheen disappears from the surface. The curing compound shall be used within 120 days of manufacture.

3.10 PATCHING

A. Cut out all honeycombed and defective areas. Cut edges perpendicular to surface at least 1 inch deep, no feather edge allowed, and patch. Using bonding agent, fill holes flush with cement mortar composed of 1 part cement and 2 parts sand. Rub surface with wood float and burlap. Keep patches damp for a minimum of 7 days or spray with curing compound to minimize shrinking. Fill all form tie holes in same manner. Defective work shall be corrected to the satisfaction of the Engineer.

3.11 CONCRETE BEDDING AND ENCASEMENT

A. Place concrete bedding up to a height of 1/3 of the outside diameter of the pipe in all trenches requiring concrete bedding. Place concrete bedding and encasement in such a manner that no dirt or foreign material becomes mixed with the concrete. Concrete shall be placed as shown on the Drawings. Concrete shall have sufficient strength before any additional backfill material is placed in the trench.

3.12 DUCT BANKS

A. Duct bank concrete shall be compacted by rodding or spading only. Mechanical vibrators shall not be used. Concrete shall be worked around reinforcement and embedments and into corners of the forms. After screeding and before final floating a red concrete surface coloring shall be dusted on the fresh concrete surface at the rate recommended by the manufacturer.

3.13 EMBEDMENTS

A. Gate frames, fence posts, light fixtures, gate thimbles, special castings, channels or other miscellaneous metal parts that are to be embedded in the concrete shall be set and secured in the forms prior to concrete placement. Unless otherwise specified, anchor bolts and inserts shall be embedded in concrete as shown. The Contractor shall
provide inserts, anchors or other bolts necessary for the attachment of piping, valves, metal parts and equipment. Operators or sleeves for gate or valve stems shall be positioned to clear reinforcing steel, conduit and other embeddings, and to align accurately with equipment.

3.14 TESTING

A. The District shall have test cylinders taken and tested by an approved testing laboratory to verify strength of the concrete, in conformance with ASTM C31. Acceptance and evaluation of the concrete strengths shall be by the District in accordance with ACI 318.

3.15 FAILURE TO MEET STRENGTH REQUIREMENTS

A. Concrete is expected to reach higher compressive strength than that which is indicated in 3.01. The strength level of concrete will be considered acceptable if following conditions are satisfied per ACI 318:

1. The averages of all sets of 3 consecutive strength test results are greater or equal to the specified compressive strength.

2. No individual strength test (average of 2 cylinders) falls below the specified compressive strength, by more than 500 pounds per square inch.

3. Whenever one, or both, of 2 conditions stated above is not satisfied, the District may request the Contractor to provide additional curing of affected portion followed by cores taken in accordance with ASTM C42, ACI 318, and ACI 350 and comply with the following requirements:

   a. If the additional curing does not bring average of 3 cores taken in affected area to at least specified compressive strength, designate such concrete in affected area as defective.

   b. The Engineer may require the Contractor to strengthen defective concrete by means of additional concrete, additional reinforcement, or replacement of all defective concrete, all at the Contractor’s expense.

4. If the above conditions are not satisfied and the concrete fails to meet the minimum 28-day compressive strength, the under-strength concrete shall be removed and replaced at no additional cost to the District.

END OF SECTION
DIVISION 05 METALS

OPEN WEB STEEL JOISTS AND GIRDER

SECTION 05210

PART 1 – GENERAL

1.01 SCOPE

A. This section covers the work necessary to furnish and install steel joists and related items, complete.

1.02 REFERENCES


1.03 SUBMITTALS

A. Contractor shall furnish detailed drawings and lists showing mark, number, type, location and spacing of all joists. Submittals shall include bridging type, method of attachment to the joists, and anchorage to the ends. Submittals shall also include the type of paint and all accessories and details as may be required for proper installation of joists.

1.04 QUALIFICATIONS

A. Manufacturer shall be a member of the Steel Joist Institute and shall have been engaged in the design and manufacture of similar units for a period of not less than ten (10) years.

PART 2 – MATERIALS

2.01 JOISTS

A. Joists shall conform to the Standard Specifications, latest revisions. Identify each joist with its mark.

2.02 SHOP PAINT

A. Shop paint shall be "Tnemec 10-99", "Rustoleum No. 5769", or equal and shall conform
to SECTION 09900 – PAINTING and EID Standard Specification 09 90 00 as applicable.

2.03 EXTENDED ENDS

A. Extended ends shall be designed to have a load bearing capacity at least equal to the load requirements of the Steel Joist Institute.

2.04 BRIDGING

A. Member sizes and end anchorage shall be in accordance with the Standard Specifications unless otherwise noted on the Drawings.

1. K Series Joists
   Horizontal bridging shall be attached to joists by welding.

2. Cross bracing
   Provide additional cross bracing at end bays and other locations as shown on Drawings.

PART 3 – EXECUTION

3.01 HANDLING

A. Protect joists and accessories from harmful elements when stored at the job site. Store above ground on platforms, pallets, or other supports. Keep joists free from dirt or other foreign matter.

3.02 INSTALLATION

A. Bridging
   Bridging shall conform to referenced SJI standards and information contained on the Drawings.

B. Bearings and Anchorages
   Minimum bearings and anchorages shall conform to referenced SJI standards and the Drawings as related to particular type of support.

C. Joist Setting
   Set joists to lines, levels, and spacing as indicated. Provide bearing plates as indicated and/or required to carry out structural requirements. Execute general handling and erection in accordance with the referenced SJI standards.
D. **Joist Fastening**
   Joists shall be permanently fastened to supports and all bridging and anchorage completely installed before any construction loads, other than workers, are placed on the joists.

E. **Welding**
   Execute welding in accordance with "Code of Arc and Gas Welding in Building Construction" of the American Welding Society as amended to date, and only by welding operators who have been previously qualified to perform the type of work required.

F. **Touch Up**
   After erection, field connections and all abraded places shall be touched up with the same kind of paint as the shop coat.

3.03 TESTING

A. The District reserves the right to use ultrasonic inspection to verify adequacy of all welds.

END OF SECTION
PART 1 – GENERAL

1.01 SCOPE

A. This section covers the work necessary to furnish and install metal fabrications, complete.

1.02 GENERAL

A. Extent of metal fabrication work is shown on contract drawings, including schedules, notes, and details to show size and location of members, typical connections, and type of steel required.

B. Metal fabrications and structural steel work is to be completed as defined in the American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on Drawings.

C. Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements. Materials or fabricated components, which do not comply, shall be promptly removed and replaced.

D. Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work. Promptly notify Engineer whenever design of members and connections for any portion of structure are not clearly indicated.

1.03 SUBMITTALS

A. Product Data

Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel and steel fabrications, including certified copies of mill reports covering chemical and physical properties.

2. High-strength bolts (each type), including nuts and washers.
3. Metal Decking, Siding and Roofing materials technical data, standard color samples for Owner’s selection, installation instructions, and maintenance instructions.

B. **Shop Drawings**
Contractor shall submit shop drawings prepared under supervision of a registered professional engineer, including complete details and schedules for fabrication and assembly of structural steel members, metal fabrications, procedures and diagrams.

1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS A2.1 and A2.4 symbols, and show size, length, and type of each weld.

2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

3. Submit shop drawings and details of metal fabrications that show profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

C. **Test Reports**
Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.

D. **Welder’s Certification**
Qualified welding processes and welding operators shall be certified in accordance with AWS "Standard Qualification Procedure. Welder’s certificates shall be submitted, certifying all welders that are employed on the project, as well as verification of AWS qualification within the previous 12 months. If recertification of welders is required, retesting will be the Contractor’s responsibility.

1.04 **QUALITY ASSURANCE**

A. **Codes and Standards**
Comply with provisions of following, except as otherwise indicated:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges."

2. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings" including "Commentary" and Supplements thereto as issued.

3. AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts"
approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.


5. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."

6. UL90 Tested and certified system for wind up-lift.

7. ASTM E331 for water penetration of metal decking panel.


1.05 METAL DECKING WARRANTY

A. Metal Decking Manufacturer’s Product Warranty
   Warrant for (20) twenty years, following project delivery date, that metal decking panels will not rupture, fail structurally, or perforate.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to insure uninterrupted progress of work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay work. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures as directed.

PART 2 – MATERIALS

2.01 METAL SURFACES, GENERAL

A. For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

2.02 STEEL SECTIONS, STRUCTURAL STEEL SHAPES, PLATES AND BARS

A. Steel sections shall conform to ASTM A36.
2.03 COLD-FORMED STEEL TUBING
A. Steel tubing shall conform to ASTM A500, Grade B.

2.04 STEEL PIPE
A. Steel pipe shall conform to ASTM A53, Grade B.

2.05 ELECTRODES FOR WELDING
A. Electrodes for welding shall comply with AWS Code.

2.06 BOLTS, NUTS, AND WASHERS
A. Bolts, nuts, and washers shall conform to ASTM A307 and shall be galvanized in accordance with ASTM A153 for galvanized components unless otherwise indicated in the construction documents.

2.07 WELDING MATERIALS
A. Welding materials shall conform to AWS D1.1 and shall be the type required for materials being welded.

2.08 HEADED STUD-TYPE SHEAR CONNECTORS
A. Headed stud-type shear connectors shall conform to ASTM A108 and shall be Grade 1015 or 1020, cold finished carbon steel; with dimensions complying with AISC Specifications.

2.09 ANCHOR BOLTS
A. Anchor bolts shall conform to ASTM A307 and shall be non-headed type unless otherwise indicated.

2.10 UNFINISHED THREADED FASTENERS
A. Unfinished threaded fasteners shall conform to ASTM A307 and shall be Grade A, regular low-carbon steel bolts and nuts. Provide hexagonal heads and nuts for all connections.

2.11 HIGH-STRENGTH THREADED FASTENERS
A. High strength structural bolts, heavy hexagon nuts, and hardened washers shall be quenched and tempered, medium-carbon steel bolts, nuts and washers, complying with ASTM A325.
2.12 SHOP AND TOUCH-UP PRIMER

A. Shop and touch-up primer shall conform to SSPC 15, Type 1, red oxide, and SECTION 09900 – PAINTING.

2.13 TOUCH-UP PRIMER FOR GALVANIZED SURFACES

A. Touch-up primer for galvanized surfaces shall conform to SECTION 09900 - PAINTING.

2.14 METAL DECKING

A. Metal decking panels shall meet the specifications provided on the Drawings for X-SPAN by AEP SPAN, or equal. Drawings provide the panel specifications for gauge, section properties and decking attachment fasteners. Additional requirements below.

B. The pattern, finish and color of the preformed metal roofing shall be selected by the Owner.

C. End closures shall be waterproof in tightly fit panel configurations

D. Sealant compound shall be Norton V730, Geocel Construction 2,000, or approved.

E. Sealant tape shall be as recommended by decking manufacturer.

F. Flashing and trim for weather tightness and appearance shall be furnished by the preformed roof panel manufacturer and be of a gauge adequate for installation involved, as detailed on approved shop drawings. Finish shall match that of the roof panel.

G. Provide all required accessories for complete, secure, and waterproof installation.

H. Unless otherwise shown on Drawings or specified herein, fabricate panels in continuous one-piece lengths and fabricate flashings and accessories in longest practicable lengths.

I. Refer to the GENERAL NOTES on the Drawings Sheet S-1 for further requirements.

2.15 STAIRCASE TREADS

A. Staircase steps (or treads / planks) shall be 13 gauge, manufactured of sheet steel per ASTM A36, carbon steel, with perforated or serrated slip-resistant surface, as with PERF-O-GRIP manufactured by McNichols, or equal.

B. Steps shall be hot dipped galvanized coating.
C. Steps are 36-inch length, 12-inch width and 2-inch channel depth.

D. Refer to the GENERAL NOTES on the Drawings Sheet S-1 for further requirements.

PART 3 – EXECUTION

3.01 SHOP FABRICATION AND ASSEMBLY

A. Fit and shop assemble fabrications in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Provide camber in structural members where indicated.

D. Properly mark and match-mark materials for field assembly.

E. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

F. Continuously seal joined members by continuous welds.

G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

H. On all exposed mechanical fastenings, flush countersink screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

I. Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop Drawings.

J. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

K. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise. On all exposed mechanical fastenings flush countersink screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
3.02 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work. Beginning of installation means erector accepts existing conditions.

3.03 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete with setting templates, to appropriate sections.

Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds. Provide temporary planking and working platforms as necessary to effectively complete work.

3.04 FINISHES

A. Where finishing is required, complete assembly, including welding of units, before start of finishing operations.

B. For fabrication of work which will be exposed to view use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

C. Prepare surfaces to be primed in accordance with SSPC SP 2.

D. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

E. Do not prime surfaces in direct contact with concrete or where field welding is required.

F. Items to be painted shall be primed with two coats.

G. At a minimum, all steel exposed to weather shall be galvanized in accordance with ASTM A123, structural steel members. Provide a minimum of 1.25 oz/sq ft galvanized coating. Refer to SECTION 09900 – PAINTING for steel coating requirements.
3.05 INSTALLATION

A. Weld or bolt shop connections, as indicated. Bolt field connections, except where welded connections or other connections are indicated. Provide threaded fasteners as indicated on structural drawings.

B. Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts" (RCRBSJ).

C. Install items plumb and level, accurately fitted, free from distortion or defects.

D. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

E. Perform field welding in accordance with AWS D1.1. Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.

F. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

G. Level and plumb individual members of structure within specified AISC tolerances.

H. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

I. Splice members only where indicated and accepted on shop drawings.

J. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

K. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

L. Do not enlarge unfair holes in members by burning or by use of drift pins. Ream holes that must be enlarged to admit bolts.

M. Do not use gas-cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Engineer. Finish gas-cut sections equal to a sheared appearance when permitted.
N. Obtain approval of the Engineer prior to site cutting or making adjustments not scheduled.

3.06 SETTING BASES AND BEARING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

B. Set loose and attach base plates and bearing plates for structural members on wedges or other adjusting devices.

C. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

D. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

E. Comply with manufacturer’s installation instructions for grouting.

3.07 ERECTION TOLERANCES

A. Maximum variation from plumb shall not exceed ¼-inch. Maximum offset from true alignment shall not exceed ¼-inch.

3.08 QUALITY CONTROL

A. Testing
   District will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

   1. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations found.

   2. Contractor shall provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

   3. Testing agency may inspect structural steel at plant before shipment; however, Engineer reserves right, at any time before final acceptance to reject material not complying with specified requirements.
3.09 DEFICIENCY CORRECTION

A. Correct deficiencies in steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any non-compliance of original work, and as may be necessary to show compliance of corrected work.

3.10 METAL DECKING

A. Installation of the metal decking shall be in accordance with the Manufacturer's drawings and instructions. The panel sidelap shall overlap one major corrugation. One of the outboard corrugations shall be formed as the overlapping corrugation, the other outboard corrugation shall be formed as the underneath corrugation (this shall be a full corrugation to provide bearing support to the side lap). This shall be formed with a continuous length sealant groove. Endlap shall be at least 6-inch and fastened together over and to structural members. Eave panel shall extend beyond the building structural line.

1. Fasteners
   All panel-to-structural member connections shall be made with galvanized steel, dichromate dipped Scrubolt fasteners, 3/8-inch hex-head metal backed sealing washer, by Butler Manufacturing or approved equal as provided by the Manufacturer. Panel-to-panel connections shall be made with #1/4-14 x 7/8-inch galvanized 3/8-inch head mini-pt. self-drilling screws with 5/8-inch OD ALZN steel back sealing washer.

END OF SECTION
DIVISION 07 THERMAL AND MOISTURE PROTECTION

PREFORMED RIBBED METAL ROOFING

SECTION 07410

PART 1 - GENERAL

1.01 SCOPE

A. This Section covers the work necessary to furnish and install all preformed metal roofing and all accessories needed to form the roof and make it weather tight as specified and as shown on the Drawings, complete.

1.02 SUBMITTALS

A. Contractor shall make the following submittals:

1. **Samples**
   a. Prior to ordering products, submit manufacturer’s standard color samples for District’s selection.
   b. Prior to starting work, submit (2) two, 12 x 16 inch panel samples showing shape and color for Engineer’s and District’s acceptance.

2. **Manufacturer’s Installation Instructions**

3. **Manufacturer’s Maintenance Instructions**

1.03 QUALITY ASSURANCE

A. **Installer Qualifications**
   Contractor shall have no less than two years of successful experience in installation of preformed roof panels similar to requirements for this project, and a firm which is acceptable to manufacturer of preformed roof panels, as shown by current written statement by manufacturer.

B. **Regulatory Agency Requirements**
   Comply with Building Code Requirements.

C. **Testing and Certification**

1. **Wind-up Lift**
   UL90 Tested and certified system for wind up-lift.
2. **Air Infiltration**
   Panel (without insulation) to meet the following standard when tested in accordance with ASTM E283 for air infiltration.

3. **Water Penetration**
   Panel to meet the following standard when tested in accordance with ASTM E331 for water penetration.

1.04 **WARRANTY**

A. **Manufacturer’s Product Warranty**
   Warrant for (20) twenty years, following project delivery date, that panels will not rupture, fail structurally, or perforate.

B. **Contractor’s Warranty**
   Warrant panels, flashing, sealants, fasteners, and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage for two (2) years following project substantial completion date, and to repair or replace without additional cost to the District, any leaks and resulting damage to other materials and building contents as may occur.

**PART 2 - MATERIALS**

2.01 **APPROVED MANUFACTURER**

A. Preformed metal roofing designation and details indicating standards of a particular manufacture shall not be construed to limit competition. Preformed metal roofing panels manufactured by ASC Profiles, AEP Span Inc. have been designated. Products of other manufacturers conforming to the Drawings and Specifications shall be subject to the approval of the Engineer.

B. Panel Designation for Roof: HR-36, 24 gauge.

C. Panel Designation for Fascia: Box Rib, 24 gauge.

D. The pattern, finish and color of the preformed metal roofing shall be selected by the District.

2.02 **PANELS**

A. **Base Metal**
   1. Material: Steel
   2. Manufacturing Standard: ASTM A446, Grade C.
   3. Minimum Yield Strength: 40,000 psi.
4. Thickness: 24 gauge.
5. Protective Coating: Zincaluma.
6. Protective Coating Thickness: 1.9 mils.
7. Protective Coating Components:
   a. Zinc = 45%
   b. Aluminum Alloy = 55%

B. Configuration
1. Pattern: As called out on Drawings.
2. Rib Spacing: 7.2 inches O.C.
3. Rib Height: 1-1/2 inches.
5. Panel Length: Length to span over three supports whenever possible.

C. Exterior Finish
2. Minimum Primer Coat dry film thickness: 0.2 mils.
4. Minimum Finish Coat dry film thickness: 0.8 mils.
5. Minimum total Exterior Coat dry film thickness: 1.0 mils.
6. Color: To be selected by District.

D. Interior Finish
2. Minimum Primer Coat dry film thickness: 0.15 mils
4. Minimum Finish Coat dry film thickness: 0.35 mils.
5. Minimum total Interior Finish dry film thickness: 0.50 mils.

2.03 PANEL PENETRATION FLASHING
A. Panel penetration flashing shall be recommended by Panel Manufacturer. Satisfy conditions of use.

2.04 ALL OTHER FLASHING
A. Do not use lead or copper.

2.05 FASTENERS
A. At steel up to 0.2 inches thick.
   Self-drilling and tapping screws, Truss head type #10 x 5/8" at 12 inches on center.

B. At steel thicker than 0.2 inches thick.
   Thread-cutting screws, Phillips truss type #10 x 24 x 3/4".
2.06 END CLOSURES

A. **Materials**
   Waterproof, laminated, semi-rigid, cross-linked, polyethylene foam.

B. **Size and Shaped**
   Tightly fit panel configurations.

2.07 SEALANT COMPOUND

A. **Manufacturer and Brand**
   Norton V730, Geocel Construction 2,000, or approved.

2.08 SEALANT TAPE

A. **Manufacturer and Brand**
   Recommended by panel manufacturer.

B. **Material**
   Low-density, Polyvinyl Chloride Foam Sealant.

C. **Thickness**
   5/32 inch.

D. **Width**
   1/4 inch.

E. **Adhesive**
   One-side only.

2.09 GUTTERS, FLASHING, AND TRIM

A. Gutters, flashing and trim for weather tightness and appearance shall be furnished by the preformed roof panel manufacturer and be of a gauge adequate for installation involved, as detailed on approved shop drawings. Finish shall match that of the roof panel.

2.10 ACCESSORIES

A. Provide all required accessories for complete, secure, and waterproof installation.

2.11 FABRICATION

A. Unless otherwise shown on Drawings or specified herein, fabricate panels in continuous one-piece lengths and fabricate flashings and accessories in longest practicable lengths.
B. At Roofing Panels upper ends: Turn up at least 1-1/2 inches under flashing.

C. At Roofing Panel lower ends: Turn down at least 1-1/2 inches where exposed and turn down into gutters.

PART 3 - EXECUTION

3.01 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Product Delivery
   1. Keep panels dry.

B. Product Storage and Handling
   1. Protect against damage and discoloration.
   2. Handle panels with non-marring slings.
   3. Do not bend panels.
   4. Store panels above ground, with one end elevated for drainage.
   5. Protect panels against standing water and condensation between adjacent surfaces.
   6. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and separate sheets for air-drying.

3.02 INSPECTION

A. Existing Conditions
   1. Verify that members to receive panels are complete, accurately sized and located, in true plane, secure, and otherwise properly prepared.
   2. Prior to starting work, notify Engineer about defects requiring correction.
   3. Do not start work if conditions are unsatisfactory.

3.03 PREPARATION

A. Field Measurement
   1. Verify prior to fabrication.
2. If field measurements differ slightly from Drawing dimensions, modify work as required for accurate fit. If measurements differ substantially, notify Engineer prior to fabrication.

B. Protection

1. Treat any contacting surfaces of dissimilar materials to prevent electrolytic corrosion.

2. Require workman who will be walking on roofing panels to wear clean, soft-soled shoes that will not pick-up stones or other abrasive material, which could damage panel surfaces.

3. Protect work of other trades against damage and discoloration caused by work of this Section.

C. Surface Preparation

1. At structural steel members thicker than 0.2 inches, provide 0.17-inch diameter predrilled pilot holes where necessary to receive fasteners.

2. Clean and dry surfaces prior to applying joint sealant.

3.04 INSTALLATION

A. Panels

1. Follow Manufacturer’s directions.

2. Place 30-pound asphalt impregnated building felt over plywood deck.

3. Locate fastenings as 12 inches on center or as shown on Drawings.

4. Install panel ribs vertically.

5. Lap panel ribs away from prevailing wind direction.

6. Prior to installing panel, apply sealant compound bead or sealant tape on underside of female ribs.

7. Secure panels without warp or defect.

8. Extend roof panels to overlap gutter openings 2 inches, but do not restrict opportunity to clean gutters.

B. **Allowable Erection Tolerance**

1. Maximum alignment variation = 1/4 inch in 40 ft.

C. **Flashing**

1. Follow Manufacturer’s direction.

2. Overlap panels at least 6 inches.

3. At flashing running perpendicular to panel ribs notch and fold down flashing into space between ribs.

D. **Cutting and Fitting**

1. Neat, square, and true. Torch-cutting prohibited where cut exposed to final view.

2. Openings 6 inches and larger in any direction: Shop fabricate and reinforce to maintain original load capacity.

3. Openings less than 6 inches in largest dimension: Made by trade requiring opening.

E. **Touch-Up**

1. Touch-up damaged paint surfaces with same paint used in shop. Apply in accordance with paint manufacturer’s direction.

F. **Cleaning and Repairing**

1. At completion of each day’s work and at work completion, sweep panels, flashing and gutters clean. Do not allow fasteners, cuttings, fillings or scraps to accumulate on finish surfaces.

2. Including work of other Sections, clean, repair, and touch-up or replace when directed, products which have been soiled, discolored or damaged by work of this Section.

3. Remove debris from Project Site upon work completion or sooner, if directed.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE

A. This section covers the work necessary to furnish and install steel doors and steel
door frames as shown on the Drawings and as specified herein including standard
steel frames for doors and windows and fire rated frames. See SECTION 08710 -
FINISH HARDWARE, SECTION 10055 – METAL BUILDING.

1.02 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute "Recommended
Specifications for Standard Steel Doors and Frames" (SDI-100), and as herein
specified.

1. Fire-Rated Door Assemblies
Where fire-rated doors assemblies are indicated or required, provide fire-rated
door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors
and Windows," and have been tested, listed and labeled in accordance with
ASTM E152 "Standard Methods of Fire Tests of Door Assemblies" by a
nationally recognized independent testing and inspection agency acceptable to
authorities having jurisdiction.

At stairwell enclosures, provide doors which have Temperature Rise Rating of
450 degrees F. (232 degrees C) maximum in 30 minutes of fire exposure.

2. ADA Requirements
Comply with pertinent requirements of the Americans with Disabilities Act (ADA)
and Title 24 of the California Administrative Code.

1.03 SUBMITTALS

A. Product Data
Submit manufacturer’s technical product data substantiating that products comply
with requirements.

B. Shop Drawings
Submit for fabrication and installation of steel doors and frames:
1. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections.

2. Show anchorage and accessory items.

C. **Fire Rated Doors - Exceeding Labeled Limitations**
   For door assemblies required to be fire-rated, and exceeding limitations of labeled assemblies, submit manufacturer’s certification that each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

D. **Fire Rated Doors - Exceeding Size Limitations**
   For door assemblies required to be fire-rated, and exceeding sizes of tested assemblies, submit manufacturer’s certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

### 1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work in cartons or crates providing protection during transit and job storage. Provide additional sealed plastic wrapping for factory-finished doors. Inspect metal work upon delivery for damage. Minor damages may be repaired, provided refinished items are equal in all respects to new work and acceptable to Engineer. Otherwise, remove and replace damaged items as directed.

B. Store doors and frames at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

### PART 2 - MATERIALS

#### 2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering steel doors and frames which may be incorporated in the work include; but are not limited to, the following:

1. Curries of ASSA ABLOY Door Security Solutions
2. Ceco Door of ASSA ABLOY Door Security Solutions
4. Amweld International
2.02 GENERAL MATERIALS

A. **Hot-Rolled Steel Sheets and Strip**
   Provide commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.

B. **Cold-Rolled Steel Sheets**

C. **Galvanized Steel Sheets**
   Provide zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, with ASTM A525, G60 zinc coating, mill phosphatized.

D. **Stiffeners, Reinforcement, Edge Channels, and Moldings**
   Fabricate concealed stiffeners, reinforcement, edge channels, and moldings from either cold-rolled or hot-rolled steel (at fabricator’s option); steel gage shall be not less than 16-gauge.

E. **Supports and Anchors**
   Fabricate of not less than 18-gauge galvanized sheet steel.

F. **Inserts, Bolts, and Fasteners**
   Provide manufacturer’s standard units, except that hot-dipped galvanized items, to be built into exterior walls, shall comply with ASTM A153, Class C or D as applicable.

G. **Finish Hardware**
   The Contractor shall furnish and install all finish hardware as indicated on the Drawings or in these specifications, including but not necessarily limited to, the hardware listed herein. Hardware shall be furnished complete, including all parts necessary for satisfactory operation. All locking hardware shall be keyed to the District’s standard. Screws and bolts of proper size and design shall be furnished. In the event the Contractor proposes to furnish equivalent hardware in lieu of any of the items listed, the Contractor's schedule shall show the manufacturer's name and catalog number of each item. A complete hardware list shall be submitted to the Engineer for approval. See SECTION 08710 - FINISH HARDWARE for additional requirements.

H. **Shop Primer**
   Provide rust-inhibitive enamel or paint, by either air-drying or baking, suitable as a base for specified finish paints.

I. **Mineral Cores**
   Mineral cores, if used, shall contain no asbestos.
J. **Corridor Windows**  
Corridor windows, where required shall provide fire-rated frames of the style and arrangements shown on the contract drawings.

K. **Glazing**

1. **At Non-Labeled Doors:**  
Tempered float glass, ASTM C1048, Kind FT, Condition A, Type I, Glass 1 clear glass, Glazing Quality B, meeting ANSI Z97.1 and 16 CFR 1201, CI or CII as applicable; 6-mm minimum thickness.

2. **At Labeled Doors:**  
Wire glass, ASTM C1036, Type II, Class 1, Form 1, glazing quality, clear float, UL listed, meeting ANSI Z97.1 with 0.020 inch diameter wire welded in square mesh pattern embedded in 6-mm minimum thickness.

### 2.03 HOLLOW STEEL DOORS

2.03 Hollow steel doors shall be manufactured from either cold-rolled or hot-rolled steel (at fabricator’s option). All exterior facing doors shall be filled with insulation. For openings of less than 4'-0" in width, hollow steel doors shall be manufactured of not less than 18-gauge steel. Hollow steel doors for openings of 4'-0" and greater in width shall be steel stiffened and manufactured of not less than No.16-gauge steel. Doors shall be 1 ¾ inches thick and shall be louvered as shown on the Drawings. Doors larger than 3 feet wide shall be constructed as shown on the Drawings.

### 2.04 STANDARD STEEL FRAMES

A. **Metal Frames**  
Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on the Drawings.

1. Conceal fastenings, unless otherwise indicated.

2. Fabricate interior frames of minimum 16-gauge cold-rolled furniture steel.

3. Fabricate exterior frames of 16-gauge hot-dipped galvanized steel.

4. Steel door frames shall be the set-in type for eight inch (8") block.

5. Steel door frames shall be of the same manufacturer as the door.

B. **Door Silencers**

1. Except on gasketted and rated frames, drill stops to receive three silencers on strike jambs of single-swing frames and two silencers on heads of double-swing frames.
2. Provide plastic plugs to keep holes clear during construction.

C. **Plaster Guards and Mortar Boxes**
   Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

D. **Junction Box**
   Provide a junction box or enclosure behind each item of electrical hardware and connection conduit between junction boxes on the same frame.

### 2.05 STOPS AND MOLDINGS

A. Provide stops and moldings around solid, glazed, and louvered panels in hollow metal units and in frames to receive doors, where indicated. Form fixed stops and moldings integral with frame, unless otherwise indicated.

B. Provide removable stops and moldings where indicated or required, formed of not less than 20-gauge steel sheets matching steel of frames.
   1. Secure with countersunk machine screws spaced uniformly not more than 12" on center.
   2. Form corners with butted hairline joints
   3. Coordinate width of rabbet between fixed and removable stoops with type of glass or panel and type of installation indicated.

### 2.06 FACTORY FINISHING REQUIREMENTS

A. Galvanized with A60 zinc coating in accordance with ASTM A653 (Wipe Coat galvanized coating is not acceptable).

B. Phosphate treat metal for paint adhesion.

C. Shop coat of electrostatically applied, 1.0 mil minimum, baked-on enamel in custom color as selected by District.

### 2.07 MISCELLANEOUS ITEMS

A. Furnish manufacturer’s standard core filler, fasteners, and other ancillary items.
PART 3 - EXECUTION

3.01 FABRICATION, GENERAL

A. Fabricate steel frame units to be rigid, neat in appearance and free from defects, warp or buckle; comply with SDI-100 requirements as indicated. Unless otherwise indicated, provide counter-sunk flat Phillips heads for exposed screws and bolts.

B. Prepare frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with the applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware or concealed overhead door closers, provide space, cutouts, reinforcing and provisions for fastening in top rail of doors or head of frames, as applicable. Reinforce frames to receive surface-applied hardware; drilling and tapping for surface-applied finish hardware may be done at the job site. Locate finish hardware as shown on final Shop Drawings or, if not indicated, in accordance with pertinent provisions of these specifications.

C. Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

3.02 INSTALLATION

A. Install standard steel doors, frames, and accessories in accordance with final Shop Drawings, manufacturer’s data, and as herein specified. Doors and frames shall be accurately cut, fitted, and installed level, square, plumb, and in alignment. Fasteners shall be of sufficient length, and shall be sized for loads imposed. Doors and frames shall be provided with accurately made cutouts, and shall be reinforced for strength where necessary. Doors shall be adjusted to provide smooth, unbinding operation with all hardware fully operable.

1. Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.

2. Install fire-rated frames in accordance with NFPA Std. No. 80.

3. In metal stud partitions, install at least three (3) wall anchors per jamb at hinge and strike levels.

4. In open steel stud partitions, place studs in wall anchor notches and wire tie.

5. In closed steel stud partitions, attach wall anchors to studs with tapping screws.
3.03 ADJUST AND CLEAN

A. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer. Immediately prior to final inspection, remove protective plastic wrappings from pre-finished doors. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

3.04 PROTECTION

A. Protect installed doors and frames against damage from other construction work. Minor scratches shall be touched up with matching aerosol paint. Major dents and damage may be cause for replacement at the discretion of the Engineer.

END OF SECTION
DIVISION 08 OPENINGS
FINISH HARDWARE
SECTION 08710

PART 1 - GENERAL

1.01 SCOPE

A. This Section covers the work necessary to furnish and install all door hardware components that are required for swing doors. The Contractor shall furnish all labor and materials needed to complete the work included in this section, complete.

B. It shall be the specific duty and responsibility of the Contractor to examine the Contract Documents and furnish proper hardware for all openings, whether scheduled or not. Furnish such hardware in type and quality suitable for the service required and comparable to those specified for similar conditions.

1.02 SUBMITTALS

A. Product Data
Include information necessary to show compliance with requirements of this section and include instructions for installation and for maintenance of operating parts and finish. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Include the following information in the submittals:

1. Type, style, function, size and finish of each hardware item;
2. Name and manufacturer of each item;
3. Fastenings and other pertinent information;
4. Mounting locations for hardware;
5. Door and frame sizes and materials;
6. Keying information;
7. Clearly indicate how the District’s instructions on keying of locks are to be fulfilled.

B. Samples
Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule. All samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison procedures may, after final check of operation, be used in the Work, within limitations of keying coordination requirements.
C. **Templates**

Furnish hardware templates to each fabricator of doors, frames, and other items to be factory-prepared, for the installation of hardware. Upon request, check Shop Drawings of such other items to confirm that adequate provisions are made for proper location and installation of hardware.

### 1.03 QUALITY ASSURANCE

A. **Manufacturer**

Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

B. **Supplier Qualifications**

The door hardware supplier shall be a recognized architectural door hardware supplier, with warehousing facilities in the vicinity of the Work, that has a record of successful service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Work.

The supplier shall meet with District's locksmith coordinator to finalize keying requirements and to obtain final instructions in writing.

Finish hardware supplied for this Work shall comply with all applicable codes, including provisions for accessibility by the physically handicapped required by the California Code of Regulations, Title 24, Part 2 and the Americans with Disabilities Act (ADA).

C. **Fire-Rated Openings**

Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction.

Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

Where emergency exit devices are required on fire-rated doors (with supplementary marking on doors' UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware."

### 1.04 PRODUCT HANDLING

A. Provide secure lock-up for hardware delivered to the Work but not yet installed. Control handling and installation of hardware items that are not immediately replaceable, so that completion of the Work will not be delayed by hardware losses, both before and after installation.
1.05 MAINTENANCE

A. Furnish a complete set of specialized tools and maintenance instructions as needed for District’s continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - MATERIALS

2.01 ACCEPTABLE MANUFACTURERS

A. Hinges
   Hager, Ives, McKinney, Stanley, or equal

B. Locksets/Latchsets
   Schlage "L" Series, 03 Levers, or equal

C. Wall, Floor and Overhead Stops and Holders
   Ives, Hager, Quality, Glynn Johnson or equal

D. Exit Devices
   Von Duprin or equal

E. Protection Plates
   Hager, Ives, McKinney or equal

F. Automatic Flush Bolts
   Hager, Ives, or equal

G. Coordinators
   Hager, Ives, or equal

H. Closers
   Hager, LCN, or equal

I. Thresholds, Gaskets, Weatherstripping, and Astrogals
   Pemko, National Guard or equal

2.02 FABRICATION

A. The Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

B. Produce hardware units of basic metal and forming method indicated, using manufacturer’s standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable
hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated. Doors specified require reinforcement for UL approved screw attachment of all hardware items to fire rated doors. Thru-bolting will not be acceptable and will be cause for rejection of doors.

D. Provide concealed fasteners for hardware units which are exposed when door is closed, except when no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce the item. In such cases, provide sleeves for each thru-bolt or use hex screw fasteners.

2.03 HINGES

A. **Butt Hinges**

Provide only full mortise template-produced units. Furnish Phillips flat-head or machine screws for installation of units. Finish screw heads to match surface of hinges. Hinges shall be solid stainless steel with stainless steel hinge pins conforming to ANSI A5112 with ANSI 630 / US32D finish. Full Mortise hinges shall be Ives 5BB1HW, Hager BB1199, Stanley FBB199, McKinney T4A3386, or approved equal. Hinges shall be provided as follows, except as otherwise noted:

1. Hinges: Stainless Steel
2. Pins: Stainless Steel
3. Exterior doors: Non-removable pins
4. Interior doors: Non-rising pins
5. Tips: Flat button and matching plug, finished to match leaves.
6. Number of hinges: Provide number of hinges indicated but not less than three hinges per door leaf for doors 90 inches or less in height and one additional hinge for each 30 inches of additional height.
7. Size of hinges: Unless otherwise specified, hinges for doors through 3 foot 0 inches wide shall be 4.5 inches x 4.5 inches. Hinges for doors over three feet wide shall be 5 inches x 5 inches.

2.04 LOCKSETS AND LATCHSETS

A. Contractor shall provide and install locksets and latchsets. Locksets shall be stainless steel mortise locks with levers and escutcheon trim. Contractor shall furnish and install all cylinders. Keys will be provided and keyed by the Contractor in conformance with the District’s standards for quantity and type of key.
1. **Exterior Lockset**
   Lockset for entrance/access doors shall be Schlage L9465P, 03L trim, 630 finish, or approved equal.

2. **Interior Lockset**
   Locksets for doors within the pump station building shall be Schlage L9010, 03L trim, 630 finish, or approved equal.

### 2.05 WALL, FLOOR AND OVERHEAD STOPS AND HOLDERS

A. **Wall Stop/Holder**
   Furnish and install cast brass wall stops Ives WS445, Hager 256, or approved equal, wall stop and holder wherever door strikes wall.

B. **Floor Stop/Holder**
   Where wall stops will not work, furnish and install cast brass Ives FS446, Hager 268, or approved equal, floor stop and holder.

C. **Overhead Stop/Holder**
   Where wall or floor stops will not work, provide satin stainless steel Glynn Johnson heavy duty overhead door holder/stop, 90 Series, Hold-Open Model, US32D for doors 3 feet and less in width and use 79 Series, US32D for doors wider than 3 feet, or approved equal.

### 2.06 EXIT DEVICES

A. Exit devices (panic bars) shall be stainless steel, non-handed, field sizeable, devices for single or double doors and shall coordinate and comply with the lockset/latchsets specified above. Exit devices shall be UL listed Panic Hardware (FVSR) SA163 (N). Fire devices (F) shall be UL listed Fire Exit Hardware (GXHX) R4504 (N), A label. Exit devices shall be tested in accordance to ANSI A156.3, 1989, Grade 1. Panic bars shall be Von Duprin Series 98 Exit Devices, with US32D finish, or approved equal.

### 2.07 PROTECTION PLATES

A. Protection plates shall be of the kickplate type and shall be installed on all doors. Kickplates shall be constructed from a minimum of 0.050” stainless steel. Gasket tape shall be used as necessary to reduce tarnishing from electrolytic oxidation. Kickplates shall be Hager 193S, Ives Series 8400, McKinney KP-50, or approved equal.

### 2.08 AUTOMATIC FLUSH BOLTS

A. Flush bolts for metal doors shall be stainless steel, non-handed and shall combine a constant latching top bolt with an automatic bottom bolt. Flush bolts shall be Hager 293D, Ives FB51P, or approved equal.
2.09 COORDINATORS

A. All paired doors shall have door coordinators which will prevent the active door from closing before the inactive door, by means of a lever and trigger mechanism. Coordinator channel shall be constructed of steel with a paintable prime coat finish, length variable per door opening. Coordinator shall have a safety mechanism which will allow the active door to close first, if under extreme pressure. Coordinators shall be Hager 297D, Ives COR X FL, or approved equal.

2.10 CLOSERS

A. Door closers used for exterior doors up to 4 foot 0 inches and interior doors up to 5 foot 0 inches shall conform to ANSI A156.4, be heavy duty, surface mounted, manufactured of heavy duty cast iron, with an aluminum colored powder coat finish. Closer shall be non handed, non-sized, meet ADA requirements, have a hold-open arm function, and have a non-metallic cover. Door closers shall be Hager Series 5300, Grade 1, with aluminum painted finish, LCN Series 4040, Grade 1, with aluminum powder coated finish, or approved equal.

2.11 THRESHOLDS, GASKETS, WEATHERSTRIPPING, AND ASTRAGALS

A. Thresholds shall be smooth saddle type, manufactured of stainless steel and shall be National Guard Products 412SS, Pemko 175SS, or approved equal. Gaskets shall be self-adhesive silicone National Guard Products 5050W, Pemko S88W or approved equal smoke seal gaskets and National Guard Products 9450W or 5050W, Pemko HSS2000, or approved equal fire seal gaskets. Weatherstripping shall be the rigid jamb type with an extruded silicone rubber seal and shall be National Guard Products 162SA, Pemko 303AS, or approved equal. Overlapping astragals shall be installed on pairs of doors to conceal the gap between the doors. Astragals shall be manufactured of stainless steel and shall be fastened with through-bolts. Astragals shall be National Guard Products 139 SS, Pemko 357SS, or approved equal.

2.12 HARDWARE FINISHES

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, except as otherwise indicated. All finishes shall meet or exceed the ANSI A156.18 Standard for Materials and Finishes. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer’s standards, but in no case less than specified for the applicable units of hardware by referenced standards.
PART 3 – EXECUTION

3.01 HARDWARE SCHEDULE

<table>
<thead>
<tr>
<th>Door Description</th>
<th>Room #</th>
<th>Door #</th>
<th>Hardware System #</th>
<th>Handing</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Door (Pump Room)</td>
<td>001</td>
<td>1</td>
<td>3</td>
<td>Left</td>
</tr>
<tr>
<td>East Door (Pump Room)</td>
<td>001</td>
<td>4</td>
<td>4</td>
<td>Left &amp; Right</td>
</tr>
<tr>
<td>North Door (Pump Room)</td>
<td>001</td>
<td>5</td>
<td>3</td>
<td>Left</td>
</tr>
<tr>
<td>South Door (Elect. Room)</td>
<td>002</td>
<td>2</td>
<td>3</td>
<td>Right (in swing)</td>
</tr>
<tr>
<td>West Door (Elect. Room)</td>
<td>002</td>
<td>3</td>
<td>1</td>
<td>Left</td>
</tr>
</tbody>
</table>

All system hardware components provide model and manufacturer OR APPROVED EQUAL is allowed.

A. SYSTEM #1 (SINGLE EXTERIOR DOOR WITH PANIC HARDWARE)

<table>
<thead>
<tr>
<th>#</th>
<th>Hardware</th>
<th>Model/Catalog #</th>
<th>Finish</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Ea Butt Hinge</td>
<td>5BB1HW</td>
<td>US32D/ANSI 630</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Ea Exit Device</td>
<td>98NL X 990NL</td>
<td>ANSI 630</td>
<td>Von Duprin</td>
</tr>
<tr>
<td>1</td>
<td>Ea Rim Cylinder</td>
<td>20-057</td>
<td>ANSI 626</td>
<td>Schlage</td>
</tr>
<tr>
<td>1</td>
<td>Ea Surface Closer</td>
<td>4041 EDA</td>
<td>ANSI 689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>Ea Stop &amp; Holder</td>
<td>WS445 / FS446</td>
<td>ANSI 626</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Set Weather-Stripping</td>
<td>5050W</td>
<td>WHT</td>
<td>National Guard</td>
</tr>
<tr>
<td>1</td>
<td>Ea Door Bottom</td>
<td>35VA</td>
<td>ANSI 628</td>
<td>National Guard</td>
</tr>
<tr>
<td>1</td>
<td>Ea Threshold</td>
<td>412SS</td>
<td>AL</td>
<td>National Guard</td>
</tr>
<tr>
<td>1</td>
<td>Ea Kickplate</td>
<td>8400</td>
<td>SS</td>
<td>Ives</td>
</tr>
</tbody>
</table>

B. SYSTEM #2 (PAIR OF EXTERIOR DOORS WITH PANIC HARDWARE) (NOT USED)

C. SYSTEM #3 (SINGLE EXTERIOR WITH LOCKSET)

<table>
<thead>
<tr>
<th>#</th>
<th>Hardware</th>
<th>Model/Catalog #</th>
<th>Finish</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Ea Butt Hinge</td>
<td>5BB1HW</td>
<td>US32D/ANSI 630</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Ea Lockset</td>
<td>L9453P 03L</td>
<td>630</td>
<td>Schlage</td>
</tr>
<tr>
<td>1</td>
<td>Ea Surface Closer</td>
<td>4041 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>1</td>
<td>Ea Stop &amp; Holder</td>
<td>WS445 / FS446</td>
<td>626</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Set Weather-Stripping</td>
<td>5050W</td>
<td>WHT</td>
<td>National Guard</td>
</tr>
<tr>
<td>1</td>
<td>Ea Door Bottom</td>
<td>35VA</td>
<td>628</td>
<td>National Guard</td>
</tr>
<tr>
<td>1</td>
<td>Ea Threshold</td>
<td>412SS</td>
<td>AL</td>
<td>National Guard</td>
</tr>
<tr>
<td>1</td>
<td>Ea Kickplate</td>
<td>8400</td>
<td>SS</td>
<td>Ives</td>
</tr>
</tbody>
</table>
D. SYSTEM #4 (PAIR OF EXTERIOR DOORS WITH LOCKSET - SHORT DOORS)

<table>
<thead>
<tr>
<th>#</th>
<th>Hardware</th>
<th>Model/Catalog #</th>
<th>Finish</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Ea Butt Hinge</td>
<td>5BB1HW</td>
<td>US32D/ANSI 630</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Set Constant Latch Bolts</td>
<td>FB51P</td>
<td>630</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Ea Dust Proof Strike</td>
<td>DP1</td>
<td>626</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Ea Lockset</td>
<td>L9453P 03L</td>
<td>630</td>
<td>Schlage</td>
</tr>
<tr>
<td>1</td>
<td>Ea Coordinator</td>
<td>COR X FL</td>
<td>628</td>
<td>Ives</td>
</tr>
<tr>
<td>2</td>
<td>Ea Closer Mtg Brackets</td>
<td>MB1/2</td>
<td>600</td>
<td>Ives</td>
</tr>
<tr>
<td>2</td>
<td>Ea Surface Closer</td>
<td>4041 EDA</td>
<td>689</td>
<td>LCN</td>
</tr>
<tr>
<td>2</td>
<td>Ea Stop &amp; Holder</td>
<td>WS445 / FS446</td>
<td>626</td>
<td>Ives</td>
</tr>
<tr>
<td>1</td>
<td>Set Weather-Stripping</td>
<td>5050W</td>
<td>WHT</td>
<td>National Guard</td>
</tr>
</tbody>
</table>

3.02 INSTALLATION

A. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage, and reinstallation, or application of surface protections, with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrate.

B. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation. Drill and countersink units that are not factory-prepared for anchorage fasteners; space fasteners and anchors in accordance with industry standards. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.03 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application made. Clean adjacent surfaces soiled by hardware installation.

3.04 MAINTENANCE SERVICE

A. Approximately six (6) months after filing of the Notice of Completion for the project by the District, the Contractor shall replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units at no additional cost to the District.

END OF SECTION
PART 1 – GENERAL

1.01 SCOPE

A. This section includes everything necessary for, or incidental to, executing and completing the painting and coating of all metal, piping, concrete slabs, concrete masonry units, walls, ceilings, or other surfaces requiring painting, except as otherwise hereinafter specifically excluded, complete.

B. All necessary ventilation, lighting equipment, and scaffolding shall be furnished and installed by the Contractor. Such scaffolding shall conform to regulations of the State Industrial Accident Commission and local ordinances.

C. Contractor shall conform with EID Standard Specifications 09 90 00 PAINTING AND COATING and these specifications.

1.02 SUBMITTALS

A. The Contractor shall submit the following items to the Engineer for review and color selection:

1. **Color Cards**
   Submit Color cards for all coatings proposed for use showing full range of standard colors.

2. **Product Data**
   Submit product data including generic description, complete technical data, surface preparation and application instructions.

3. **Coating System Data Sheets**
   Submit Coating System Data Sheets. A sample is included at the end of this Section.

4. **Manufacturer’s Certification**
   Submit the manufacturer’s certification that coatings comply with specified requirements and are suitable for intended application.

5. **Warranty**
   Submit the manufacturer’s standard warranty.
1.03 SURFACES REQUIRING PAINTING

A. The following items shall be painted: All exposed pump components including the motor, discharge head, and base plate, above ground piping, including valves and fittings, filter tanks, propane tanks, electrical conduits, building walls, floors and ceilings and associated interior and exterior appurtenances.

1.04 SURFACES NOT TO BE PAINTED

A. Manufacturer coated equipment such as the motor control center, telemetry, pneumatic components, roofing, pump column pipe, chlorination equipment. Other surfaces that shall remain uncoated include: machined surfaces, grease fittings, cement mortar lined and coated pipe, glass, equipment nameplates, station pipe bolting, exposed threads and nuts, aluminum and stainless steel components except as required for electrical insulation between dissimilar metals or where aluminum and stainless steel are in contact with concrete.

1.05 QUALITY ASSURANCE

A. Single Source

   All materials of a paint system, including primer and finish coats, shall be produced by the same paint manufacturer unless otherwise approved by the Engineer. Thinners, cleaners, driers, and other additives shall be as recommended by the paint manufacturer of the particular coating.

B. Manufacturer Representative

   The paint manufacturer shall provide a representative to visit the job site at intervals during surface preparation and painting as may be required for product application questions and to determine compliance with the manufacturer’s instructions as may be required for product application quality assurance. A manufacturer representative’s visit may be necessary to resolve field problems attributable to, or associated with, the manufacturer’s products furnished under this contract.

C. Surface Preparation

   Preparation of surfaces and application of coatings shall be in conformance with the applicable AWWA, SSPC, and ASTM specifications, this Specification, and the printed recommendations of the paint manufacturer. All surfaces must be dry, clean, free of oil, grease, form release agents, curing compounds, laitance, other foreign matter and be structurally sound. Remove all loose paint, mortar spatter, mill scale, and rust.

D. Weather

   Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with the manufacturer’s instructions foremost. Abrasive blast cleaning shall not be performed whenever the relative humidity exceeds 85-percent, nor whenever the surface temperature is less than 5-degrees F above the dew point of the ambient air. The surface temperature shall be a minimum of 40-degrees F and
at least 5-degrees above the dew point before coating can occur for all coating systems. Do not prepare surfaces or apply coatings in dust, smoke, rain, fog, or damp or humid weather or if the wind velocity is above the manufacturer’s limit. Schedule coating work to avoid release of excessive dust and airborne contaminants.

E. **Ventilation**
   Provide ventilation during coating evaporation stage in confined or enclosed areas.

F. **Inspection**
   The Contractor shall give the Engineer a minimum of 3-days advance notice of the start of any surface preparation work or coating application work. All such work shall be performed only in the presence of the Engineer, unless the Engineer has granted prior approval to perform such work in his absence.

   Inspection by the Engineer, or the waiver of inspection of any particular portion of the work, shall not be construed to relieve the Contractor of his responsibility to perform the work in accordance with these Specifications.

   For all coatings subject to immersion, full cure must be obtained for the completed system prior to submersion. Consult the coatings manufacturers written instructions for these requirements. The coating shall not be immersed for any purpose until completion of the curing cycle.

**PART 2 – MATERIALS**

**2.01 GENERAL**

A. All materials used, except as otherwise specified in carrying out the provisions of this contract, shall be manufactured by the following companies, or approved equals:

1. Devoe Coatings
2. TNEMEC
3. Rain Guard
4. Glidden Professional
5. Kelly Moore

B. Alternate systems will be considered subject to the review of the Engineer. Deviations from the specified paint systems must be reviewed by the Engineer prior to use. Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for all coating system materials used in contact with the production, treatment or distribution of drinking water including contact with raw water to be treated. Use only products that are in compliance with local VOC regulations.

**2.02 PAINT MATERIALS**

The following surface preparations and paint and coating materials shall apply to this project:
A. **System Number 1 – (Indoor/Outdoor Coating) Interior Submerged Pipe Ends and Fittings (Potable Water)**

The interior of steel surfaces in contact with potable water shall be coated as follows:

1. **Surface Preparation**
   Blast to near-white metal surface cleanliness in accordance with SSPC 10. Blast profile on steel should be 1.5 to 2.5 mils in depth and be of a sharp, jagged nature as opposed to a “peen” pattern (from shot blasting).

2. **First Coat**
   Polyamidoamine Epoxy or High Solids Epoxy (certified to NSF 61)
   a. TNEMEC Series V140F Pota-Pox Plus @ 6 to 8 mils DFT
   OR
   b. Devoe Bar-Rust 233H @ 4 to 6 mils DFT

3. **Second Coat**
   4. Polyamidoamine Epoxy or High Solids Epoxy (certified to NSF 61)
      a. TNEMEC Series V140F Pota-Pox Plus @ 6 to 8 mils DFT
      OR
      b. Devoe Bar-Rust 233H @ 4 to 6 mils DFT

5. **Third Coat**
   Polyamidoamine Epoxy or High Solids Epoxy (certified to NSF 61)
   a. TNEMEC Series V140F Pota-Pox Plus @ 6 to 8 mils DFT
   OR
   b. Devoe Bar-Rust 233H @ 4 to 6 mils DFT
B. **System Number 2 – (Indoor/Outdoor Coating) Interior of Submerged Pipe Ends and Fittings (Non-Potable Water)**

The interior of steel surfaces in contact with non-potable water shall be coated as follows:

1. **Surface Preparation**
   Blast to near-white metal surface cleanliness in accordance with SSPC 10. Blast profile on steel should be 1.5 to 2.5 mils in depth and be of a sharp, jagged nature as opposed to a "peen" pattern (from shot blasting).

2. **First Coat**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series V140F Pota-Pox Plus @ 6 to 8 mils DFT  
      OR
   
   b. Devoe Bar-Rust 233H @ 4 to 6 mils DFT

3. **Second Coat**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series V140F Pota-Pox Plus @ 6 to 8 mils DFT  
      OR
   
   b. Devoe Bar-Rust 233H @ 4 to 6 mils DFT

4. **Third Coat**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series V140F Pota-Pox Plus @ 6 to 8 mils DFT  
      OR
   
   b. Devoe Bar-Rust 233H @ 4 to 6 mils DFT
All exposed steel surfaces exposed to weather or are located above grade inside a building shall be coated as follows:

1. **Surface Preparation**
   Commercial Blast (SSPC 6)

2. **First Coat**
   Aromatic Urethane, Zinc-Rich or Reinforced Inorganic Zinc Urethane
   
   a. TNEMEC Series 90-97 Tneme-Zinc @ 2.5 to 3.5 mils DFT
   OR
   b. Devoe Catha-Coat 302H @ 2.5 to 4.0 mils DFT

3. **Second Coat**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Bar-Rust 235V (In Winter) or Bar-Rust 231 (In Summer) @ 4 to 6 mils DFT

4. **Third Coat**
   Aliphatic Acrylic Polyurethane
   
   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT
   OR
   b. Devoe Devthane 379H @ 2 to 3 mils DFT
D. **System Number 4 – (Indoor/Outdoor Coating) Exterior of Epoxy Coated Steel Piping, Hydropneumatic Tanks, Valves, Fittings, Pump Discharge Heads, Pump Motors, and Pump Base Plates.**

All steel piping with existing fusion bonded epoxy coating including, valves, fittings, pump discharge heads, pump motors, and pump base plates that are exposed to weather or are located above grade inside a pump station building shall be coated as follows:

1. **Surface Preparation**
   Hand Tool Clean (SSPC 2,3) Abrade and De-Gloss existing surface.

2. **First Coat**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   
   b. Devoe Bar-Rust 235V (In Winter) or Bar-Rust 231 (In Summer) @ 4 to 6 mils DFT

3. **Second Coat**
   Aliphatic Acrylic Polyurethane
   
   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT
   OR
   
   b. Devoe Devthane 379H @ 2 to 3 mils DFT
E. **System Number 5 – (Indoor/Outdoor Coating) Exterior of Factory Primed Steel Doors, Frames and Miscellaneous Equipment**

All exterior and interior factory primed steel doors, frames and miscellaneous equipment that are exposed to weather or are located inside a building shall be coated as follows:

1. **Surface Preparation**
   Factory Primed, clean and dry

2. **First Coat (Indoor Applications)**
   Modified Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 135 Chembuild @ 4 to 6 mils DFT
   OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT

3. **Second Coat (Indoor Applications)**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT

4. **First Coat (Outdoor Applications)**
   Modified Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 135 Chembuild @ 4 to 6 mils DFT
   OR
   b. Devoe Bar-Rust 235V (In Winter) or Bar-Rust 231 (In Summer) @ 4 to 6 mils DFT

5. **Second Coat (Outdoor Applications)**
   Aliphatic Acrylic Polyurethane
   
   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT
   OR
   b. Devoe Devthane 379H @ 2 to 3 mils DFT
F. **System Number 6 – (Indoor/Outdoor Coating) Exterior of FRP Doors**

All exterior and interior FRP doors that are exposed to weather or are located inside a building shall be coated as follows:

1. **Surface Preparation**
   Factory Primed, clean and dry

2. **First Coat**
   Polyamidoamine Epoxy or Waterborne Epoxy Primer
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT  
   OR
   b. Devoe Devran 203 @ 3 to 4 mils DFT

3. **Second Coat**
   Aliphatic Acrylic Urethane
   
   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT  
   OR
   b. Devoe Devthane 379H @ 2 to 3 mils DFT

4. **Third Coat**
   Aliphatic Acrylic Urethane
   
   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT  
   OR
   b. Devoe Devthane 379H @ 2 to 3 mils DFT
G. **System Number 7 – (Outdoor Coating) Exterior of Ductile and Cast Iron Pipe, Valves, and Fittings**

All ductile iron and cast iron piping, valves, and fittings exposed to weather and ultraviolet light deterioration or underground conditions shall be coated as follows:

1. **Surface Preparation**
   Hand Tool Clean (SSPC 2 and SSPC 3) Abrade and De-Gloss existing surface.

2. **First Coat (Exterior Applications)**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT

3. **Second Coat (Exterior Applications)**
   Aliphatic Acrylic Polyurethane
   
   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT
   OR
   b. Devoe Devthane 379H @ 2 to 3 mils DFT

4. **First Coat (Below Ground Applications)**
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 66HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Devtar 5A-HS @ 6 to 8 mils DFT

5. **Second Coat (Below Ground Applications)**
   Coal Tar Epoxy or Hydrocarbon Epoxy
   
   a. TNEMEC Series 46H-413 Hi-Build Tneme-Tar @ 16 to 20 mils DFT
   OR
   b. Devoe Devtar 5A-HS @ 6 to 8 mils DFT
H. System Number 8 – (Indoor Coating) Exterior of Ductile and Cast Iron Pipe Valves and Fittings
All ductile iron and cast iron piping, valves, and fittings located in a building or exposed to other interior humid conditions shall be coated as follows:

1. Surface Preparation
   Measure surface profile (anchor pattern) in accordance with ASTM D 4417, Method C. If surface profile is less than 1.5 mils then proceed with brush-off blast cleaning in accordance with SSPC 2. If surface profile is 1.5 mils or greater then proceed with hand or power tool cleaning in accordance with SSPC 3.

2. First Coat
   Polyamidoamine Epoxy or High Solids Epoxy
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
      OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT

3. Second Coat
   Polyamidoamine Epoxy or High Solids Epoxy
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
      OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT
I. **System Number 9 – (Outdoor Coating) Exterior of Concrete Masonry Units and Concrete Walls (Clear Water Repellent Coating)**

The exterior of concrete masonry unit block walls, split face block walls, or concrete walls that are to receive a clear water repellent that are exposed to weather, driving rain and mildew, but are not subject to graffiti shall be coated as follows:

1. **Surface Preparation**
   - **CMU**: Allow mortar to cure for 14-days minimum. Level protrusions and mortar splatter. Moisture content shall be under 13 percent. pH shall be under 10.
   - **Concrete**: Allow new concrete to cure for 30-days minimum, followed by abrasive blast in accordance with manufacturer’s instructions.

2. **First Coat**
   - Siloxane/Silane Blend or Modified Polysilane
     - a. TNEMEC Series 633 Prime-A-Pell H₂O @ 50 to 75 sf/gallon
       OR
     - b. Rain Guard Blok-Lok @ 60 to 120 sf/gallon

3. **Second Coat**
   - Siloxane/Silane Blend or Polysilane
     - a. TNEMEC Series 633 Prime-A-Pell H₂O @ 50 to 75 sf/gallon
       OR
     - b. Rain Guard Blok-Lok (None required)
J. System Number 10 – (Outdoor Coating) Exterior of Concrete Masonry Units and Concrete Walls (Clear Water Repellent and Anti-Graffiti Coating)
The exterior of concrete masonry unit block walls, split face block walls, or concrete walls that are in public areas that may be exposed to graffiti and that are exposed to weather, driving rain and mildew, shall be coated with a clear water repellent anti-graffiti coating as follows:

1. Surface Preparation
   CMU: Allow mortar to cure for 14-days minimum. Level protrusions and mortar splatter.
   Concrete: Allow new concrete to cure for 30-days minimum, followed by abrasive blast in accordance with manufacturer's instructions.

2. First Coat
   RTV Silicone Rubber Water Repellent or Polysilane Graffiti Protectant
   a. TNEMEC Series V626 Dur-A-Pell GS @ 65 to 85 sf/gallon
      OR
   b. Rain Guard Blok-Lok or Microseal @ 60 to 120 sf/gallon

3. Second Coat
   RTV Silicone Rubber Water Repellent or Co-polymer Graffiti Protectant
   a. TNEMEC Series V626 Dur-A-Pell GS @ 65 to 85 sf/gallon
      OR
   b. Rain Guard Vandl-Guard @ 125 to 175 sf/gallon

4. Third Coat
   RTV Silicone Rubber Water Repellent or Co-polymer Graffiti Protectant
   a. TNEMEC Series V626 Dur-A-Pell GS @ 65 to 85 sf/gallon
      OR
   b. Rain Guard Vandl-Guard @ 125 to 175 sf/gallon
K. System Number 11 – (Outdoor Coating) Exterior of Concrete Masonry Units and Concrete Walls (Colored Water Repellent Coating)

The exterior of concrete masonry unit block walls or concrete walls that are to receive a colored coating and are exposed to weather, driving rain and mildew, but are not subject to graffiti shall be coated as follows:

1. Surface Preparation
   - **CMU**: Allow mortar to cure for 14-days minimum. Level protrusions and mortar splatter.
   - **Concrete**: Allow new concrete to cure for 30-days minimum, followed by abrasive blast in accordance with manufacturer’s instructions.

2. First Coat
   - Waterborne Cementitious Acrylic or Advanced Technology Waterborne Epoxy
     - a. TNEMEC Series 130 Envirofill @ 60 to 115 sf/gallon
     - b. Devoe Bloxfil 4000 @ 50 to 75 sf/gallon
     - c. Devoe Tru-Glaze 4015 @ 50 to 75 sf/gallon

3. Second Coat
   - Polyamidoamine Epoxy or High Solids Epoxy
     - a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
     - b. Devoe Bar Rust 235V @ 4 to 6 mils DFT

4. Third Coat
   - Waterborne Acrylic Polyurethane or Aliphatic Acrylic Urethane
     - a. TNEMEC Series 1080 Endura-Shield @ 2 to 3 mils DFT
     - b. Devoe Devthane 379H @ 2 to 3 mils DFT
L. **System Number 12 – (Indoor Coating) Exterior of Concrete Masonry Units and Concrete Walls**

Concrete masonry unit walls and concrete walls in the interior of a building or elsewhere shall be coated as follows:

1. **Surface Preparation**
   - **CMU:** Allow mortar to cure for 14-days minimum. Level protrusions and mortar splatter.
   - **Concrete:** Allow new concrete to cure for 30-days minimum, followed by abrasive blast in accordance with manufacturer's instructions.

2. **First Coat**
   - Waterborne Cementitious Acrylic or Advanced Technology Waterborne Epoxy
     a. TNEMEC Series 130 Enviroofill @ 60 to 115 sf/gallon
     OR
     b. Devoe Bloxfil 4000 @ 50 to 75 sf/gallon
     OR
     c. Devoe Tru-Glaze 4015 @ 50 to 75 sf/gallon

3. **Second Coat**
   - Polyamidoamine Epoxy or High Solids Epoxy
     a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
     OR
     b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT

4. **Third Coat**
   - Polyamidoamine Epoxy or High Solids Epoxy
     a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
     OR
     b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT
M. System Number 13 – (Indoor Coating) Exterior of Sheet Rock
The sheet rocked walls and ceilings in the interior of the station building shall be coated as follows:

1. Surface Preparation
   Sand joint compound until smooth and feather-edges. All surfaces shall be dry.

2. First Coat
   Vinyl Acrylic
   a. TNEMEC Series 51 PVA Sealer @ 1 to 2 mils DFT
      OR
   b. Glidden Professional 1030N PVA Wall Primer & Sealer @ 350 sf/gallon

3. Second Coat
   Polyamidoamine Epoxy or High Solids Epoxy
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
      OR
   b. Devoe Bar Rust 235V @ 4 to 6 mils DFT

4. Third Coat
   Polyamidoamine Epoxy or High Solids Epoxy
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
      OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT
N. **System Number 14 – (Indoor Coating) Exterior of Chemical Room Components (High Chemical Concentrations)**

The concrete masonry unit walls, sheet rocked walls, and moldings of the chemical treatment rooms that are exposed to high concentrations of chlorine, fluoride, or other chemicals shall be coated as follows. Chemical rooms with low concentrations of chemicals shall be coated per the applicable System Numbers 11 or 12.

1. **Surface Preparation**
   - **CMU**: Allow mortar to cure for 14-days minimum. Level protrusions and mortar splatter.
   - **Concrete**: Allow new concrete to cure for 30-days minimum, followed by abrasive blast in accordance with manufacturer's instructions.
   - **Sheet Rock**: Sand joint compound until smooth and feather-edges. All surfaces shall be dry.

2. **First Coat**
   Waterborne Cementitious Acrylic or Advanced Technology Waterborne Epoxy
   
   a. TNEMEC Series 130 Envirofill @ 60 to 115 sf/gallon
   OR
   b. Devoe Bloxfil 4000 @ 50 to 75 sf/gallon

3. **Second Coat**
   Polyamine Novolac Epoxy
   
   a. TNEMEC Series 282 Tneme-Glaze @ manufacturer’s recommended DFT
   OR
   b. Devoe Devran 124 or Devmat 111 @ manufacturer’s recommended DFT

4. **Third Coat**
   Polyamine Novolac Epoxy
   
   a. TNEMEC Series 282 Tneme-Glaze @ manufacturer’s recommended DFT
   OR
   b. Devoe Devran 124 or Devmat 111 @ manufacturer’s recommended DFT
O. **System Number 15 – (Indoor Coating) Exterior of Concrete Floors**
All concrete floors in the building shall have a non-skid protective coating suitable for moderate chemical exposure and heavy traffic and impact exposure. The Contractor shall be responsible for any preparatory work required by the coating manufacturer. The Contractor shall supply a 2-foot minimum square mockup of the concrete floor anti-skid coating system for approval by the Engineer prior to beginning work on the floor.

1. **Surface Preparation**
   Allow new concrete to cure for 30-days minimum, followed by abrasive blast or mechanical abrasion in accordance with manufacturer’s instructions.

2. **First Coat**
   Modified Polyamine Epoxy or Chelated Polymeric Oxirane
   
   a. TNEMEC Series 201 Epoxoprime @ 6 to 12 mils DFT
   OR
   b. Devoe Pre-Prime 167 @ 1.5 mils DFT

3. **Second Coat**
   Polyamine Novolac Epoxy (immediately following the coating, broadcast selected silica between 3 to 5 lbs/gallon of applied coating)
   
   a. TNEMEC Tneme-Glaze Series 282 @ 6 to 12 mils DFT
   OR
   b. Devoe Devran 124 @ 10 to 12 mils DFT

4. **Third Coat**
   Polyamine Novolac Epoxy (before coating, remove excess silica when dry to foot traffic)
   
   a. TNEMEC Tneme-Glaze Series 282 @ 6 to 12 mils DFT
   OR
   b. Devoe Devran 124 @ 10 to 12 mils DFT
P. System Number 16 – (Outdoor Coating) Exterior of PVC and Fiberglass Piping and Conduit Materials
The exterior of PVC and fiberglass piping and conduits exposed to weather and ultraviolet light shall be coated as follows:

1. Surface Preparation
PVC and Fiberglass surfaces shall be wiped with a clean rag and clean solvent compatible with the specified coating prior to coating application. Scarify all PVC or Fiberglass surfaces prior to coating.

2. First Coat
Polyamidoamine Epoxy or Waterborne Epoxy Primer

   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Devran 203 @ 3 to 4 mils DFT

3. Second Coat
Aliphatic Acrylic Urethane

   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT
   OR
   b. Devoe Devthane 379H @ 2 to 3 mils DFT
Q. **System Number 17 – (Indoor Coating) Exterior of PVC and Fiberglass Piping and Conduit Materials**
The exterior of PVC and fiberglass piping and conduits that are located inside buildings or enclosures and are not exposed to weather and ultraviolet light shall be coated as follows:

1. **Surface Preparation**
   PVC and Fiberglass surfaces shall be wiped with a clean rag and clean solvent compatible with the specified coating prior to coating application. Scarify all PVC or Fiberglass surfaces prior to coating.

2. **First Coat**
   Polyamidoamine Epoxy or Waterborne Epoxy Primer
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Devran 203 @ 3 to 4 mils DFT

3. **Second Coat**
   Polyamidoamine Epoxy or Waterborne Epoxy
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT
R. System Number 18 – (Outdoor Coating) Exterior of Aluminum (Gutters and Downspouts), Non-Ferrous Metals (Copper, Brass, or Bronze), and Galvanized Metal

Exterior aluminum materials such as gutters and downspouts, non-ferrous metals such as copper, brass or bronze, and galvanized metal such as conduits, pipe hangers and pipe supports that are to be painted rather than repaired with zinc coating and that are exposed to weather shall be coated as follows:

1. **Surface Preparation**
   Remove water-soluble dirt and chemicals with water and detergent and solvent-soluble contaminants with Solvent Clean (SSPC 1). Allow to dry and then Hand Tool (SSPC 2) or Power Tool (SSPC 3) to remove oxides. Scarify to provide a minimum 1-mil profile to aid adhesion.

2. **First Coat**
   Polyamidoamine Epoxy or Waterborne Epoxy Primer
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT
   OR
   b. Devoe Devran 203 @ 3 to 4 mils DFT

3. **Second Coat**
   Aliphatic Acrylic Urethane
   
   a. TNEMEC Series 1075 Endura-Shield II @ 2 to 3 mils DFT
   OR
   b. Devoe Devthane 379H @ 2 to 3 mils DFT
S. **System Number 19 – (Indoor Coating) Exterior of Aluminum (Ducting), Non-Ferrous Metals (Copper, Brass, or Bronze), and Galvanized Metal**

Interior aluminum materials such as ducting, non-ferrous metals such as copper, brass or bronze, and galvanized metal such as conduits, pipe hangars and pipe supports that are to be painted rather than repaired with zinc coating and that are not exposed to weather shall be coated as follows:

1. **Surface Preparation**  
   Remove water-soluble dirt and chemicals with water and detergent and solvent-soluble contaminants with Solvent Clean (SSPC 1). Allow to dry and then Hand Tool (SSPC 2) or Power Tool (SSPC 3) to remove oxides. Scarify to provide a minimum 1-mil profile to aid adhesion.

2. **First Coat**  
   Polyamidoamine Epoxy or Waterborne Epoxy Primer
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT  
   OR
   b. Devoe Devran 203 @ 3 to 4 mils DFT

3. **Second Coat**  
   Polyamidoamine Epoxy or High Solids Epoxy
   
   a. TNEMEC Series 161HS Tneme-Fascure @ 4 to 6 mils DFT  
   OR
   b. Devoe Bar-Rust 235V @ 4 to 6 mils DFT
T. **System Number 20 – (Indoor/Outdoor Coating) Exterior of Damaged Galvanized Metal (Touch-up Repair Only)**

Defects in factory applied galvanized items such as galvanized fencing, ladders, rain gutters, down spouts, metal doors, door hangers and pipe hangers shall be coated with a Zinc-Rich coating with a minimum of 14-pounds of metallic zinc content per gallon. The coatings for potable and non-potable applications shall be as follows:

1. **Surface Preparation**
   Solvent Clean (SSPC 1), followed by Hand Tool (SSPC 2) finished with Brush-Off Blast (SSPC 7). Provide a minimum 1-2 mil profile to aid adhesion.

2. **Potable Water**
   Aromatic Urethane, Zinc-Rich or Inorganic Zinc-Rich Urethane (NSF 61 certified)
   
   a. TNEMEC Series 94-H₂O Hydro-Zinc @ 2.5 to 3.5 mils DFT
      OR
   b. Devoe Catha-Coat 316 @ 2.5 to 3.5 mils DFT (MADE TO ORDER ONLY)

3. **All Other Applications**
   Aromatic Urethane, Zinc-Rich or Inorganic Zinc-Rich Urethane
   
   a. TNEMEC Series 90-97 Tneme-Zinc @ 2.5 to 3.5 mils DFT
      OR
   b. Devoe Catha-Coat 302H @ 2.5 to 4.0 mils DFT
U. System Number 21 – (Outdoor Coating) Exterior of Wood
Exterior wood such as tails, trim, soffits and all other wood that is exposed to weather or highly humid atmospheres shall be coated as follows:

1. Surface Preparation
   Sand rough areas. Ensure wood is dry before coating. Seal knots and pitch pockets and fill cracks and nail holes after primer has cured.

2. First Coat
   Waterborne Modified Polyamine Epoxy or Acrylic Resin
   a. TNEMEC Series 151-1051 Elasto-Grip FC @ manufacturer’s recommended DFT
      OR
   b. Glidden Professional Hydrosealer @ 350 to 400 sf/gallon
      OR
   c. Kelly-Moore Paint Co. #255 Acry-Shield Primer 250 to 300 sf/gallon

3. Second Coat
   Acrylic Emulsion
   a. TNEMEC Series 180 W.B. Tneme-Crete @ 4 to 10 mils DFT
      OR
   b. Glidden Professional Fortis 350 @ 350 to 400 sf/gallon
      OR
   c. Kelly-Moore Paint Co. #1245 Acry-Shield 100% Acrylic Ext. Finish Low-Sheen @ 250 to 300 sf/gallon

4. Third Coat
   Acrylic Emulsion
   a. TNEMEC Series 180 W.B. Tneme-Crete @ 4 to 10 mils DFT
      OR
   b. Glidden Professional Fortis 350 @ 350 to 400 sf/gallon
      OR
   c. Kelly-Moore Paint Co. #1245 Acry-Shield 100% Acrylic Ext. Finish Low-Sheen @ 250 to 300 sf/gallon
V. System Number 22 – (Indoor Coating) Exterior of Wood
Interior wood such as trim, cabinets and all other wood that is not exposed to weather or highly humid atmospheres shall be coated as follows:

1. Surface Preparation
Sand rough areas. Ensure wood is dry before coating. Seal knots and pitch pockets and fill cracks and nail holes after primer has cured.

2. First Coat
Waterborne Modified Polyamine Epoxy or Waterborne Acrylic Resin
   a. TNEMEC Series 151-1051 Elasto-Grip FC @ manufacturer’s recommended DFT
      OR
   b. Glidden Professional 3210 Gripper Primer/Sealer @ 300 to 450 sf/gallon
      OR
   c. Kelly-Moore Paint #287 Adhesion Plus Primer @ 250 to 300 sf/gallon

3. Second Coat
Modified Polyamine Epoxy or Waterborne Epoxy Polyamide
   a. TNEMEC Series 280 Tneme-Glaze @ manufacturer’s recommended DFT
      OR
   b. Devoe Tru-Glaze-WB 4426 Epoxy @ 2 to 4 mils DFT

4. Third Coat
Modified Polyamine Epoxy or Waterborne Epoxy Polyamide
   a. TNEMEC Series 280 Tneme-Glaze @ manufacturer’s recommended DFT
      OR
   b. Devoe Tru-Glaze-WB 4426 Epoxy @ 2 to 4 mils DFT
W. System Number 23 – (Outdoor Coating) Exterior of Buried Valve Boxes and Valves

The exterior of valve boxes and gate valves, butterfly valves and all other buried valves shall be coated as follows:

1. Surface Preparation
   Blast to near-white metal surface cleanliness in accordance with SSPC 10. Blast profile on steel should be 1.5 to 2.5 mils in depth and be of a sharp, jagged nature as opposed to a "peen" pattern (from shot blasting).

2. First Coat
   Polyamine Epoxy Primer
   a. TNEMEC Series 66HS Hi-Build Epoxoline @ 3 to 4 mils DFT
   b. Devoe Devtar 5A-HS

3. Second Coat
   Polyamine Epoxy-Coal Tar
   a. TNEMEC Series 46H-413 Hi-Build Tneme-Tar @ 8 to 10 mils DFT
   b. Devoe Devtar 5A-HS

4. Third Coat
   Polyamine Epoxy-Coal Tar
   a. TNEMEC Series 46H-413 Hi-Build Tneme-Tar @ 8 to 10 mils DFT
   b. Devoe Devtar 5A-HS
X. System Number 24 – (Indoor/Outdoor Coating) Interior and/or Exterior Fusion Bonded Epoxy Coating (Touch-up Repair)
The interior and/or exterior of pipe coated with fusion bonded to be repaired, shall be as follows:

1. Surface Preparation
   Remove oil, grease and loosely adhering deposits. Abrade the FBE surface with medium grit sandpaper (approx 80 grit). Powered rotary Sanders and sweep blasting are also acceptable means of performing this task as well. Ensure that the surrounding FBE is roughened for 10 mm on all sides of the holiday. Ensure the abraded surface is cleaned of abrading debris with the use of an air blast or a clean lint free cloth then verify anchor profile is 1.5 - 4 mils. With the metal above 41°F/5°C and a minimum of 5°F/3°C above the dew point, apply Scotchkote 323 at recommended film thickness.

2. First Coat
   Two part liquid epoxy

   a. 3M Company Scotchkote 323 @ 25 to 60 mils DFT
PART 3 – EXECUTION

3.01 GENERAL

A. No paint shall be reduced or applied in any way except as herein specifically called for, or as recommended by the manufacturer. Should conflict occur between specifications and manufacturer’s recommendations and/or standard practice, the Engineer shall be notified prior to bid submittal for clarification.

B. It is the responsibility of the Contractor to inspect and provide substrata surfaces that are prepared in accordance with these Specifications and the printed directions and recommendations of the paint manufacturer whose product is to be applied.

C. All doors, windows, trim, moldings, base boards, electrical boxes, light fixture boxes, penetrations through the ceilings, walls or floors, shall be caulked prior to coating.

3.02 MATERIAL DELIVERY AND STORAGE

A. All materials shall be new and shall be delivered to the worksite in unopened containers that plainly show, at the time of use, the designated name, date of manufacturer, and name of manufacturer. Materials shall be stored in a suitable protected area that is heated or cooled as required to maintain temperatures within the range recommended by the manufacturer.

B. Empty and dry paint containers may be disposed of onsite; however wet paint containers or containers with unused product may not be disposed as general debris and must be discarded as hazardous waste or taken back to Contractor’s place of business for reuse. Washing of brushes in sinks that flow too sanitary must only be allowed if permitted by the owner or wash water collected and disposed by Contractor.

3.03 AIR QUALITY

A. All coatings shall conform to the pertinent Volatile Organic Compound (VOC) requirements and any other air quality regulations applicable at the location of use. Coating materials which cannot be guaranteed by the manufacturer to conform, whether or not specified by product designation, shall not be used.

3.04 COATING COMPATIBILITY

A. The Contractor shall be responsible for ensuring the compatibility of field coatings with each other or with the coatings on shop coated or previously coated surfaces. Coatings used in the first field coat over shop coated or previously coated surfaces shall cause no wrinkling, lifting, or other damage to underlying coats. Coatings used in successive field coats shall be produced by the same manufacturer.
3.05 PROTECTION OF MATERIALS NOT TO BE PAINTED

A. Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring any adjacent surfaces. Protect working parts of all mechanical and electrical equipment from damage during surface preparation and painting process. All openings in motors shall be masked to prevent paint and all other materials from entering the motors.

3.06 PAINT MIXING

A. Multiple-component coatings shall be prepared using all of the contents of the container for each component as packaged by the paint manufacturer. No partial batches will be permitted. Multiple-component coatings that have been mixed shall not be used beyond their pot life.

3.07 SCAFFOLDING

A. All necessary scaffolding shall be furnished and installed by the Contractor. Such scaffolding shall conform to regulations of the State Industrial Accident Commission and local ordinances.

3.08 SAFETY

A. Painting shall be performed in strict accordance with the safety recommendations of the paint manufacturer; with the safety recommendations of the National Association of Corrosion Engineers contained in the publication, Manual for Painter Safety; Federal, state, and local agencies having jurisdiction. All necessary ventilation, lighting equipment, and scaffolding shall be furnished and installed by the Contractor.

B. All necessary precautions shall be taken to prevent fire. Rags and waste soiled with paint shall be removed from the premises at the end of each day’s work, or stored in metal containers with metal covers.

3.09 SURFACE PREPARATION

A. **Metal Surface Preparation**

   All sharp edges and corners shall be ground smooth and all weld spatter, slag burrs, and other objectionable surface conditions must be removed prior to the surface preparation for coating.

   No surface preparation blasting will be permitted prior to submission of samples. All workmanship for metal surface preparation as specified shall be in strict conformance with the current Steel Structures Painting Council (SSPC) Specifications as follows:
Solvent Cleaning    SSPC 1
Hand Tool Cleaning    SSPC 2
Power Tool Cleaning    SSPC 3
Flame Cleaning    SSPC 4
White Metal Blast Cleaning    SSPC 5
Commercial Blast Cleaning    SSPC 6
Brush-Off Blast Cleaning    SSPC 7
Pickling    SSPC 8
Weathering Followed by Blast Cleaning SSPC 9
Near-White Blast Cleaning    SSPC 10
Power Tool Cleaning to Bare Metal    SSPC 11
Ultra-High Pressure Water Jetting SSPC 12
Concrete SSPC 13

Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surface uncoated for more than 8-hours.

Alternatives to standard abrasive blast cleaning methods, will be permitted subject to a review by the Engineer.

Where OSHA or EPA regulations preclude standard abrasive blast cleaning, wet or vacu-blast methods may be required. Coating manufacturer’s recommendations for wet blast additives and first coat application shall apply.

B. Other Surfaces
All other surfaces shall be prepared in accordance with these specifications and the manufacturer’s recommendations.

3.10 APPLICATION OF PAINT

A. General
Manufacturer’s written instructions for applying each type of paint or protective coating shall be furnished to the Engineer prior to application. Cleaned surfaces and all coats shall be inspected prior to the succeeding coat. Schedule such inspection with the Engineer in advance. Apply all coatings in strict accordance with the paint manufacturer’s recommendations, as approved by the Engineer. Succeeding coats shall be painted in a different color to facilitate inspection. Final colors shall be as selected by the District. Sufficient time shall be allowed between coats to assure thorough drying of previously applied paint. Coating shall be applied in a neat manner that will produce an even film of uniform and proper thickness, with finished surfaces free of runs, sags, ridges, laps, and brush marks. Units to be bolted together shall be painted prior to assembly or installation, unless otherwise specified.
B. **Shop Primed Surfaces**
   All shop primed items shall be inspected at the jobsite for compliance with these Specifications. Schedule such inspection with the Engineer in advance. Areas of chipped, peeled, or abraded primer shall be hand or power sanded feathering the edges. The areas shall then be spot primed with the specified primer.

C. **Manufacturer Applied Paint Systems**
   Abraded areas on factory finished items shall be repaired in strict accordance with the manufacturer's directions. Repaired areas shall be carefully blended into the original finish.

D. **Film Thickness**
   Coverage is listed as either total dry film thickness in mils (DFT) or the spreading rate in square feet per gallon (sf/gallon). The number of coats is the minimum required irrespective of the coating thickness. Additional coats may be required to obtain the minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions. Maximum film build per coat shall not exceed the coating manufacturer's recommendations.

E. **Damaged Coatings**
   Damaged coatings, pinholes and holidays shall have the edges feathered and repaired in accordance with the recommendations of the paint manufacturer, as approved by the Engineer. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.

F. **Unsatisfactory Application**
   Work shall be free of runs, bridges, shiners, laps, delamination, wrinkling, peeling, blistering, cracks, chips, abrasions or other imperfections. Evidence of these conditions shall be cause for rejection. All visible areas of imperfections shall be hand- or power-sanded feathering the edges. The areas shall then be primed and finish coated in accordance with the Specifications. Depending on the extent of repair and its appearance, a finish sanding and topcoat may be required by the Engineer.

   If the item has insufficient film thickness, the surface shall be cleaned, and then prepared as required by the manufacturer taking into account the recoat window, and top coated with the specified paint material to obtain the specified appearance and coverage. Specific surface preparation requirements shall be determined by the coating manufacturer, as approved by the Engineer.

   All areas of overspray including floors, windows, and equipment shall be cleaned or repainted if unable to be cleaned, to the satisfaction of the Engineer.

   Leave all staging up until areas are inspected and approval is given by the Engineer, for each surface or coating. Staging removed prior to inspection shall be replaced.

   Any defects in the coating system shall be repaired by the Contractor per written recommendations of the coating manufacturer, at no additional cost to the District.
3.11 SHIPPING

A. In all cases where pre-coated items are to be shipped to the jobsite, all efforts shall be made to protect the coating from damage. Coated items shall be battened to prevent abrasion. Contractor shall use nonmetallic or padded slings and straps in handling. Items will be rejected for excessive damage.

3.12 TOUCH-UP PAINT

A. The Contractor shall leave a minimum of 1-gallon of paint for each type and color used on the project for the District’s use in future maintenance operations. Appropriate touch-up paint for factory coated items including factory coated electrical panels, gutters, and doors and window frames, shall be delivered to the District.

3.13 ANNIVERSARY INSPECTION

A. Schedule
   A first anniversary warranty inspection of all painted surfaces will be conducted by the District, approximately eleven (11) months from the date of recording the Notice of Completion. The District shall establish the date of the inspection and will notify the Contractor at least thirty (30) calendar days in advance of the inspection.

B. Equipment
   The Contractor shall furnish ventilation, scaffolding, and lighting equipment as necessary for warranty inspections, and shall be present for such inspections.

C. Inspection Report
   The District will prepare and deliver to the Contractor a report of the warranty inspection, prior to the expiration of the 12-month warranty period. The inspection report will set forth the number and types of failures observed, the percentage of surface area where failures have occurred, and the names of the persons making the inspections. Photographs or reports of the coating imperfections or failures shall be considered acceptable evidence of failure.

D. Failure
   Any location where coating has delaminated, peeled, blistered, or cracked; and any location where rusting is evident will be considered a failure of the coating system.

E. Remedial Work
   Repair all failures by removing the deteriorated coating, cleaning the surface, and recoating with the same system in accordance with this Section and the coating manufacturer. With the approval of the District, surface preparation of small failures (areas less than 1 sq./ft.) may be made by cleaning to bare metal in accordance with appropriate SSPC-SP standards.
F. **Schedule of Remedial Work**
   The District shall establish a starting date and reasonable time of completion for the remedial work. The starting date shall be no more than thirty (30) calendar days after the submittal of the inspection report to the Contractor. Should the Contractor fail to start the remedial work within ten (10) calendar days after the starting date established by the District, the District may at its option perform the remedial work, and the Contractor shall pay to the District the actual cost of such work, plus 20 percent to cover added engineering and administrative cost.

G. **Cost**
   Warranty inspections of the remedial work shall be at the expense of the Contractor.

END OF SECTION
COATING SYSTEM DATA SHEET

<table>
<thead>
<tr>
<th>Surface Description:</th>
<th>System Number:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surface Preparation Description:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coating</th>
<th>DFT (mils)</th>
<th>Color</th>
<th>Manufacturer and Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Coat (Primer)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Coat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third Coat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total System</td>
<td></td>
<td></td>
<td>Not less than minimum thickness specified</td>
</tr>
</tbody>
</table>

Notes: (Attached if needed.)

Project:

Painting Contractor:

Attach Technical Data Sheet (if applicable) for each paint system submittal.
DIVISION 10 SPECIALTIES
METAL BUILDINGS
SECTION 10055

PART 1 - GENERAL

1.01 SCOPE

A. This Section covers the work necessary to furnish materials and construct the Pump Building and Electrical Building. The Structural Drawings include details and specifications for the materials and erection of both buildings. Where there are conflicts between Structural Drawings and these Specifications for the Metal Building, the Structural Drawings supersede.

B. Both buildings shall be corrugated steel buildings, weathertight and insulated, with metal framing. The buildings are to be field erected and assembled. The Contractor shall furnish all labor and materials needed to complete the work included in this section, complete.

1.02 RELATED SECTIONS

A. The following sections are related to the Metal Buildings and include additional requirements and submittals:

   a. SECTION 05500 METAL FABRICATIONS
   b. SECTION 08110 METAL DOORS AND FRAMES
   c. SECTION 08710 FINISH HARDWARE

1.03 SUBMITTALS

A. Contractor shall submit manufacturer's specifications and shop drawings for the building materials specified in this section and the Structural Drawings.

1.04 STANDARDS

A. All buildings shall be designed in accordance with the applicable sections of the latest edition of the AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings and the AISI Specifications for the Design of Cold Formed Steel Structural Members. Buildings shall comply with state and local building code requirements.
1.05 METAL PANEL WARRANTY

A. Metal Decking Manufacturer’s Product Warranty
Warrant for (20) twenty years, following project delivery date, that metal decking panels will not rupture, fail structurally, or perforate.

B. Contractor’s Warranty
Warrant panels, flashing, sealants, fasteners, and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage for one (1) years following project substantial completion date, and to repair or replace without additional cost to the District any leaks that occur.

PART 2 - MATERIALS

2.01 CONCRETE

A. All concrete for the building slabs and vault shall comply with the requirements of SECTION 03300 – CONCRETE and EID Standard Specification 03 00 00, except as herein specified.

2.02 STRUCTURAL SYSTEM

(Per Structural Drawings)

2.03 ROOF PANELS

A. Roof panels shall be minimum 24-guage aluminum-zinc alloy-coated steel (AZ55) with mill-applied acrylic surface treatment. Minimum 0.55 ounce coated weight per square foot (approximately 55% aluminum, 45% zinc applied by the continuous hot-dip method) as determined by the triple-spot test per ASTM A792.

B. Roof panels shall be designed to support a 200-lb load distributed evenly over a 2' square area centered between two purlins without exceeding a panel deflection-to-span ratio of 1/180 in a two-span condition. Panels shall be of maximum length, up to 38'-9" so as to minimize panel endlap. Panel endlap shall be factory prepunched (top panel with a round hole and bottom panel with a slotted hole) to provide for expansion and contraction and panel alignment.

C. There shall be four major corrugations spaced 12" on center. Each corrugation shall be 1-1/2” high, 2-7/8” wide tapering 1-9/32” wide at the top with no intermediate minor corrugations. In the panel flat, there shall be two additional corrugations, 1” wide, 1/8” high spaced 3” on center between major corrugations. Roof panels shall be “Bulterib II” as manufactured by Butler Buildings, or an approved equal.
1. **Ridge Panel**
   Ridge panel shall be one-piece, factory curved to match the roof slope. Cross-section of the ridge panel shall match the roof panel.

2. **Eave Panel**
   Eave panel shall extend beyond the building structural line.

D. Roof panels shall be model Design Span by AEP Span, or equal. Provide color options to the Owner in a submittal with hard copy Color Chart samples.

**2.04 WALL PANELS**

A. Wall panels shall be minimum 24-gauge aluminum-zinc alloy-coated steel (AZ55) with mill-applied acrylic surface treatment. Minimum 0.55 ounce coated weight per square foot (approximately 55% aluminum, 45% zinc applied by the continuous hot-dip method) as determined by the triple-spot test per ASTM A792

B. Panels shall be 36” wide with four major corrugations; 1-1/2” high 7-3/16” on center with one minor corrugation between each of the major corrugations the entire length of the panel. Panels shall be factory prepunched at panel end and shall match prepunched holes in structural members for proper alignment.

C. Wall panels shall be one piece from base to building eave. The upper end of the panel shall be fabricated with a mitered cut to match corrugations of roof panels. The bottom end of the panels shall be straight cut.

D. Wall panels shall be model HR-36 by AEP Span, or equal. Provide color options to the Owner in a submittal with hard copy Color Chart samples.

**2.05 DOORS**

A. **Hollow Steel Doors**
   The hollow steel doors shall be manufactured of not less than No. 18 gauge steel. The doors shall be 1 3/4 inches thick and shall be louvered as noted. Louvers shall be a minimum of 16 gauge galvanized steel and shall be weatherproof. Removable insect screens shall be installed on the inside face of the louver and shall be 0.063 x ¼ inch aluminum screen set in a fixed aluminum U-frame. Drilling for hardware shall be from templates. See SECTION 08110 – METAL DOORS AND FRAMES for additional requirements.

B. **Finish Hardware**
   The Contractor shall furnish and install all finish hardware as indicated on the Drawings, in these specifications, or as recommended by the Manufacturer, including but not necessarily limited to, the hardware listed herein. Hardware shall be furnished complete, including all parts necessary for satisfactory operation. Screws and bolts of proper size and design shall be furnished. In the event the Contractor proposes to
furnish equivalent hardware in lieu of any of the items listed, the Contractor’s schedule shall show the manufacturer’s name and catalog number of each item. A complete hardware list shall be submitted to the Engineer for approval.

2.06 INSULATION

A. Walls, ceilings, and exterior doors shall be insulated. Walls and ceilings shall have fiberglass blanket insulation. Insulation shall be single layer, providing a minimum insulation rating of R-19.

2.07 WALL AND CEILING FANS/VENTS

A. Wall mounted cabinet fans shall be capable of an air delivery specified on the plans, with heavy gauge steel wire inlet guards. Fans are as specified on the Drawings.

2.08 MISCELLANEOUS HARDWARE

A. All miscellaneous hardware shall comply with the manufacturer’s recommendations and/or requirements. All hardware used in the erection of the metal building shall be provided by the manufacturer.

PART 3 - EXECUTION

3.01 CONCRETE

A. Subgrade preparation of the concrete floor slab shall include applying a 0.004 inch thick polyethylene film vapor barrier over a minimum 4 inch thick 3/4 inch maximum clean, crushed rock layer. The polyethylene film shall be Visqueen as manufactured by Visking Co., Fremont, CA, or approved equal, and shall be installed per the manufacturer’s instructions.

3.02 INSULATED METAL WALLS

A. Installation of the metal walls, including insulation, shall be according to the manufacturer’s written instructions. The structural system shall be plumb prior to wall panel attachment. Panels shall be aligned and attached in accordance with erection drawings furnished by the Manufacturer. All sidelap shall cover a minimum of one full corrugation.

1. Fasteners
   Lock-rivet fasteners, when used, shall be set by a special lock-rivet fastener tool. Fastener locations shall be as shown on erection drawings furnished by the Manufacturer. All exposed fasteners shall be prepainted to match wall color.
INSULATED METAL ROOF

A. Installation of the insulated metal roof shall be in accordance with the Manufacturer’s drawings and instructions. The panel sidelap shall overlap one major corrugation. One of the outboard corrugations shall be formed as the overlapping corrugation, the other outboard corrugation shall be formed as the underneath corrugation (this shall be a full corrugation to provide bearing support to the side lap). This shall be formed with a continuous length sealant groove. Endlap shall be at least 6-inch and fastened together over and to structural members. Eave panel shall extend beyond the building structural line.

1. Fasteners
   All panel-to-structural member connections shall be made with galvanized steel, dichromate dipped Scrubolt fasteners, 3/8-inch hex-head metal backed sealing washer, by Butler Manufacturing or approved equal as provided by the Manufacturer. Panel-to-panel connections shall be made with #1/4-14 x 7/8-inch galvanized 3/8-inch head mini-pt. self-drilling screws with 5/8-inch OD ALZN steel back sealing washer.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE

A. This section covers work necessary to furnish and install all signs, safety equipment, delineators, fire extinguishers, pipe/conduit markers, and all appurtenances as shown on the Drawings and specified herein, complete.

1.02 GENERAL

A. Signs, delineators, pipe markers, and safety equipment shall be furnished and installed as specified herein. Where not specifically indicated or specified, fasteners, posts, and other accessories shall be provided as required and as recommended by the manufacturer of the specific item.

1.03 SUBMITTALS

A. Complete product literature and detailed drawings shall be submitted in accordance with the submittals sections.

PART 2 - MATERIALS

2.01 SIGNS

A. Signs shall be constructed of 0.040 aluminum with a baked enamel finish. Signs shall be for outdoor duty, pre-drill for mounting, and contain OSHA heading descriptions as specified herein. Signs shall be as manufactured by the Seton Name Plate Company (New Haven, CT (800) 243-6624) or an approved equal.

2.02 CONDUIT AND PIPELINE MARKERS

A. All conduit or pipe shall be labeled by means of a pre-formed snap-around outdoor grade acrylic plastic marker with the condition, direction, and type of fluid marked in bold capital letters. The markers must have the proper coating to ensure resistance to acid and/or other corrosive conditions. All markers shall be OSHA and ANSI color coded, lettered, and comply with the requirements of the National Fire Protection Association (NFPA).

2.03 PAINT

A. Paint shall be as specified in SECTION 09900 - PAINTING.
2.04 FIRE EXTINGUISHERS

A. Fire extinguishers shall be all-purpose, nitrogen-pressured, dry chemical type and shall be U.L rated, 10 pound capacity, with a class rating of ABC. Cylinders are to be of heavy-duty steel construction, corrosion and impact resistant with a red polyester epoxy finish and a visual pressure gauge.

2.05 CHEMICAL HANDLING EQUIPMENT

A. The Contractor shall furnish one set of aprons, gloves, and eye goggles, each of which shall be chemically inert to chlorinated solutions.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Signs and pipe markers shall be installed after all equipment and building surfaces have been primered and painted. Delineators shall be installed after all backfilling and finish grading is complete.

3.02 SIGNS

A. Signs shall be furnished and mounted at various locations described herein, for the purpose of indicating and defining specific hazards throughout the work area.

B. Signs shall be 10” x 7” in size unless otherwise specified.

C. Signs with placement locations are:

<table>
<thead>
<tr>
<th>Location</th>
<th>No. Required</th>
<th>OSHA Heading</th>
<th>Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Fire Extinguisher</td>
<td>1</td>
<td>(NONE)</td>
<td>FIRE EXTINGUISHER</td>
</tr>
<tr>
<td>On or near pump motor and discharge head, Intake pumps, Booster pumps</td>
<td>2</td>
<td>DANGER</td>
<td>EQUIPMENT STARTS AUTOMATICALLY</td>
</tr>
<tr>
<td>Both Doors to MCC Room, Inside of MCC Room, and on MCC Doors</td>
<td>5</td>
<td>DANGER</td>
<td>HIGH VOLTAGE</td>
</tr>
</tbody>
</table>
3.03 CONDUITS AND PIPELINES

A. All conduits and pipelines shall be labeled as to the type and condition of fluid conveyed. The following table presents the minimum number of markers required. However, the Contractor shall be responsible for labeling all conduits and pipelines, as identified by the Engineer.

B. Conduits and pipes to be marked are as follows:

<table>
<thead>
<tr>
<th>Pipe or Conduit</th>
<th>Conduit/Pipe Size</th>
<th>No. Required</th>
<th>Locations</th>
<th>Wording for Marker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake/Pump Discharge</td>
<td>3”</td>
<td>2</td>
<td>Near Pump</td>
<td>TO TANK</td>
</tr>
<tr>
<td>Booster Pump Suction</td>
<td>4”</td>
<td>2</td>
<td>Near Pump</td>
<td>TO BOOSTER</td>
</tr>
<tr>
<td>Booster Pump Discharge</td>
<td>2”</td>
<td>2</td>
<td>Near Pump Discharge</td>
<td>TO WTP</td>
</tr>
<tr>
<td>Tank Inlet</td>
<td>3”</td>
<td>1</td>
<td>At each tank</td>
<td>INLET</td>
</tr>
<tr>
<td>Tank Outlet</td>
<td>4”</td>
<td>1</td>
<td>At each tank</td>
<td>OUTLET</td>
</tr>
<tr>
<td>Tank Drain</td>
<td>3”</td>
<td>1</td>
<td>At each tank</td>
<td>DRAIN</td>
</tr>
</tbody>
</table>

3.04 FIRE EXTINGUISHERS

A. The Contractor shall install one (1) fire extinguisher(s) inside the Electrical Building. The fire extinguishers shall be wall-mounted, located immediately adjacent to the access door.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE

A. This section covers the work necessary to furnish, install and test one conical bottom, high-density polyethylene (HDPE), black, insulated tank for potable water storage with a nominal capacity of 1,400 gallons. This section covers the tank and tank accessories, as described herein, which includes stainless steel tank stand, tank insulation, and tank fittings.

B. The CONTRACTOR shall be responsible for furnishing the cone-bottom tank(s) and its accessories for chemical storage as indicated.

C. Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for the conical bottom HDXLPE storage tank and related appurtenances in contact with the stored raw water. The raw water stored in the tank will be used to supply the District; surface water treatment plant for drinking water purposes.

1.02 REFERENCES, CODES AND STANDARDS

A. American Society of Testing Materials (ASTM).
   a. D638  Tensile Properties of Plastics
   b. D883  Standard Definitions of Terms Relating to Plastics
   c. D1505  Density of Plastics by the Density-Gradient Technique
   d. D1525  Test Method for Vicat Softening Temperature of Plastics
   e. D1693  ESCR Specification Thickness 0.125" F50-10% Igepal

B. ANSI Standards: B-16.5, Pipe Flanges and Flanged Fittings


D. ARM: Low Temperature Impact Resistance (Falling Dart Test Procedure).

1.03 SUBMITTALS

A. The Contractor shall submit, for approval by the Engineer all materials, equipment, and supplies used in the construction and installation of the tank in addition to the following:
1. **Shop Drawings**
   Shop drawings shall be approved by the engineer or contractor prior to the manufacturing of the cone-bottom tank(s). Submit the following as a single complete initial submittal. Sufficient data shall be included to show that the product conforms to Specification requirements. Provide the following additional information:

   a) Cone-bottom tank and Fitting Material
      i. Resin Manufacturer Data Sheet
      ii. Stand material
      iii. Fitting material
      iv. Gasket style and material
      v. Bolt material

   b) Dimensioned Tank Drawings
      i. Location and orientation of openings, fittings, accessories, restraints and supports.
      ii. Details of manways, flexible connections, and vents.

   c) Calculations shall be stamped and signed by a registered, third party engineer in the State of California.
      i. Wall thickness. Hoop stress shall be calculated using 600 psi @ 100 degrees F.
      ii. Tank restraint system. Show seismic and wind criteria.

2. **Manufacturer Instructions**
   a) Unloading procedures
   b) Installation instructions
   c) Electrical heat tracing and foam insulation data sheets as required

3. **Factory Test Reports**
   a) Material, specific gravity rating at 600 psi @ 100 degrees F. design hoop stress.
   b) Wall thickness verification.
   c) Fitting placement verification.
   d) Visual inspection
   e) Impact test
   f) Gel test
   g) Hydrostatic test

4. **Color Selection Options**
   Submit color cards for the selection of the tank color approval by the District.

B. Upon final approval of the tank submittals, the Contractor shall furnish to the District one set of shop drawings with the final corrections and any revisions incorporated therein.
1.04 GENERAL DESIGN CRITERIA

A. The tank shall be designed to the following criteria:

1. Product to be stored: Raw unchlorinated water for potable use
2. Specific gravity: 1.0
3. pH of product: 6-8
4. Temperature of product: 40 - 100 °F
5. Ambient temperature range: 20 - 110 °F
6. Nominal capacity (at overflow elevation): 1,400 gallons
7. Maximum Inlet Flow Rate: 100 gpm
8. Maximum Outlet Flow Rate: 100 gpm
9. Diameter: 7'-11" (depending on manufacturer)
10. Height: 7'-2.5" total, with 3'-1" shell height (depending on manufacturer),
11. Design pressure: Atmospheric

1.05 TANK FOUNDATION DESIGN INFORMATION

A. The conical bottom tank will be provided by the manufacturer with a pre-engineered metal stand with floor bolt connections. The tank stand will sit on a concrete floor that is constructed on a metal deck with pier foundations, designed by others. The metal deck and concrete floor system that the tank will sit on was designed using the soil bearing capacity given in the Geotechnical Report (Appendix A).

B. The Contractor shall conform with all requirements contained in the geotechnical report in a manner that minimizes the risk for future settlement. This includes, but is not limited to, excavation and over-excavation of on-site soil; placement and compaction of imported non-expansion soil and on-site soil; moisture conditioning, and all related testing specified by the Geotechnical Report. The Contractor shall obtain the services of a qualified geotechnical engineer, licensed in the State of California to conduct all necessary subsurface inspections and testing required as part of complying with the Geotechnical information contained in the reference geotechnical documents. The cost for any additional investigation, testing, and analysis is to be included in the bid price.
C. Footing designs for soil bearing strengths less than that specified, and those designs deviating from the tank manufacturers standard, shall be the responsibility of the Owner and his Engineer based on tank live and dead loading data provided by the tank manufacturer. The foundation shall be designed by the tank manufacturer and design drawings shall be submitted to the Owner as stated above.

1.06 QUALITY ASSURANCE

A. The Contractor shall provide a cone-bottom tank of high density polyethylene (HDPE) with integral metal tank stand with seismic restraints and related appurtenance. Tanks furnished under this Section shall be supplied by Poly Processing Company, or approved equal, who has been regularly engaged in the design and manufacture of HDXLPE storage tanks for over 10 years.

B. Tanks shall be manufactured from virgin materials

1.07 WARRANTY

A. The warranty shall be a limited 5-year full replacement warranty.

PART 2 - MATERIALS

2.01 GENERAL

A. Tanks shall be rotationally-molded, cone-bottom, high density polyethylene one-piece seamless construction, cylindrical in cross-section and vertical with conical bottom. Tanks shall be adequately vented as prescribed by the manufacturer. Where indicated, tanks shall be provided with ancillary mechanical fittings and accessories. Tanks shall be marked to identify the manufacturer, date of manufacture and serial numbers must be permanently embossed into the tank.

2.02 TANK

A. The tank shall be high density polyethylene resin, with approval for use on drinking water with NSF 61 certification and shall contain ultraviolet stabilizer as recommended by resin manufacturer. The tank shall be black and the resin shall have a carbon black compounded into it. The tank material shall be rotationally molded and be a resin that is commercially available at the time of tank manufacture.

B. Wall thickness for a given hoop stress is to be calculated in accordance with ASTM D 1998. Tanks shall be designed using a hoop stress no greater than 600 psi. In no case shall the tank thickness be less than design requirements per ASTM D 1998.

1. The minimum wall thickness shall be sufficient to support its own weight in an upright position without external support but shall not be less than 0.187” thick.
2. On closed top tanks the top head shall be integrally molded with the cylindrical wall. Its minimum thickness shall be equal to the thickness of the top of the straight sidewall. In most cases, flat areas shall be provided for attachment of large fittings on the dome of the tank.

3. The conical bottom shall be integrally molded with the cylindrical wall. Knuckle radius shall be:

<table>
<thead>
<tr>
<th>Tank Diameter, ft</th>
<th>Min Knuckle Radius, in</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than or equal to 6</td>
<td>1</td>
</tr>
<tr>
<td>greater than 6</td>
<td>1-1/2</td>
</tr>
</tbody>
</table>

4. Manway cover shall be 24-in of Polyethylene material with a coarse thread. Gaskets shall be closed cell, polyethylene foam, viton materials.

2.03 ACCESSORIES

A. The location of the accessories is depicted on the Drawings. The following accessories shall be furnished and installed by the Contractor.

1. Stand
   Stainless steel stand for cone-bottom tank shall be provided. Stands shall be designed and certified by a structural engineer registered in the State of California. Design shall conform to the most recent edition of the IBC code for seismic and wind loads.

2. Ladder
   a. Stainless steel access ladders shall be provided with the polyethylene chemical storage tanks at locations as shown. Safety cages shall be added to ladders as required, per OSHA. Ladder shall have the ability to lockout from unwanted entry with a cover or cage.
   b. Ladders must be secured to the tank and secured to the concrete to allow for tank expansion/contraction due to temperature and loading changes. Use proper chemical resistant materials when anchoring to tank dome or sidewall.
   c. All ladders shall be designed to meet applicable OSHA standards. Reference: OSHA 2206; 1910.27; fixed ladders.

3. Insulation
   a. Insulation used shall be polyurethane foam with a density of 2.5 lb/ft³ with a minimum an “R” value of 6.3/in. The foam shall be applied with a nominal thickness of 2” to the external tank surfaces except the tank bottom.
b. Upon completion of application and curing of the insulation, 2 full coverage coats of latex mastic coating shall be applied to the surface of the insulation in such manner as to seal the insulation from the outside environment.

4. Fittings and Gaskets

a. Bolted One-Piece Sure Seal (B.O.S.S.) Double flange fittings shall be constructed of virgin polyethylene. Bolts will be welded to a common backing ring and encapsulated with polyethylene preventing fluid contact with the metal material. Flange will have a gasket to provide a sealing surface against the flange and tank surface. Bolt holes shall straddle the principal centerline of the tank.

b. All connections to the tank shall incorporate a minimum ¼” thick Viton gasket approved for use in drinking water with NSF 61 certification

5. Roof Vent
The tank must be vented for the material and flow and withdrawal rates expected. Vents should comply with OSHA 1910.106(F)(iii)(2)(IV)(9). U-vents shall sized by the tank manufacturer and be furnished complete with stainless steel 20 mesh insect screen. Connection shall be a threaded bolted flange fitting.

6. Inlet and Outlet Pipe
A 3-inch diameter inlet (roof mounted) and 4-inch diameter outlet (lower sidewall mounted) with flanged connection pipe stubs shall be provided for the inlet and outlet connections to the tank. Wall penetrations shall be designed to support the fittings and Flexijoint type flexible expansion joints, as shown on the Drawings.

7. Drain Pipe/Sump
A 3-inch diameter flanged pipe bottom flange center drain shall be provided for the tank drain, as shown on the Drawings.

8. Flexible Joint
Flexible joints shall be 100% virgin PTFE Flexijoint® expansion joint. Expansion joint to have a minimum of 3 convolutions, stainless steel limit cables and FRP composite flanges. Galvanized parts will not be accepted.

9. Water Level Connection
A center roof threaded bolted connection shall be provided for the Ultrasonic Transducer as shown on the drawings.
2.04 FACTORY TESTING

A. Material Testing

1. Perform gel and low temperature impact tests in accordance with ASTM D 1998 on condition samples cut from each polyethylene chemical storage tank.

B. Tank Testing

1. Dimensions: Take exterior dimensions with the tank empty, in the vertical position. Outside diameter tolerance, including out-of-roundness, shall be per ASTM D 1998. Fitting placement tolerance shall be +/- 1/2-in vertical and +/- 1 degree radial.


3. Hydrostatic test: Following fabrication, the bottom tanks, including inlet and outlet fittings, shall be hydraulically tested with water by filling to the top sidewall for a minimum of 1/2 an hour and inspected for leaks. Following successful testing, the tank shall be emptied and cleaned prior to shipment.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall coordinate all shipment, offloading and installation instructions with the tank manufacturer.

B. The contract is responsible for a complete installation including flushing and commissioning of the tank system.

3.02 DELIVERY, STORAGE, AND HANDLING

A. The tank shall be shipped upright or lying down on their sides with blocks and slings to keep them from moving. AVOID sharp objects on trailers.

B. All fittings shall be installed and, if necessary, removed for shipping and shipped separately unless otherwise noted by the contractor.

C. Upon arrival at the destination, inspect the tank(s) and accessories for damage in transit. If damage has occurred, the contractor shall notify the manufacturer immediately.
Installation

A. Install the tanks in strict accordance with the manufacturer’s Installation Manual and shop drawings.

B. Installation will be inspected by manufacturer to verify system flexible connections, venting and fittings are properly installed. In addition to on-site inspection tank system(s) to be reviewed using tank manual check list as supplied by manufacture as listed below.

C. Manufacturer to provide 1-hour training session to prepare operators to service and maintain the tank system. Included in training session will be (10) training manuals.

D. Manufacturer’s trained technician to do an onsite inspection of installation. Inspection will verify plumbing connections, venting, and applicable ancillary equipment such as ladders, restraints, etc. A verification of proper installation certificate will be supplied when equipment passes installation checklist.

E. Tank manuals will consist of installation check lists, tank drawing(s) as built, fitting drawings referencing nozzle schedule on tank drawing, materials of construction, and recommended maintenance program.

3.03 FIELD TESTING

The tanks be hydro-tested for leakage for a 24 hour period prior to commissioning.

3.04 FLUSHING AND COMMISSIONING

A. Contractor to ensure the tank is thoroughly flushed and clean of any particulates, sediment, grease, or debris prior to bring the tank in service.

B. A chemical disinfection is not required due to this being a raw water facility and the sensitivity to the adjacent river. Contractor is to thoroughly clean the tank to the District’s satisfactions through means of jetting, scrubbing, filling and emptying with clean water.

END OF SECTION
DIVISION 15 MECHANICAL
PIPE (STATION, DISTRIBUTION AND DRAINAGE)

SECTION 15025

PART 1 – GENERAL

1.01 SCOPE

A. This section consists of furnishing and installing black steel pipe (BSP), welded steel pipe, polyvinyl chloride (PVC) pipe, ductile iron (DI) pipe, corrugated metal pipe (CMP), copper tubing, high density polyethylene pipe (HDPE), fittings, closure pieces, pipe supports, bolts, nuts, gaskets, thrust blocks and all associated appurtenances. Pipe types, lengths, and dimensions are indicated on the Drawings. No substitution or deviation from Drawings will be allowed.

B. All materials, labor and workmanship associated with the installation of the piping shall conform to the Drawings and Specifications and applicable AWWA and ASTM Standards.

C. All standards contained in the El Dorado Irrigation District Improvement Standards and Technical Specifications shall be followed in addition to the requirements in this section. Copies of the subject standards are available on the District’s Website.

D. Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for all new piping related appurtenances used in the production or distribution of drinking water in contact with drinking water including contact with raw water to be treated.

E. Do not prepare any shop drawings for, or make final order for, or design any pipe materials for any particular section of pipeline, until all utilities that are to remain in that section of pipeline have been exposed.

1.02 RELATED WORK

A. SECTION 02300 - EARTHWORK

B. SECTION 03300 - CONCRETE

1.03 SUBMITTALS

A. Prior to the start of manufacturing, the following shall be submitted to, and approved by the Engineer:
1. **Shop Drawings**
   The Contractor shall submit complete data on pipe, fittings, linings, coatings, and any manufacturer’s installation instructions showing conformance with the applicable standard.

   Shop drawings shall include a laying plan showing the location of each pipe section and each special length with each piece numbered or otherwise designated in sequence. Laying plans shall be submitted for all welded steel and ductile iron pipe and underground PVC pipe. All outlets and bends shall be installed where located on the Drawings unless otherwise approved.

2. **Certification**
   Certification properly executed by the manufacturer shall be furnished to the Engineer showing compliance to the required Specifications and applicable standards. Test data on tests performed shall be provided as requested by the Engineer.

1.04 **HANDLING, STORAGE AND SHIPPING**

   A. Coated pipe shall be shipped on bunks, and secured with nylon belt tied down straps or padded banding located approximately over braces. Coated pipe shall be stored on padded skids, sand or dirt berms, sand bags, old tires or other suitable means so that coating will not be damaged. Coated pipe shall be handled with the wide belt slings, padded forks, or other means that will not damage the pipe. Chains, cables or other equipment likely to cause damage to the pipe or coating shall not be used. Prior to shipment, the pipe shall be visually inspected for damage to the coating. Any damaged areas shall be repaired in accordance with the standard to which the coating was applied.

   B. Pipe that shows evidence of exposure to sunlight, age, surface deterioration, or other physical damage is not acceptable. The decision of the Engineer shall be final as to the acceptability of the pipe to be installed. For pipe older than 24 months, the District will require information on the pipe storage during the period. The District reserves the right to reject pipe older than 24 months or to require retesting and recertification by the pipe manufacturer.

1.05 **DESIGN PRESSURES**

   A. The design pressure of pipe shown on the Drawings or in these Specifications is the minimum required static internal design pressure in pounds per square inch. The pipe shall be designed for this internal pressure, for earth loads, and for an AASHTO H-20 wheel load, all without exceeding the allowable design stresses. Pipe shall be designed for earth and wheel load both with and without internal pressure. In addition, pipe shall be designed for the test pressure specified herein without exceeding 50 percent of yield stresses or joint design pressures.
B. Pipe shall be designed for 150 psi working pressure with an additional 50 psi allowance for surge.

C. All fittings, couplings, valves, and other appurtenances shall be rated for the same or a higher design pressure as the pipe they are used on and shall withstand the test pressure without damage.

D. Provide thrust blocks or restrained joints at valves and fittings as shown or where not shown as necessary to prevent the movement or deflection of the pipe when under pressure. Thrust restraint design pressure shall be 200% of the pipe design pressure, or the test pressure, whichever is greater.

1.06 PIPE DIAMETERS

A. The pipe diameters shown on the Drawings and used in these Specifications are inside diameters unless specific reference is made to outside diameter of the pipe or the pipe is a standardized product normally designated by a nominal size, e.g., ductile iron pipe.

1.07 MARKING AT PLANT

A. Each pipe and fitting shall be marked at the plant. Marking shall include size or diameter and class of pipe or fittings, manufacturer’s identification, and date of manufacture.

1.08 INSPECTION

A. All pipe may be subject to inspection at the place of manufacture in accordance with the provisions of the referenced standards as supplemented by the requirements herein. The Contractor shall notify the District in writing of the manufacturing starting date not less than 14 calendar days prior to the start of any phase of the pipe manufacture. In addition, the Contractor shall give the District three (3) working days advance notice of the start of any surface preparation or coating application work.

B. During the manufacture of the pipe, the District shall be given access to all areas where manufacturing is in process and shall be permitted to make all inspections necessary to confirm compliance with the Specifications. Material, fabricated parts, and pipe that are discovered to be defective, or that do not conform to the requirements of this Specification, will be subject to rejection at any time prior to final acceptance of the pipe.
PART 2 – MATERIALS

2.01 PIPE

A. Pipe used in the construction of the raw water pump station shall be of the type shown on the Drawings. It shall be the regular product of a manufacturer who is fully experienced, reputable, and qualified in the manufacture of the materials to be furnished and has successfully manufactured comparable pipe for at least three (3) years.

1. Black Steel Pipe (under 6-inch diameter)
Black steel piping shall conform to the requirements of ASTM A53, Schedule 40 and shall be Grade B. Butt-welded flanged fittings shall conform to ASME B16.5.

Pipe, fittings and flanges shall be lined and coated with a fusion-bonded epoxy conforming to AWWA C213 and SECTION 09900 - PAINTING. Field application and repair of fusion bonded epoxy lined and coated pipe shall be performed in accordance with SECTION 09900 - PAINTING.

2. Stainless Steel Pipe
All stainless steel pipe shall be type 304/304L or as indicated on the Drawings. Pipe shall have welded construction with exception of 1/8” to 3/8” pipe sizes which shall be seamless. Pipe shall meet ASTM A733, ASTM A312, and ANSI/ASME B1.20.1.

3. Galvanized Steel Pipe
Galvanized steel pipe shall conform to the requirements of ASTM A53, Schedule 40 and shall be Grade B.

4. Black Steel Pipe (6 inch diameter and larger)
Steel pipe shall be designed in accordance with AWWA M11. Steel pipe shall be manufactured of steel plate of the thickness shown on the Drawings. Where not shown, the thickness shall be not less than 3/16 of an inch for pipe 24 inches in diameter and smaller, and not less than 1/4 of an inch for larger sizes unless otherwise approved by the Engineer.

Pipe materials, fabrication, and shop testing of straight pipe shall conform to the requirements of the "AWWA Standard for Steel Water Pipe 6 Inches and Larger" (AWWA C200). All outlets, 4 inches in diameter and larger, shall be provided with reinforcing designed for the water working pressure specified or shown. For pipe 14 inches in diameter and larger, the inside diameter after lining shall be not less than the nominal diameter specified or shown. Pipe smaller than 14 inches in diameter may be furnished in standard outside diameters.

Pipe, fittings and flanges shall be lined and coated with a fusion-bonded epoxy conforming to AWWA C213 and SECTION 09900 - PAINTING. Field application and repair of fusion bonded epoxy lined and coated pipe shall be performed in accordance with SECTION 09900 - PAINTING.
5. **Ductile Iron Pipe (DIP)**

Ductile iron pipe furnished in diameters three inches (3”) through twenty-four inches (24”) shall be manufactured in accordance with AWWA C151. Joints shall be single rubber gasket push-on joints in accordance with AWWA C111. All underground push-on joints shall be restrained joint pipe and fittings using U.S. Pipe TR FLEX or approved equal.

Where flanged joints are specified, pipe barrel shall be threaded and fitted with flanges in accordance with AWWA C115. Laying length shall be the manufacturer’s standard length, not to exceed 20 feet. Shorter lengths may be used when required for closures and proper location of special sections. Where the class is not indicated on the plans, the pipe shall be Class 350.

Pipe, fittings and flanges shall be cement mortar lined in accordance with AWWA C104. Field application and repair of cement mortar lined pipe shall be performed in accordance with AWWA C602. The outside coating shall be an asphaltic coating per AWWA C151.

Pipe and fittings shall be wrapped in polyethylene. Polyethylene wrapping shall be in accordance with AWWA C105. Minimum thickness shall be 0.008 inch (8 mils).

6. **Polyvinyl Chloride Pipe (PVC)**

   a. **Schedule 80 PVC**

Schedule 80 PVC pipe in sizes ½-inch to 8-inches shall conform to the latest revision of ASTM D1785, ASTM D2467 and ASTM D2665. The PVC pipe shall be manufactured in sections not to exceed 20-feet in length. The Contractor shall use either solvent weld or gasketed bell and spigot pipe. Pipe and couplings shall be US manufactured by Johns-Manville, Certainteed, or approved equal.

   b. **Chlorinated PVC (CPVC)**

CPVC pipe and fittings shall conform to ASTM D2846 and ASTM D1784 and be Schedule 40. Pipe and fittings shall be manufactured as a system and be the product of one manufacturer. Solvent cement joints shall be made in a two step process with primer manufactured for thermoplastic piping systems and solvent cement conforming to ASTM F493.

   c. **AWWA C900 & C905 PVC**

PVC pipe shall conform to the latest revision of AWWA C900 and C905 for diameters 4-inch through 12-inch and 12-inch through 30-inch respectively. The PVC pipe shall be manufactured in cast-iron O.D.’s and in sections not to exceed 20 feet in length. The Contractor shall use either plain end pipe with elastomeric couplings or gasketed bell and spigot pipe. The pipe shall be a minimum Class 150 (DR18) or as indicated on the Drawings. Pipe end couplings shall be US manufactured by Johns-Manville, Certainteed or equal.
d. **AWWA C909 PVC**
   PVC pipe shall conform to the latest revision of AWWA C909 for diameters 4-inch through 24-inch. The PVC pipe shall be manufactured in cast-iron O.D.'s and in sections not to exceed 20 feet in length. The Contractor shall use either plain end pipe with elastomeric couplings or gasketed bell and spigot pipe. The pipe shall be a minimum pressure class 165 psi. Pipe end couplings shall be US manufactured by Johns-Manville, Certainteed or equal.

7. **High Density Polyethylene Pipe (HDPE) and Fittings**
   a. **Drainage Applications**
      High-density polyethylene pipe and fittings shall be a minimum of DR-11, unless otherwise indicated on the Drawings and conform to AASHTO M294 or MP7-97 Type S or Type D with inside diameters of twelve inches (12") to sixty inches (60"). Pipe joints shall be bell and spigot or welded type, certified capable of watertight performance, with O-ring gaskets meeting ASTM Designation F477. The assembly of joints shall be in accordance with the pipe manufacturer's recommendations and requirements of ASTM Designation D3212. The quality of the material and installation shall meet or exceed the requirements of Section 61 and Section 64 of the CALTRANS Standard Specifications.

8. **Red Brass Pipe**
   Red Brass pipe shall be lead free, conform to ASTM B43 and be minimum class 150 lb.

9. **Copper Tubing**
   Copper tubing for use in underground water service shall be continuous-run (no joints) Type K soft copper tubing. Copper tubing for use in interior water service shall be Type K hard copper tubing and compression or lead-free solder sweat connections. Pipe shall conform to the latest revisions of AWWA C800, ASME B31, and ASTM B88.

10. **Corrugated Metal Pipe (CMP)**
    Corrugated metal pipe shall be steel pipe, shall conform to the requirements in AASHTO Designation M 36/M 36M, and shall be fabricated from zinc-coated steel sheet (AASHTO Designation M218). Corrugated steel pipe shall be fabricated with helical corrugations and with a continuous lock or weld seam extending from end to end of each length of pipe. Pipe that has been patched will be rejected.

11. **Reinforced Concrete Pipe (RCP)**
    Reinforced concrete pipe shall conform to the specifications of ASTM C76. Joints for concrete pipe shall be tongue and groove, bell and spigot or other approved type, and shall be of such a design that when properly laid, they shall have a smooth and uniform interior surface. Each joint shall be sealed to prevent leakage. Sealing materials shall consist of either cement mortar, rubber gasketed joints, or resilient materials conforming to Section 65 of the CALTRANS Standard Specifications.
1. **Flexible Suction Hose**
   Suction hose for use with the intake suction assembly shall be a flexible, non-collapsible hose capable of withstanding the negative gauge pressure on the suction of the intake pump. The hose shall be constructed with materials suitable for use in a raw potable water supply. The floating hose shall be compatible with the Megator Dolphin Strainer that is used for the intake in the river.

2.02 FITTINGS

A. **PVC Bell and Spigot Fittings**
   Socket or bell-and-spigot type PVC fittings shall be standard commercial products fabricated by molding or by extrusion and machining and shall conform to the requirements of ASTM D2241 and these Specifications. The manufacture of the fittings shall be in accordance with good commercial practice so as to produce fittings compatible with the type of PVC pipe furnished. Dimensions and tolerances of fitting joints shall conform to the tolerances of the PVC pipe furnished. The minimum burst strength of the fittings shall be not less than that of the adjacent pipe.

B. **Ductile Iron Fittings**
   Ductile iron fittings shall conform to the requirements AWWA C104, C110, C111. AWWA C153 compact fittings may also be used as an approved equal. Fittings shall be of a pressure class at least equal to that of the adjacent pipe.

C. **Black Steel Fittings**
   Fabricated fittings shall be made up of steel pipe, conforming to ASTM A53, 35,000 psi minimum yield strength, ¼ inch wall, except 20-inch diameter through 24-inch diameter, which shall be 3/8-inch wall. Welding fittings shall be seamless steel conforming to ASTM A234.

D. **Stainless Steel Fittings**
   Stainless steel fittings shall be made up of type 304/304L stainless steel unless otherwise indicated by the Drawings. Fittings shall conform to ASTM A351 and/or ASTM A733.

E. **Red Brass Fittings**
   Red Brass fittings shall contain less than 0.25% weighted average lead content and meet ASTM B62 and ASTM B584 or B927, as well as ASME B16.5 and B1.20.1 and be minimum class 150 lb
   Brass nipples and pre-cut pipe shall contain less than 0.25% weighted average lead content and meet ASTM B687 or ASTM B43.

F. **Copper Fittings**
   Copper fittings shall be lead free and meet ASTM B75, as well as ASME B16.22.
G. Polyethylene Molded Fittings
Molded fittings shall be manufactured and tested in accordance with ASTM D3261 and shall be so marked.

H. Reinforced Concrete Pipe Fittings
Fittings and specials for reinforced concrete pipe shall be shop fabricated. Fittings and specials shall be designed for the same internal and external pressures as the adjoining pipe or as shown. Fabrication details shall be submitted to the Engineer for review prior to the manufacture of fittings and specials.

Fittings may be fabricated from steel plate cement mortar-lined and coated, or from mitered end concrete pipe provided the maximum angle of any miter is 10 degrees (maximum 20-degree bend). Steel plate fittings shall conform to the dimensional requirements of AWWA C208, Table 2. Steel plate thickness shall be 3/16-inch minimum. Steel fittings shall be lined and coated in accordance with AWWA C205. Bell adapters shall be fabricated from steel plate and shall be accurately dimensioned for a rubber gasket joint. Mitered end concrete pipe fittings will be allowed only for A-25, B-25, and C-25 reinforced concrete pipe. All other classes of reinforced concrete pipe will require steel fittings as specified.

2.03 JOINTS AND COUPLINGS

A. Steel Pipe Butt Strap Joints

1. Butt-strap joints shall be used only where required for closures or where shown, or approved by the District.

B. Steel Pipe Lap Joints

1. Preparation for field welding shall be in accordance with AWWA C200.

2. Shop-applied interior linings and exterior coatings shall be held back from the ends of the pipe as indicated or as otherwise acceptable to the District.

3. The method used to form, shape and size bell ends shall be such that the physical properties of the steel are not substantially altered. Unless otherwise approved by the District, bell ends shall be formed by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. No process will be permitted in which the bell is formed by rolling. Faying surfaces of the bell shall be essentially parallel, but in no case shall the bell slope vary more than 2 degrees from the longitudinal axis of the pipe.
C. Steel Pipe Bell and Spigot Joints

1. The Contractor shall require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

2. The method used to form, shape and size bell ends shall be such that the physical properties of the steel are not substantially altered.

3. Unless otherwise approved by the District, bell ends shall be formed by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. No process will be permitted in which the bell is formed by rolling.

4. Unless otherwise approved by the District, spigot ends with rolled gasket grooves shall be non-destructively tested by the dye penetrant or magnetic particle method for the full circumference, especially at the weld seam area.

5. Faying surfaces of the bell and spigot shall be essentially parallel, but in no case shall the bell slope vary more than 2 degrees from the longitudinal axis of the pipe.

6. Actual yield strength of the steel used in the spigot rolling operation (i.e. yield strength values in mill certifications and subsequent destructive test results) shall be limited to 50,000 psi.

7. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself, will provide watertight joints under all operating conditions when properly installed.

D. Polyethylene Fusion Joints

Joints between plain end pipes and fittings shall be made by butt fusion. Joints between the main and saddle branch fittings shall be made using saddle fusion. Butt fusion shall be performed between pipe ends, or pipe ends and fitting outlets that have the same outside diameter and are not different in wall thickness by more than one Standard DR. Transitions between unlike wall thickness greater than one SDR shall be made with a transition nipple or by mechanical means or electrofusion. External and internal beads shall not be removed. The butt fusion and saddle fusion procedures used shall be procedures that are recommended by the pipe and fitting Manufacturer. The contractor shall ensure that persons making heat fusion joints have received training in the Manufacturer’s recommended procedure.
**E. High Deflection Couplings for Polyvinyl Chloride Pipe**

High deflection couplings shall be manufactured of extruded PVC coupling stock. Couplings shall meet the requirements of AWWA C900 Municipal Water Pipe. Couplings shall be High Deflection Stop Couplings by Certainteed or equal.

**F. Flanged Coupling Adapters**

Flanged coupling adapters shall be wrought steel or cast iron capable of withstanding the designated internal pressure without leakage or overstressing. Diameter of the coupling shall be compatible with the outside diameter of the pipe on which the coupling is installed. Furnish all joint accessories with couplings. Verify dimensions of all existing pipelines in the field before ordering couplings.

Steel style flanged couplings shall consist of a steel body, steel or malleable iron follower rings, and steel bolts. Steel flanged coupling shall be as manufactured by Rockwell International, Inc.; Dresser Manufacturing Division of Dresser Industries, Inc.; or equal.

Cast style flexible coupling shall consist of a cast iron middle ring, malleable iron follower rings, and steel bolts. Cast flexible couplings shall be as manufactured by Rockwell International, Inc.; Dresser manufacturing Division of Dresser Industries, Inc.; Romac Industries, Inc.; or equal.

**G. Flexible Couplings**

Flexible couplings for use with steel pipe shall be Dresser, Style 38; Rockwell, Style 411; or equal. Flexible couplings for use with ductile iron pipe shall be Dresser, Style 53, 153, or 38; Rockwell, Style 431; or equal. Steel middle rings shall be pressure tested beyond the yield point. Verify dimensions of all existing pipe.

Cast style flexible coupling shall consist of a cast iron middle ring, malleable iron follower rings, and steel bolts. Cast flexible couplings shall be as manufactured by Rockwell International, Inc.; Dresser manufacturing Division of Dresser Industries, Inc.; Romac Industries, Inc.; or equal.

**H. Transition Couplings and Expansion Joints**

Flexible transition couplings shall be bolted, with ductile iron sleeve and end rings, Ford Model 501, Dresser No. 153, or Rockwell No. 431. Flexible expansion joints shall have fully molded arches. Diameter of the coupling shall be compatible with the outside diameter of the pipe on which the coupling is installed. Furnish all joint accessories with Flexible Couplings.

**I. Mechanical Joint Restraints**

Restraint devices for mechanical joint fittings and appurtenances shall conform to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53 and the following:

1. Restraint devices for nominal pipe sizes 3 inch through 48 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.
2. The devices shall have a working pressure rating of 350 psi for 3-16 inch and 250 psi for 18-48 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

3. Joints between PVC pipe and cast-iron valves or fittings shall be mechanical joint or approved equal.

4. Gland body wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536. Restraint devices shall be Listed by Underwriters Laboratories (3” through 24” inch size) and Approved by Factory Mutual (3” through 12” inch size).

Mechanical joint restraints for ductile iron pipe shall be Megalug Series 1100 produced by EBAA Iron Inc. or approved equal. Mechanical joint restraints for PVC C900 & C905 pipe shall be Megalug Series 2000 produced by EBAA Iron Inc. or approved equal.

J. Flanges
Flanges shall have flat faces. Pipe flanges shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise shown. All flanges shall conform to AWWA C207, Class E, or AWWA C110 Section 10-18 for ductile iron fittings.

K. Gaskets
Flange gaskets shall be 1/8" thick minimum, full-faced, cloth impregnated in accordance with applicable parts of ANSI B16.21 and AWWA C207, as last amended. Gaskets shall have holes to pass bolts, and be free from corrosive alkali or acid ingredients. Segmented straight-joint or interlocking gaskets will not be accepted.

L. Nuts, Bolts and Washers
Nuts, bolts and washers shall conform to AWWA C207 the sizes and quantities recommended in Section 2 of AWWA C207. Bolts shall be threaded to conform to Unified National Coarse (UNC) Coast Thread Series.

Nuts, bolts, and washers shall be carbon steel, cadmium plated, of domestic origin and conform to ASTM A563 Grade B, ASTM A307 - Grade B, and ASTM F844 respectively. Cadmium plating shall conform to Federal Specification QQ-P-415-1956, Type 1, Class 1.

2.04 APPURTENANCES

A. Service Saddles
For aboveground dry tap connections, strap saddles shall be bronze or brass bodied with stainless steel straps or a full circle bronze body clamp double bolted to each side of the saddle for pipe sizes 6 inch through 12 inch.

A fabricated two part carbon steel saddle shall be used for wet tap connections. The carbon steel used in the saddle shall have a minimum yield strength of 30,000 psi. The bolts and nuts shall be stainless steel, Type 316. The entire sleeve shall be shop
coated with a minimum of 8 mils of fusion bonded powder epoxy in accordance with AWWA C213. No wet taps will be allowed where the outlet is the same size as the main. Fabricated steel and cast iron saddles shall have a minimum ½ inch welded thread-o-let or 3000 lb. half-coupling for testing.

B. Butyl Rubber Tape Wrap
Tape wrap shall be 15 mil butyl rubber adhesive, polyethylene-backed tape as produced by Polyken Division of the Kendall Company, Boston, MA; Royston Laboratories, Inc., Pittsburgh, PA; or equal.

C. Joint Lubricant
Furnish joint lubricant with the pipe. Furnish the amount and type recommended by the pipe manufacturer. The lubricant for water pipes shall be a water-soluble, nontoxic, vegetable soap compound conforming to United States Pharmacopeia No. P39.

D. Feeler Gauge
Furnish sufficient feeler gauges of the proper size, type, and shape for use during installation to check the rubber gaskets.

E. Concrete for Thrust Blocks and Concrete Encasement
Concrete shall conform to SECTION 03300 - CONCRETE.

F. Adjustable Pipe Support
Adjustable pipe supports shall be 3-inch diameter stand with 2½-inch pipe diameter pipe supports, and yolk as shown on the Drawings. All exposed pipe support material/parts shall be constructed from galvanized steel. Manufacturer shall be Grinnell, Tripac, Pipeline Products Model PSG-S, Standon Model C92, or approved equal.

G. Flange Insulation Kits
Provide flange insulation kits consisting of:

1. Insulating Gaskets
Gaskets shall be fullfaced, 1/8-inch minimum thickness, and laminated phenolic with neoprene gaskets on each side. Insulating gaskets shall be Johns-Manville No. 71 dielectric sheet packing, Raybestos-Manhattan No. 73, or equal.

2. Insulating Stud Sleeves for Each Bolt
Sleeves shall be a high-density polyethylene or spiral wrapped mylar.

3. Insulating Washers for Each Bolt
Washers shall be 1/8-inch thick phenolic.

4. Steel Washers Over Each Insulating Washer
1/8-inch thick cadmium plated. One-piece molded acetal resin, combination sleeve and washers are acceptable.
2.05 LOCATING WIRE

A. Where called for on the Drawings, locating wire shall be No. 10 A.W.G. insulated copper wire. Insulation shall be 1/16-inch PVC.

2.06 WARNING TAPE

A. Where called for in the Drawings, a non-detectable warning tape for the water line shall consist of a nominal 4.0 mil (0.004") overall thickness of polyethylene film formulated to resist degradation due to acid and alkaline soils. The color of the water line tape shall be blue and in black bold letters printed "CAUTION - WATER LINE BELOW." The tape shall be Hytech Non-Detectable Tape provided by Northtown Company or equivalent.

2.07 POLYETHYLENE WRAP

A. All underground steel and ductile iron pipe and fittings shall be wrapped in polyethylene film. The polyethylene wrap shall be 8 mil minimum in thickness, group 2, linear low density, flat tube, virgin polyethylene film. The wrap shall meet or exceed the requirements of AWWA C105. The wrap shall be secured with 10 mil plastic tape. The film shall be marked showing trademark, year of manufacture, type of resin, specification conformance applicable pipe sizes and the words “warning corrosion protection – repair any damage.”

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION AND BACKFILL

A. Contractor shall conform to EID Standard Specifications 31 23 33 TRENCH EXCAVATION, BACKFILL AND COMPACTION for all trench work.

3.02 PREPARATION AND HANDLING

A. All pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer’s recommendations and according to accepted water works practice. Each section of pipe and each fitting shall be thoroughly cleaned out before it is installed. All pipe, fittings, and appurtenances, shall be carefully lowered into the trench by suitable tools or equipment in such a manner as to prevent any damage, particularly to the lining and coating. When required by the District, approved slings shall be used to lower the pipe. Under no circumstances shall pipe or accessories be dropped into a trench. All pipe, fittings and appurtenances, shall be examined for defects before lowering into the trench. Any defective, damaged, or unsound materials shall be rejected.
3.03 DIRECTION OF LAYING

A. On slopes of 10 percent or less, the pipe may be laid in either direction on the slope. On slopes exceeding 10 percent, the pipes shall be laid in the uphill direction, unless otherwise permitted by the Engineer. For pipes with push-on joints, the bell end shall normally face the direction of laying.

3.04 ALIGNMENT

A. Pipelines intended to be straight shall be so laid, and in no case shall deviation from a straight line exceed 0.30 foot for line and 0.10 foot for grade from the line and grade shown on the Drawings. Where pipelines are to be laid on a curve by means of unsymmetrical closure of spigot into bell, the pipe may be deflected at the joints. Under no circumstances shall the deflection exceed the maximum allowable as recommended by the pipe manufacturer. At no time shall horizontal or vertical deflections be achieved by pulling the pipe.

B. Where horizontal or vertical curves are shown in the alignment which cannot be installed by joint deflection of standard pipe lengths, the Contractor with the Engineer’s approval, may select from the following options:

1. Use shorter pipe lengths and allowable joint deflection as specified.

2. Use special mitered joints.

3. Use standard or special fabricated bends.

4. Use high deflection couplings.

C. If alternates two or three are used, thrust blocking may be required. If the Engineer determines that thrust blocking is necessary, it shall be furnished at no additional cost to the District.

3.05 LAYING AND JOINTING PIPE AND FITTINGS

A. Materials used in jointing pipe shall only be that furnished with the pipe or recommended by the manufacturer. Pipe laying shall proceed with the bell ends pointing upstream. After a selection of pipe has been lowered into the prepared trench, clean the end of the pipe to be joined, the inside of the joint, and the rubber ring immediately before joining the pipe. Make assembly of the joint in accordance with the recommendations of the manufacturer. Provide all special tools and appliances required for the jointing assembly.

B. The gasket position shall be checked with a feeler gauge, furnished by the pipe manufacturer, to assure proper seating. After the joint has been made, check pipe for alignment and grade. Apply sufficient pressure in making the joint to assure that the
joint is "home," as defined in the standard installation instructions provided by the pipe manufacturer. To assure proper pipe alignment and joint makeup, place sufficient pipe zone material to secure the pipe from movement before the next joint is installed.

C. Take the necessary precautions required to prevent excavated or other foreign material from entering the pipe during the laying operation. At all times, when laying operations are not in progress, at the close of the day's work, or whenever the workers are absent from the job, close and block the open end of the last laid section of pipe to prevent entry of foreign material or creep of the gasketed joints.

D. Take all precautions necessary to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.

E. Flexible expansion joints shall be installed against full-face flanges on each side of joint to protect fitting from cracking.

F. The raised face on steel flanges must be removed for all connections to cast iron flanges.

G. All exposed nuts, bolts and threads (except stainless steel) to be buried underground shall be painted with bitumastic paint or approved equal after nuts are tightened. All buried underground fittings shall be wrapped tightly with polyethylene film held securely in place with adhesive tape.

3.06 UNSUITABLE CONDITIONS FOR LAYING PIPE

A. Do not lay pipe in water, or on an unstable trench bottom, or when in the opinion of the Engineer, trench conditions are unsuitable.

3.07 PIPE CUTTING

A. When necessary to cut pipe, it shall be neatly and squarely cut to length using methods recommended by the manufacturer. All field-cut PVC shall be beveled and lubricated before joining.

3.08 COPPER TRACING WIRE

A. All runs of non-metallic pipe shall have locating wire laid along the top of the pipe and at all valves and appurtenances and held in place with ties or hitches of the same kind of wire, except RCP pipe used for storm drains or overflow lines. The wire shall be stubbed up inside each valve box and be placed as shown in the Drawings. The ties or hitches shall be spaced not more than 20 feet apart. The copper wire is to be used in the future as a means of locating the pipe with an electronic-type pipe locator. The copper wire shall be brought to the surface in each valve box so a direct connection can be made to the electric pipe locator. Care shall be taken to insure no "open" circuits occur. Electrical wire nuts will be an acceptable method of connection. Such joints will
be taped and coated to prevent corrosion from damaging connections. Splice tracing wire by stripping insulation and twisting bare copper wires together and soldering or electrical wire nuts may be used to form a permanent connection. Wrap connection with standard black electrical tape.

3.09 THRUST BLOCKS

A. All pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist shall be thrust restrained as shown or specified.

B. Thrust blocks shall be installed such that the thrust block shall extend from the fitting to undisturbed soil, and shall be of such bearing area as to assure adequate resistance to the force to be encountered. Minimum size of thrust blocking shall be in accordance with the standard detail shown in the Drawings. The excavation configuration and soil conditions may require additional concrete. Additional concrete shall be furnished and installed as a part of the contract prices.

C. Thrust blocks shall be kept clear of the joints so that the pipe and fitting joints will be accessible for repairs, unless otherwise directed. Side forms shall be used to contain the concrete. The concrete shall be placed in accordance with SECTION 03300 - CONCRETE.

3.10 CONCRETE ENCASEMENT

A. Concrete encasement shall be installed as indicated on the Drawings. All pipe to be encased shall be suitably supported and blocked in proper position, and shall be anchored to prevent flotation.

B. Except for welded joint pipe, a flexible joint shall be provided within 18 inches and as shown on the Drawings, from the terminations of any concrete encasement.

3.11 DISCONTINUED PIPE LAYING

A. Whenever pipe laying is discontinued for an hour or more, the open end of all mains and fittings shall be closed with watertight plugs or bulkheads. The plug or bulkhead shall not be removed unless, or until, the trench is dry. Pipe shall not be laid when the condition of the trench or the weather is unsuitable.

3.12 BEVELED PIPE

A. Sections of pipe with one or both ends beveled may be used for curved alignment. Beveled pipe shall have a maximum deflection of five (5) degrees from a plane perpendicular to the pipe axis unless otherwise shown on the Drawings or approved by the Engineer.
3.13 WELDING

A. No welding of ductile iron or cast iron pipe is permitted.

B. Field welded joints shall be in accordance with AWWA C206 and the provisions of AWS D1.1. Where exterior welds are performed, adequate space shall be provided for welding and inspection of the joints.

C. During installation of welded steel pipe in either straight alignment or on curves, the pipe shall be laid so that the lap joint clearance, at any point around the circumference of the joint, shall comply with the requirements of AWWA C206.

D. Unless double fillet welds are indicated, field welded lap joints may, at the Contractor’s option, be made on either the inside or the outside of the pipe.

E. Butt straps, where used or required, shall be a minimum of 6 inches wide, the same thickness as the pipe wall and shall provide for a minimum of 3/4 inch lap at each pipe joint.

F. The pipe ends shall be cut straight on joints where butt straps are used for realignment, adjustment, or deflection, and fillet welds shall be made as indicated.

G. After the pipe and pipe joint are properly positioned in the trench, the length of pipe between joints shall be backfilled to at least 1 foot above the top of the pipe. Care shall be exercised during the initial backfilling to prevent movement of the pipe and to prevent any backfill material from being deposited on the joint.

H. Prior to the beginning of the welding procedure, any tack welds used to position the pipe during laying shall be removed. Any annular space between the faying surfaces of the bell and spigot shall be equally distributed around the circumference of the joint by shimming, jacking, or other suitable means. The weld shall then be made in accordance with AWWA C206. Where more than one pass is required, each pass except the first and final one shall be peened to relieve shrinkage stresses; and all dirt, slag, and flux shall be removed before the succeeding bead is applied.

I. As soon as practicable after welding of each joint, all field-welded joints shall be tested by the liquid penetrant inspection procedure conforming to the requirements of ASTM E165 under Method “B” and “Leak Testing” at the expense of the Contractor. All defects shall be chipped out, rewelded and retested at no additional cost to the District.

J. Following tests of the joint, the exterior joint spaces shall be coated in accordance with these specifications and SECTION 09900 – PAINTING after which backfilling may be completed.
3.14 CEMENT MORTAR COATING OF STEEL PIPE

A. The interior and exterior joint recesses shall be thoroughly wiped clean and all water, loose scale, dirt and other foreign material shall be removed from the inside surface of the pipe.

B. The cement for joint grout and mortar shall be portland cement acceptable under ASTM C150 and shall be of the same type used for the pipe coating.

C. After the pipe has been laid and after sufficient backfill has been placed between the joints to hold the pipe securely in place, the outside annular space between pipe sections shall be completely filled with grout formed by the use of polyethylene foam-lined fabric bands. The grout shall be composed of one part cement to not more than 2 parts sand, thoroughly mixed with water to a consistency of thick cream.

D. The grout space prior to filling shall be flushed with water so that the surface of the joint to be in contact with the grout will be thoroughly moistened when the grout is poured.

E. The joint shall be filled with grout by pouring from one side only, and shall be rodded with a wire or other flexible rod or vibrated so that the grout completely fills the joint recess by moving down one side of the pipe, around the bottom of the pipe and up the opposite side. Pouring and rodding the grout shall be continued to allow completion of the filling of the entire joint recess in one operation.

F. Grouting of the outside joint spaces shall be kept as close behind the laying of the pipe as possible except that in no case shall grouting be closer than 3 joints of the pipe being laid.

G. The grout bands or heavy-duty diapers shall be polyethylene foam-lined fabric with steel strapping of sufficient strength to hold the fresh mortar, resist rodding of the mortar and allow excess water to escape. The foam plastic shall be 100 percent closed cell, chemically inert, insoluble in water and resistant to acids, alkali and solvents. The fabric backing shall be cut and sewn into 9-inch wide strips with slots for the steel strapping on the outer edges. The polyethylene foam shall be cut into strips 6 inches wide and slit to a thickness of 1/4-inch which will expose a hollow or open cell surface on one side. The foam liner shall be attached to the fabric backing with the open or hollow cells facing toward the pipe. The foam strip shall cover the full interior circumference of the grout band with sufficient length to permit an 8-inch overlap of the foam at or near the top of the pipe joint. Splices to provide continuity of the material will be permitted. The polyethylene foam material shall be protected from direct sunlight. The polyethylene foam-lined grout band shall be centered over the joint space with approximately equal widths extending over each pipe end and securely attached to the pipe with steel straps. After filling the exterior joint space with cement grout, the flaps shall be closed and overlapped in a manner that fully encloses the grout with polyethylene foam. The grout band shall remain in position on the pipe joint.
3.15 CEMENT MORTAR LINING OF STEEL PIPE

A. After the backfill has been completed to final grade, the interior joint recess shall be filled with mortar of stiff consistency mixed in proportions of one part cement to 2 parts sand.

B. The mortar shall be tightly packed into the joint recess and troweled flush with the interior surface, and all excess shall be removed.

C. At no point shall there be an indentation or projection of the mortar exceeding 1/16-inch.

D. The interior lining of the CMLC pipe at field welded joints or bell and spigot joints shall be repaired by buttering the inside of the joint, pushing the pipe ends together, and then pulling a burlap wrapped ball through the joint which forces the mortar up into the joint creating a seamless mortar lining at the joint between the shop applied mortar lining of both pipe segments.

E. These joints shall be video-taped by the District or hand holes shall be provided at each joint, all at no additional cost to the District.

F. The Contractor shall perform all work in a thorough and workmanlike manner by trained personnel, under the supervision of experienced personnel skilled in machine application of cement-mortar lining to pipelines of size comparable to this work.

G. Curing of the in-place cement-mortar lining shall be in accordance with AWWA C602.

H. The Contractor shall provide additional protective devices as required to ensure that the airtight covers, which maintain a moist condition in the pipeline, are not damaged.

I. Defective areas encompassing the full diameter of the pipe shall be replaced by machine wherever the length measured along the pipe centerline is greater than 5 feet; otherwise defective areas may be replaced by hand.

3.16 STEEL PIPE RUBBER GASKETED JOINTS

A. Immediately before jointing pipe, the spigot end of the pipe shall be thoroughly cleaned, and a clean rubber gasket lubricated with a NSF approved vegetable-based lubricant shall be placed in the spigot groove.

B. The volume of the gasket shall be “equalized” by moving a metal rod between the gasket and the spigot ring around the full circumference of the spigot ring.

C. The bell of the pipe already in place shall be carefully cleaned and lubricated with a NSF approved vegetable-based lubricant. The spigot of the pipe section shall then be inserted into the bell of the previously laid joint and telescoped into its proper position.
D. Tilting of the pipe to insert the spigot into the bell will not be permitted.

E. After the pipe units have been joined, a feeler gauge shall be inserted into the recess and moved around the periphery of the joint to detect any irregularity in the position of the rubber gasket. If the gasket cannot be “felt” all around, the joint shall be disassembled. If the gasket is undamaged, as determined by the District, it may be reused, but only after the bell ring and gasket have been relubricated.

3.17 THREADED JOINTS

A. Threaded joints, for service connections, air release assemblies, etc., shall be made with Teflon Plumber’s Tape.

3.18 REINFORCED CONCRETE PIPE JOINTS

A. Each joint shall be sealed to prevent leakage. Joints sealed with cement mortar or resilient materials, shall be sealed both inside and outside.

B. If cement mortar is used in sealing the joint, the sealed joint shall be protected and cured in a manner approved by the Engineer. If the sealing material will not adhere to the pipe, or if a portion of the outside of the joint is inaccessible, the Contractor shall use a “diaper” or other method approved by the Engineer to properly seal the joint.

C. Immediately prior to making a cement mortar joint, the tongue and inside of the groove shall be thoroughly wetted with clean water.

3.19 WARNING TAPE FOR WATER LINE

A. Non-detectable warning tape shall be placed on top of the twelve (12) inch backfill covering the water line.

3.20 PIPE HYDROSTATIC TESTING

A. All pipe and appurtenances shall be hydrostatically tested. See SECTION 15950 - PERFORMANCE TESTING AND FACILITY STARTUP for testing requirements.

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE

A. This section covers the work necessary for furnishing and installing globe valves, gate valves, check valves, pump control valves, corporation stops, ball valves, combination air/vacuum valves, valve boxes and all related appurtenances, complete.

B. Certification with NSF Standard 61 shall be provided by the National Sanitation Foundation for all new valving and related appurtenances used in the production or distribution of drinking water in contact with drinking water including contact with raw water to be treated.

1.02 SUBMITTALS

A. Complete specifications, data, and catalog cuts or drawings covering the items furnished under this section shall be submitted by the Contractor.

PART 2 - MATERIALS

2.01 GENERAL

A. The Contractor shall furnish and install all valves as shown and specified. All valves shall be designed for and have a working pressure class rating equal to or greater than the design pressure for the adjoining pipe. Valves shall be capable of withstanding the field test pressure of the connecting piping without damage. All valves of one type and class shall be provided by the same manufacturer.

B. Each valve body shall be shop tested under a test pressure equal to twice its design water-working pressure, by the manufacturer, unless otherwise specified.

2.02 BUTTERFLY VALVES

(NOT USED)

2.03 GATE VALVES - 3 INCHES OR SMALLER

A. Conform with EID Standard Specification 40 05 61 and this section.
B. Gate valves 3-inches and smaller shall be ASTM B62 bronze-bodied, with integral seat and union-ring bonnet and copper-silicon bronze stems. Gate valves shall have solid bronze wedge discs with full-open ports and asbestos free packing. Gate valves shall be rated to a minimum of 250 psig working pressure. Gate valves shall be manufactured by Crane Valve, Nibco, Powell or an approved equal.

2.04 GATE VALVES - 4 INCHES OR LARGER

A. Conform with EID Standard Specification 40 05 61 and this section.

B. Gate valves shall fully comply with the latest revision of AWWA C509, and shall also be UL listed and FM approved. Unless otherwise shown on the Drawings, valves shall be furnished with flanged, push-on or mechanical joints. The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification. The valve shall have a minimum 250 psig working pressure. Valves shall be fully faced and drilled in accordance with ANSI Standards B16.1, Class 125.

C. The valve body, bonnet, stuffing box, and disc shall be composed of ASTM A126 Class B grey iron or ASTM A395 or A536 ductile iron. The body and bonnet shall also adhere to the minimum wall thickness as set forth in Table 2, section 4.3.1 of AWWA C509. Wall thickness less than those in Table 2 are not acceptable. The valve disc and guide lugs must be fully (100%) encapsulated in SBR ASTM D2000 rubber material. The valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550.

D. Unless otherwise shown on the Drawings, valves for underground service shall be NRS (non-rising stem), provided with a 2" square operating nut and valves for aboveground service shall be NRS (non-rising stem), provided with a handwheel. Valves shall open counter-clockwise (CCW) and have an arrow cast on the operating nut or handwheel showing CCW opening direction. The valve stem shall be made of bronze ASTM B132 alloy C67600 bar stock material. The stem material shall provide a minimum 70,000 psi tensile strength with 15% elongation and yield strength of 30,000 psi. Valves with cast stems or two piece stem collars are not acceptable. The valves shall have bolts and nuts for the stuffing box and bonnet with one of the following compositions: Steel, ASTM A307, Grade B zinc plated, and Type 304 stainless steel, and Type 316 stainless steel. Gate valves shall be manufactured by Cla-Val, Dresser, DeZurik, Clow, Mueller, Pratt, or approved equal.

2.05 CHECK VALVES

A. Check valves shall be rated to a minimum of 250 psig working pressure. Flanged valves shall be fully faced and drilled in accordance with ANSI Standards B16.1, Class 125. The valves shall have all internal and external ferrous surfaces coated with a fusion
bonded thermosetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550. Check valves shall open to permit flow when the inlet pressure is greater than the discharge pressure. When the discharge pressure is greater the valve shall close drip tight to prevent return flow. Check valves shall be suitable for installation in horizontal or vertical orientation.

2.06 GLOBE VALVES

A. Globe valves shall be Class 125 resilient seat and have outside screw and yokes with rising stem and be equipped with wheel handles. Unless otherwise specified on Drawings, valves shall be furnished with flanges. Globe valves shall be manufactured by Mueller, Apollo Valve, Nibco, or approved equal.

2.07 BALL VALVES

A. Ball valves shall be bronze and manufactured by Mueller, Nibco, Apollo Valve, Watts or equal.

2.08 COMBINATION AIR-VACUUM AND AIR RELEASE VALVES

A. Conform with EID Standard Specifications 40 05 78.13.

B. The location, inlet size, and valve type are shown on the Drawings. Pipe and fittings used to connect valves shall be as indicated on the Drawings, stainless steel, brass, black steel pipe.

C. Valves shall be manufactured and tested in accordance with AWWA C512. Valves 3 inches and smaller shall be threaded with NPT inlets and outlets. The body inlet connections shall be hexagonal for a wrench connection. Larger valves shall have ANSI Class 125 flanged inlets. The valves shall have two additional NPT connections for the addition of gauges, testing, and draining.

D. The covers shall be bolted to the valve body and sealed with a flat gasket. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating. Floats shall be unconditionally guaranteed against failure including pressure surges. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure. A stainless steel screened outlet and protective hood shall be provided when valve is located outdoors to prevent debris from entering the valve.

E. Valve interiors and exteriors shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550 when in contact with potable water.

F. The valve body and covers shall be constructed of ASTM A126 Class B cast iron for working pressures up to 300 psig. Higher pressure rated valves shall be constructed of ASTM A536 Grade 65-45-12 ductile iron.
2.09 BRONZE APPURTENANCES

A. Unless otherwise specified, all interior bronze parts of valves except gate valve stems shall conform to the requirements of the "Specification for Composition Bronze or Ounce Metal Castings" (ASTM B62). Gate valve stems shall be of bronze containing not more than 5 percent of zinc nor more than 2 percent of aluminum, and shall have a minimum tensile strength of 60,000 psi, a yield strength of 40,000 psi, and an elongation of at least ten percent in 2 inches, as determined by a test coupon poured from the same ladle from which the valve stems to be furnished are poured.

2.10 VALVE OPERATORS

A. Valve operators shall be of the ACME screw, traveling-nut type, sealed, gasketed, and lubricated for underground service. The operators shall be designed to meet the input torque requirements of AWWA C504 with a maximum pull of 80 pounds on a handwheel and a maximum input of 150 foot-pounds on an operating nut. They shall be capable of withstanding an overload torque of 450 foot-pounds at full-open or full-closed position without damage to the valves or valve operators. They shall be designed to resist submergence in water to 10-foot head pressure.

B. All valves shall open counterclockwise. Valves to be installed in vaults shall be equipped with hand wheels at locations shown on the Drawings.

C. All buried valves shall be equipped with a 2-inch operating nut. Operating nuts shall comply with the requirements of AWWA Specification C500, where applicable.

2.11 VALVE OPERATING EXTENSION

A. A valve operating extension shall be required whenever the valve is installed such that the operating nut is more than 32 inches below finished grade. The valve operating extension shall be constructed of steel with a 2-inch square operating nut.

2.12 WATER VALVE BOXES

A. Water valve boxes shall be Christy G-5 or Brooks 1 RT, having a cast iron face and cast iron traffic lid. Covers shall be marked "WATER", and shall have a loose fit in the box. Valve box risers shall be fabricated from 8-inch diameter PVC pipe.

2.13 DRAIN VALVE BOXES

A. Drain valve boxes shall be Christy B-48 utility boxes or equal. Valve boxes shall be high density reinforced concrete with non-settling shoulders. Covers shall be 2 piece reinforced concrete. Valve box risers shall be reinforced concrete.
2.14 PRESSURE GAUGES

A. General purpose pressure gauges shall be accurate to 2 ½% of span (ASME B40.100 Grade A) with bourdon tube. The bourdon tube of the gauge shall be made from a lead-free copper alloy. The case and bezel ring shall be constructed of stainless steel. Dials shall be 2-1/2” in diameter with a black aluminum pointer and a white ABS gauge face with black print. The gauge shall be filled with 99.7% liquid glycerin. The bottom mount process connection shall include a snubber as a separate component. The process connection shall be 1/4” stainless steel. Pipe and fittings used to connect pressure gauges shall be as indicated on the Drawings. The pressure gauge shall be Wika Type 213.53DW or approved equal.

2.15 SAND SEPARATOR WITH AUTO PURGE

A. The sand separator shall be a High Efficiency Liquid-Solid Separator, model eJPX-0055-V, vertical orientation, with 1-1/2” connections, manufactured by LAKOS.

B. The sand separator shall be equipped with an auto purge system. The SmartPurge Sensor (model LS-972) shall be used to detect solids levels and an automated Purge Valve (model AKE Pinch Valve LS-729) manufactured by LAKOS shall be controlled through the main PLC from a signal from the SmartPurge to open and close the Purge Valve when required.

PART 3 - EXECUTION

3.01 GENERAL

A. Valve-operating units, stem extensions and other accessories shall be furnished and installed by the Contractor where shown, or where required in the opinion of the Engineer to provide for convenience in operation. Where buried valves are indicated, the Contractor shall furnish and install valve boxes to grade. All valves shall be new and of current manufacture.

3.02 VALVES

A. Before installation, the valves shall be thoroughly cleaned of all foreign material, and shall be inspected for proper operation, both opening and closing, and to verify that the valves seat properly. Valves shall be installed so that the stems are vertical, unless otherwise directed by the Engineer. Jointing shall conform to AWWA C600 or AWWA C603, whichever is applicable. Valves shall be installed as depicted on the Drawings. Joints shall be tested with the adjacent pipeline. If joints leak under test, valves shall be disconnected and reconnected, and the valve and/or the pipeline retested.
B. Faces of flanges shall be cleaned thoroughly before flanged joint is assembled. After cleaning, the gasket shall be inserted and the nuts tightened uniformly around the flange. If flanges leak under test, the nuts shall be loosened, the gasket reset or replaced, the nuts retightened, and the valve and/or pipeline retested.

3.03 VALVE BOXES

A. Center the valve boxes and set plumb over the wrench nuts of the valves. Set valve boxes so that they do not transmit shock or stress to the valves. Set the valve boxes and covers in accordance with the Drawings. Cut stem extensions to the proper length so that the valve box does not ride on the stem extension when set at grade.

B. Backfill for water valve boxes shall be the same as specified for the adjacent pipe. Backfill drain valve boxes with crushed rock as shown on the Drawings. Place backfill around the valve boxes and thoroughly compact to a density equal to that specified for the adjacent trench and in such a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed, and backfilled at the Contractor’s expense.

3.04 VALVE TESTING

A. All valves shall be operated and hydrostatically pressure tested in the field. Refer to SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP for testing requirements. Valves may be operated while filling the pipe for hydrostatic testing or as a separate step. Valves must open and close smoothly with full design pressure on upstream side and atmospheric pressure on downstream side. Test mainline valves for smooth operation will full design hydrostatic pressure on both sides of valve.

B. After hydrostatic test, operate all drain valves under design static hydraulic pressure to verify that they operate correctly. Valves must open and close smoothly and seat watertight. Repair all defective drain valves and retest at design static hydraulic pressure. Additional crushed rock and erosion control may be required based on actual flow patterns.

C. During filling, check all air and vacuum valves to verify that they are operating correctly. Operate all service valves (but not isolation valves) on air and vacuum valves, under design hydrostatic pressure to ensure that they open and close smoothly. Repair any defective valves.

END OF SECTION
DIVISION 15 MECHANICAL

HORIZONTAL SELF-PRIMING CENTRIFUGAL PUMP

SECTION 15137

PART 1 – GENERAL

1.01 SCOPE

A. This section covers the work necessary to furnish and install two (2) self-priming centrifugal pump(s), capable of pumping 100 gallons per minute against 76.2 feet of head and capable of pumping water containing river sand. Each pump is to consist of the motor, pump casing, and fabricated steel vertical V-belt base including all other appurtenances needed to make the booster pump a functional unit, complete. Each pump shall be driven by a 7.5 horsepower, 4-pole, 3-phase, 480 volt, NEMA premium efficient, invert duty, TEFC motor. The pump supplier shall provide a complete unit including, pump, motor, OSHA coupling guard and skid frame.

B. The Contractor is responsible for providing all equipment necessary for field and pump performance testing. See SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP for additional requirements.

1.02 SUBMITTALS

A. Performance curves showing total dynamic head, bowl efficiency, plant efficiency, including all pump losses and descriptive literature, shall be furnished for approval. The Contractor shall also furnish detailed drawings clearly depicting dimensions of all the materials of construction for the proposed pump and motor. The drawings shall contain dimensions and materials of construction for all components to be furnished.

B. The Contractor shall furnish the Engineer with complete manuals pertaining to the installation, operation and maintenance of the furnished equipment.

1.03 PERFORMANCE CRITERIA

A. The pump manufacturer must be ISO 9001:2008 revision certified, with scope of registration including design control and service after sales activities.

B. The pump manufacturer must be registered to the ISO 14001 Environmental Management System standard and as such is committed to minimizing the impact of its activities on the environment and promoting environmental sustainability by
the use of best management practices, technological advances, promoting environmental awareness and continual improvement.

C. Pumps must be designed to handle raw, unscreened, river water. Pumps shall have 2” suction connection, and 2” discharge connection.

D. Pump Operating Conditions: Each pump and motor shall be selected to perform under following operating conditions:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
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<tbody>
<tr>
<td>Capacity</td>
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<td>Total Dynamic Head</td>
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<td>Suction Lift</td>
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<td>Discharge Head</td>
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<td>Repriming Lift</td>
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<td>213T</td>
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<tr>
<td>Motor Speed</td>
<td>1800 RPM</td>
</tr>
</tbody>
</table>

**Pre-Selected Pump Components:**
- Gorman Rupp Super T Series Model T2A71-B /F, 6.38” impeller trim
- V-belt with Cal OSHA approved guard
- PN# GRP33-07B-CI-Buna, automatic air release valve
- PN# 48313-172; N.O. Thermostat, closes at 145° F. (mounted on foot of each pump)
- Austempered Ductile Iron (ADI) Impeller, seal plate and hardened wear plate for Brinell Hardness = 400.
- Pump shall be internally coated with CeramKote 54 epoxy. The special ADI fitted impeller, wear plate and seal plate will not be coated.

E. Pump Performance Certifications

1. Solids Handling Capability

   a. All internal passages, impeller vanes, and recirculation ports shall pass a 1-1/2" spherical solid. Smaller internal passages that create a maintenance nuisance or interfere with priming and pump performance shall not be permitted. Upon request from the Engineer, manufacturer’s certified drawings showing size and location of the recirculation port(s) shall be submitted for approval.

F. Reprime Performance

1. Consideration shall be given to the sanitary sewage service anticipated, in which debris is expected to lodge between the suction check valve and its seat, resulting in the loss of the pump suction leg, and siphoning of liquid from the
pump casing to the approximate center line of the impeller. Such occurrence shall be considered normal, and the pump must be capable of automatic, unattended operation with an air release line installed.

2. During unattended operation, the pump shall retain adequate liquid in the casing to insure automatic repriming while operating at its rated speed in a completely open system. The need for a suction check valve or external priming device shall not be required.

3. Pump must reprim 21 vertical ft. at the specified speed and impeller diameter. Reprime lift is defined as the static height of the pump suction above the liquid, while operating with only one-half of the liquid remaining in the pump casing. The pump must reprime and deliver full capacity within five minutes after the pump is energized in the reprime condition. Reprime performance must be confirmed with the following test set-up:

a. A check valve to be installed down stream from the pump discharge flange. The check valve size shall be equal (or greater than) the pump discharge diameter.

b. A length of air release pipe shall be installed between pump and the discharge check valve. This line shall be open to atmosphere at all times duplicating the air displacement rate anticipated at a typical pump station fitted with an air release valve.

c. The pump suction check valve shall be removed. No restrictions in the pump or suction piping will prevent the siphon drop of the suction leg. Suction pipe configuration for reprime test shall incorporate a 2 feet minimum horizontal run, a 90° elbow and vertical run at the specified lift. Pipe size shall be equal to the pump suction diameter.

d. Impeller clearances shall be set as recommended in the pump service manual.

e. Repeatability of performance shall be demonstrated by testing five consecutive reprime cycles. Full pump capacity (flow) shall be achieved within five minutes during each cycle.

f. Liquid to be used for reprime test shall be water.

g. Upon request from the Engineer, certified reprime performance test results, prepared by the manufacturer, and certified by a registered professional engineer, shall be submitted for approval prior to shipment.
G. Manufacturer's Warranty

1. The pump manufacturer shall warrant the pump equipment to be of quality construction, free of defects in material and workmanship. A written warranty shall include specific details described below.

2. All equipment, apparatus, and parts furnished shall be warranted for twelve (12) months, excepting only those items that are normally consumed in service, such as oils, grease, packing, gaskets, O-rings, etc. The pump manufacturer shall be solely responsible for warranty of the pump equipment and all components.

3. Components failing to perform as specified by the Engineer, or as represented by the manufacturer, or as proven defective in service during the warranty period, shall be replaced, repaired, or satisfactorily modified by the manufacturer.

4. It is not intended that the pump manufacturer assume liability for consequential damages or contingent liabilities arising from failure of any vendor supplied product or part which fails to properly operate, however caused. Consequential damages resulting from defects in design, or delays in delivery are also beyond the manufacturer's scope of liability.

5. This limited warranty shall be valid only when installation is made and use and maintenance is performed in accordance with manufacturer recommendations. The warranty shall become effective on the date of acceptance by the purchaser or the purchaser's authorized agent, or sixty (60) days after installation, or ninety (90) days after shipment from the factory, whichever occurs first.

PART 2 – MATERIALS

2.01 MANUFACTURER

A. The specifications and project drawings depict equipment and materials manufactured by The Gorman-Rupp Company which are deemed most suitable for the service anticipated. It is not intended, however, to eliminate other products of equal quality and performance. The Contractor shall prepare his bid based on the specified equipment for purposes of determining low bid. Award of a contract shall constitute an obligation to furnish the specified equipment and materials.

B. After execution of the contract, the Contractor may offer substitutions to the specified equipment for consideration. The equipment proposed for substitution must be superior in construction and performance to that specified in the contract,
and the higher quality must be demonstrated by a list of current users of the proposed equipment in similar installations.

C. In event the Contractor obtains the Engineer's approval for equipment substitution, the Contractor shall, at his own expense, make all resulting changes to the enclosures, buildings, piping or electrical systems as required to accommodate the proposed equipment. Revised detail drawings illustrating the substituted equipment shall be submitted to the Engineer prior to acceptance.

2.02 PUMP DESIGN

A. Pumps shall be horizontal, self-priming centrifugal type, designed specifically for handling raw, unscreened, domestic sanitary sewage. Pump solids handling capability and performance criteria shall be in accordance with requirements listed under PART 1 - GENERAL of this section.

B. The pumps manufacturer must be ISO 9001:2008 revision certified, with scope of registration including design control and service after sales activities.

C. Materials and Construction Features

1. Pump casing: Casing shall be cast iron Class 30 with integral volute scroll. Casing shall incorporate following features:
   a. Mounting feet sized to prevent tipping or binding when pump is completely disassembled for maintenance.
   b. A 2" NPT fill port shall be supplied for ease of filling the pump casing.
   c. Casing drain plug shall be at least 3/4" NPT to insure complete and rapid draining.
   d. Liquid volume and recirculation port design shall be consistent with performance criteria listed under PART 1 - GENERAL of this section.

2. Coverplate shall be cast iron Class 30. Design must incorporate following maintenance features:
   a. Retained by hand nuts for complete access to pump interior. Coverplate removal must provide ample clearance for removal of stoppages, and allow service to the impeller, seal, wearplate or check valve without removing suction or discharge piping.
   b. A replaceable wearplate secured to the coverplate by weld studs and nuts shall be AISI 1015 HRS.
c. In consideration for safety, a pressure relief valve shall be supplied in the coverplate. Relief valve shall open at 75-200 PSI.

d. One O-ring of Buna-N material shall seal coverplate to pump casing.

e. Pusher bolt capability to assist in removal of coverplate. Pusher bolt threaded holes shall be sized to accept same retaining capscrews as used in rotating assembly.

3. Rotating Assembly: A rotating assembly, which includes impeller, shaft, mechanical shaft seal, lip seals, bearings, sealplate and bearing housing, must be removable as a single unit without disturbing the pump casing or piping. Design shall incorporate following features:

a. Sealplate and bearing housing shall be G-R Hard Iron. Separate oil filled cavities, vented to atmosphere, shall be provided for shaft seal and bearings. Cavities must be cooled by the liquid pumped. Three lip seals will prevent leakage of oil.

1) The bearing cavity shall have an oil level sight gauge and fill/vent plug check valve. The clear sight gauge shall provide easy monitoring of the bearing cavity oil level and condition of oil without removal of the fill/vent plug check valve. The air vent check valve shall vent the cavity but prevent introduction of moist air to the bearings.

2) The seal cavity shall have an oil level sight gauge and fill/vent plug. The clear sight gauge shall provide easy monitoring of the seal cavity oil level and condition of oil without removal of the fill/vent plug.

b. Impeller shall be G-R Hard Iron, two-vane, semi-open, non-clog, with integral pump out vanes on the back shroud. Impeller shall thread onto the pump shaft and be secured with a lock screw and conical washer.

c. Shaft shall be AISI 4140 alloy steel.

d. Bearings shall be anti-friction ball type of proper size and design to withstand all radial and thrust loads expected during normal operation. Bearings shall be oil lubricated from a dedicated reservoir. Pump designs which use the same oil to lubricate the bearings and shaft seal shall not be acceptable.

e. Shaft seal shall be oil lubricated mechanical type. The stationary and rotating seal faces shall be silicon carbide alloy. Each mating surface shall be lapped to within three light bands flatness (35 millionths of an inch), as measured by an optical flat under monochromatic light. The stationary seal seat shall be double floating by virtue of a dual O-ring design; an external
O-ring secures the stationary seat to the sealplate, and an internal O-ring holds the faces in alignment during periods of mechanical or hydraulic shock (loads which cause shaft deflection, vibration, and axial/radial movement). Elastomers shall be viton. Cage and spring to be stainless steel. Seal shall be oil lubricated from a dedicated reservoir. The same oil shall not lubricate both shaft seal and shaft bearings. Seal shall be warranted in accordance with requirements listed under PART 1 - GENERAL of this section.

f. Pusher bolt capability to assist in removal of rotating assembly. Pusher bolt threaded holes shall be sized to accept same capscrews as used for retaining rotating assembly.

4. Adjustment of the impeller face clearance (distance between impeller and wear plate) shall be accomplished by external means. Stainless steel adjusting shims shall be used to move the entire rotating assembly as a unit when adjusting the working clearances. Clearance adjustment which requires movement of the shaft only, thereby adversely affecting seal working length or impeller back clearance, shall not be acceptable.

5. Suction check valve shall be molded Neoprene with integral steel and nylon reinforcement. A blow-out center shall protect pump casing from hydraulic shock or excessive pressure. Removal or installation of the check valve must be accomplished from the top of pump, without disturbing the suction piping. Sole function of check valve shall be to save energy by eliminating need to reprime after each pumping cycle. Pumps requiring a suction check valve to assist reprime will not be acceptable.

6. Spool flanges shall be one-piece cast iron, class 30 fitted to suction and/or discharge ports. Each spool shall have one 1-1/4" NPT and one 1/4" NPT tapped hole with pipe plugs for mounting gauges or other equipment.

D. Serviceability

1. The pump manufacturer shall demonstrate to the Engineer's satisfaction that consideration has been given to reducing maintenance costs.

2. No special tools shall be required for replacement of any components within the pump.

2.03 ELECTRIC MOTORS

A. The motor to be coupled with the pump shall be a horizontal, solid shaft, premium efficiency, inverter duty, TEFC motor compatible with the pump furnished. Each motor shall be rated for reduced voltage auto-transformer starting, of NEMA Design B, normal torque, and normal starting current. The insulation systems shall be of Class
F or better with a Class B temperature rise, be non-hydrosopic and shall be resistant to attack by moisture and mechanical or thermal shock. The motors shall be furnished with a shaft grounding ring and insulated thrust bearings to protect the motor shaft current damage. Each motor shall be a standard motor, wound for 480V, 3 phase, 60 hertz and have a nominal speed of 1,750 rpm, have a service factor of at least 1.15. Each motor shall have a severe duty (corrosion resistant) finish, bear a name plate indicating voltage, ampere rating, horsepower and other pertinent data, and be furnished with motor heaters, drain plugs, and breathers.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Immediately after off-loading, Contractor shall inspect complete pump and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all pump serial numbers and parts lists with shipping documentation. Notify the manufacturer’s representative of any unacceptable conditions noted with shipper.

3.02 INSTALLATION

A. Install, level, align, and lubricate pump(s) as indicated on project drawings. Installation must be in accordance with written instructions supplied by the manufacturer at time of delivery.

B. Suction pipe connections are vacuum tight. Fasteners at all pipe connections must be tight. Install pipe with supports and thrust blocks to prevent strain and vibration on pump piping. Install and secure all service lines (level control, air release valve or pump drain lines) as required.

C. Check motor and control data plates for compatibility to site voltage. Install and test the station ground prior to connecting line voltage to control panel.

D. Prior to applying electrical power to any motors or control equipment, check all wiring for tight connection. Verify that protective devices (fuses and circuit breakers) conform to project design documents. Manually operate circuit breakers and switches to ensure operation without binding. Open all circuit breakers and disconnects before connecting utility power. Verify line voltage, phase sequence and ground before actual start-up.

E. After all anchor bolts, piping and control connections are installed, completely fill the grout dam in the pump station base with non-shrink grout.
3.03 FIELD QUALITY CONTROL

A. Operational Test

1. Startup of the intake pumps shall follow the pump manufacturer’s written instructions.

2. Prior to operating the intake pumps, the Contractor provide a letter from the pump manufacturer stating that the pump has been installed in accordance with the manufacturer requirements and are ready for service.

3. Ensure the intake pump suction and discharge lines have been flushed and are clear of debris and the pumps are properly primed prior to startup.

4. The pump manufacturer shall witness the startup of the intake pumps. Demonstrate that the pumps have been properly primed.

5. Prior to acceptance by owner, an operational test of all pumps, drives, and control systems shall be conducted to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is operating in accordance with the published pump operating conditions, electrical efficiency, in safe and optimum working condition, and conforms to the specified operating characteristics.

6. Observe and record operation of pumps, suction and discharge gage readings, ampere draw, pump controls, and liquid level controls. Check calibration of all instrumentation equipment, test manual control devices, and automatic control systems. Be alert to any undue noise, vibration or other operational problems.

7. Provide documentation of tests conducted and acceptance by the pump manufacturer.

3.01 TRAINING

A. Training shall be provided for the self-priming centrifugal pump assembly. See SECTION 15950 – PERFORMANCE TESTING AND FACILITY STARTUP for training requirements

END OF SECTION
PART 1 - GENERAL

1.01 SCOPE

A. This Section covers the work necessary to furnish and install one (2) vertical in-line multi-stage centrifugal booster pumps with three-phase motor for constant speed operation. The same pump manufacturer shall furnish the pump and motor.

B. Equipment and materials shall conform to current standards of the Hydraulic Institute, ANSI, and NEMA MG-1. Equipment shall be installed in accordance with the manufacturer’s recommendations and industry standard practices/procedures. Certification of compliance with Standard 61 of the National Sanitary Foundation shall be provided for all pump materials installed that are in contact with potable drinking water.

C. The Contractor is responsible for providing all equipment necessary for pump operation and performance testing. See Section 15950 – PERFORMANCE TESTING for additional requirements.

1.02 SUBMITTALS

A. The Contractor shall furnish for approval by the Engineer the following:

1. A manufacturer factory catalog pump performance curve which summarizes performance characteristics, total dynamic head, rated capacity, net positive suction head characteristics, input horsepower, and bowl efficiency ratings, over the full operating capacity of the pump, from shut-off to run out.

2. Dimensional and material drawings of the proposed pump indicating the manufacturer and model of the equipment being proposed.

3. Complete installation, operation and maintenance manuals for all equipment supplied.

4. Results of factory performance testing of the pump and motor as a complete unit.

5. Results of field performance testing. See Section 15950 – PERFORMANCE TESTING for additional requirements.
PART 2 – MATERIALS

2.01 GENERAL

A. Furnish and test one (1) vertical in-line multi-stage centrifugal pump.

B. The pump shall have a capacity of 100 gallons per minute (gpm) at a total dynamic head of 165 feet, and equipped with a 3-phase, 7.5-horsepower, TEFC motor.

C. The pump system shall be a standard product of a single pump manufacturer. The pump and motor shall be selected by the pump manufacturer.

D. The complete motor and drive shall be certified and listed by UL for conformance to U.S. and Canadian Standards.

E. The pump and motor shall be a Grundfos Model CR 15-4, or approved equal, with the optional 3-inch flange connections.

2.02 PUMPS

A. The pumps shall be ANSI/NSF 61 approved for drinking water.

B. The pumps shall be of the in-line vertical multi-stage design.

C. The head-capacity curve shall have a steady rise in head from maximum to minimum flow within the preferred operating region. The shut-off head shall be a minimum of 20% higher than the head at the best efficiency point.

D. The Vertical In-Line Multi-Stage Pumps shall have the following features:

1. The pump impellers shall be secured directly to the pump shaft by means of a splined shaft arrangement.

2. The suction/discharge base shall have ANSI Class 250 flange or internal pipe thread (NPT) connections as determined by the pump station manufacturer.

3. Pump Construction.

   a. Suction/discharge base, pump head, motor stool: Cast iron (Class 30)
   b. Impellers, diffuser chambers, outer sleeve: 304 Stainless Steel
   c. Shaft: 316 or 431 Stainless Steel
   d. Impeller wear rings: 304 Stainless Steel
   e. Shaft journals and chamber bearings: Silicon Carbide
   f. O-rings: EPDM

   Shaft couplings shall be made of cast iron or sintered steel.
4. The shaft seal shall be a balanced o-ring cartridge type with the following features:
   a. Collar, Drivers, Spring: 316 Stainless Steel
   b. Shaft Sleeve, Gland Plate: 316 Stainless Steel
   c. Stationary Ring: Silicon Carbide (Graphite Imbedded)
   d. Rotating Ring: Silicon Carbide (Graphite Imbedded)
   e. O-rings: EPDM

5. Shaft seal replacement shall be possible without removal of any pump components other than the coupling guard, shaft coupling and motor.

2.03 MOTORS

A. Motors are to be provided with the following basic features:

1. Motors shall be designed for continuous duty operation, NEMA design B with a 1.15 S.F.

2. Totally Enclosed Fan Cooled Motors are to be furnished with class “F” insulation. Open Drip Proof Motors are to be furnished with class “B” insulation.

3. Motor nameplate shall be mounted on enclosure with stainless steel fastening pins. Nameplate shall have, as a minimum, all information as described in NEMA Standard MG 1-20.40.1.

4. Open Drip Proof (ODP) motors shall have drip covers.

5. Motors over 50 lbs shall having lifting provisions.

6. Motors shall have a NEMA C-Flange for vertical mounting.

7. Drive end bearings shall be adequately sized so that the minimum L10 bearing life is 17,500 hours at the minimum allowable continuous flow rate for the pump.
PART 3 - EXECUTION

3.01 GENERAL

A. The pump shall be installed per the manufacturers installation instructions and as shown on the Drawings.

B. The manufacturer’s authorized service representative shall visit the site for as long as necessary to complete the following and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation.

C. The pump shall undergo field performance testing.

3.02 FACTORY TESTING

A. The pump manufacturer shall perform non-witnessed testing (in accordance with ISO9906 annex A) of pumps prior to shipment.

B. The pump manufacturer shall provide certified testing of pumps prior to shipment.

3.02 FIELD TESTING

A. Operational Test

1. Startup of the booster pumps shall follow the pump manufacturer's written instructions.

2. Prior to operating the booster pumps, the Contractor provide a letter from the pump manufacturer stating that the pump has been installed in accordance with the manufacturer requirements and are ready for service.

3. Ensure the booster pump suction and discharge lines have been flushed and are clear of debris and the pumps are properly primed prior to startup.

4. The pump manufacturer shall witness the startup of the booster pumps. Demonstrate that the pumps have been properly primed.

5. Prior to acceptance by owner, an operational test of all pumps, drives, and control systems shall be conducted to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is operating in accordance with the published pump operating conditions, electrical efficiency, in safe and optimum working condition, and conforms to the specified operating characteristics.
6. Observe and record operation of pumps, suction and discharge gage readings, ampere draw, pump controls, and liquid level controls. Check calibration of all instrumentation equipment, test manual control devices, and automatic control systems. Be alert to any undue noise, vibration or other operational problems.

7. Provide documentation of tests conducted and acceptance by the pump manufacturer.

3.03 WARRANTY

A. The Contractor shall provide a full warranty on all materials and installation for a period of two (2) years from date of start up. In the case of non-compliance with the stated specifications, the Owner may require Contractor to repair the pump unit, including parts and labor to make repairs, up to and including removal and replacement of all or part of the pump unit.

END OF SECTION
PART 1 – GENERAL

1.01 SCOPE

A. This section covers the acceptance tests of the hydraulic efficiency and mechanical operation of the raw water pump station, complete. The Contractor shall furnish all necessary personnel and testing equipment to accurately determine the hydraulic efficiency and mechanical operation of the pumping, electrical, piping and all other equipment as required.

B. Provide a competent field service technician of the manufacturers of all equipment furnished under Divisions 11, 13, 15 and 16 to supervise installation, adjustments, calibrations, inspection, and equipment testing during three phases of testing; factory acceptance testing (FAT), operational acceptance testing (OAT), and a seven-day performance test (7-Day Test).

C. Prepare work plans for factory acceptance testing (FAT) and operational acceptance testing (OAT) based on manufacturer recommendations for equipment performance.

D. Coordinate with the District to develop and perform the final seven-day performance test (7-Day Test).

E. Chemical disinfection is not required in this contract because this is a raw water supply system and due to the sensitivity with the use of chemicals near the adjacent river. The Contractor shall ensure that all components in contact with the process water are thoroughly flushed of all sediment, grease or debris through means of washing, jetting, scrubbing, flushing and inspecting prior to installation to the satisfaction of the District. The Contractor shall conduct flushing of all newly installed piping, pump, valves, tank and other process systems prior to testing.

1.02 RELATED WORK

A. SECTION 13216 – CONICAL BOTTOM HDPE TANK

B. SECTION 15137 – HORIZONTAL SELF-PRIMING CENTRIFUGAL PUMP

C. SECTION 15138 – VERTICAL MULTI-STAGE CENTRIFUGAL PUMP

D. DIVISION 16010 – ELECTRICAL GENERAL
1.03 GENERAL

A. System Commissioning
Commission all systems and equipment to verify performance, function, and correct operation by performing procedures to activate, startup, adjust, test, and demonstrate that the work is in operating order in accordance with the general requirements of this Section and the detailed requirements of the technical sections under the system or equipment specified. Ensure that the work is ready for full-testing, documentation, inspection by equipment manufacturers and operator training, where specified.

B. Notification
Notify the Engineer five (5) days prior to starting the booster pumps or intake pumps.

C. Coordination
During the startup period, coordinate the operation of the facility with the Engineer, subcontractors, District’s operators, and manufacturer’s representatives. Coordinate field service technicians and subcontractors to provide power controls, chemicals, water, and ancillary systems to allow for pressurizing and starting equipment. The Contractor shall prepare a detailed checklist for all equipment noting that all prerequisite steps have been updated.

D. Testing
Furnish all test equipment including safety equipment, gauges, bulkheads, discharge and dechlorination facilities, valve and piping identification, hoses, temporary piping, caps, gauges, measuring devices and all other equipment required to conduct tests. Devices and equipment shall be fully functional, adjusted, and tested.

E. Equipment Maintenance
Maintain the equipment until acceptance. Provide all lubricants, chemicals, and electricity necessary until acceptance.

F. Expendable Supplies
The Contractor shall furnish all expendable supplies, including chemicals, gas, water, chlorine and other necessary supplies required for startup, demonstration and testing and dispose of all waste or used supplies, water, etc., in accordance with all applicable local, state, and federal regulations.

G. Facility Shut Down
The Contractor shall notify the District three (3) days prior to any shut down of the existing facility and shall coordinate with the District to insure minimal disruption of service to the community.
1.04 SUBMITTALS

A. Submit name, address and resume of proposed field services technicians at least ten (10) working days in advance of the need for such services.

B. Submit detailed testing procedures for shop tests, FAT, and OAT, including specified test and performance requirements for various equipment, per manufacturer recommendations. The Contractor shall coordinate with the District to prepare the work plan for the 7-Day Test.

1. Submittals shall include the following:

   a. Name of equipment to be tested, including reference to Specifications section number and title.

   b. Testing schedule of proposed dates and times for testing.

   c. Summary of power, lighting, chemical, water, sludge, gas, etc, needs and identification of who will provide them.

   d. Outline specific assignment of the responsibilities of the Contractor and manufacturers' factory representatives or field service personnel.

   e. Detailed description of step-by-step testing requirements, with reference to appropriate standardized testing procedures and laboratory analyses by established technical organizations (e.g., ASTM, WPCF Standard Methods, etc).

   f. Samples of forms to be used to collect and record test data and to present tabulated test results.

2. Copies of test reports upon completion of specified shop, FAT, OAT, and 7-Day Test. Test reports shall incorporate the information provided in the test procedures submittals, modified to reflect actual conduct of the tests and the following additional information:

   a. Copy of all test data sheets and results of lab analyses.

   b. Summary comparison of specified test and performance requirements vs. actual test results.

   c. Should actual test results fail to meet specified test and performance requirements, describe action to be taken prior to re-testing equipment.
3. Copies of the manufacturer's field service technician's report summarizing the results of his/her initial inspection, operation, adjustment and pre-tests. The report shall include detailed descriptions and tabulations of the points inspected, tests and adjustments made, quantitative results obtained, suggestions for precautions to be taken to ensure proper maintenance, and the equipment supplier's Certificate of Installation in the format specified herein.

1.05 QUALITY ASSURANCE AND WITNESS REQUIREMENTS

A. Field service technicians shall be competent and experienced in the proper installation, adjustment, operation, testing and startup of the equipment and systems being installed.

B. Manufacturers' sales and marketing personnel will not be accepted as field service technicians.

C. The District and/or District's representatives, as required by the various equipment Specifications, may witness shop tests or factory tests.

D. FAT, OAT, and the 7-Day Test shall be performed in the presence of the District, the District's designed personnel and/or District's representatives.

PART 2 – MATERIALS

2.01 GENERAL

A. The Contractor shall furnish all necessary personnel and testing equipment to accurately determine the hydraulic efficiency and mechanical operation of the pumping, piping, electrical and all other equipment as required.

PART 3 – EXECUTION

3.01 PRELIMINARY TESTING REQUIREMENTS

A. The following shall be completed before testing and startup begins.

   1. The Engineer has reviewed and accepted the Contractor's Testing and Startup Plan.

   2. Functional verification of the individual interlocks between the field-mounted control devices and the motor control circuits, control circuit of VFD controllers, system controls and District SCADA System.
3. Functional verification of the individual instrumentation loops (analog, status, alarm, and control) from the field devices to the workstation display screens.

4. Adjustment of the pressure switches, flow switches, timing relays, level switches, vibration switches, temperature switches, and other control devices to the settings determined by the Engineer or the equipment manufacturer.

B. FAT, OAT, and the 7-Day Test shall be successfully executed prior to Substantial Completion and acceptance from the District of the Project.

C. The operation, testing and adjustment shall be as required to prove that the equipment has been left in proper condition for satisfactory operation under the conditions specified.

D. All performance tests and inspections shall be conducted during the work week of Monday through Friday, unless otherwise specified.

E. Successfully execute the step-by-step procedure for FAT, OAT, and 7-Day Test as indicated in the approved testing work plans.

F. Upon completion of each testing phase (FAT, OAT, and 7-Day Test), the manufacturer's field service technician shall submit a signed report of the results of his/her inspection, operation, adjustments and tests.

G. No testing or equipment operation shall take place until it has been verified by the Engineer that all specified safety equipment has been installed and is in good working order.

H. No testing or equipment operation shall take place until it has been verified by the Engineer that all lubricants, tools, maintenance equipment, spare parts and approved equipment operation and maintenance manuals have been furnished as specified.

I. In the event of failure to demonstrate satisfactory performance of the facility on the first or any subsequent attempt, all necessary alterations, adjustments, repairs and replacements shall be made. When the facility is again ready for operation, it shall be brought on line and a new test shall be started. This procedure shall be repeated as often as necessary until the facility has operated continuously to the satisfaction of the District and Engineer, for the specified duration.

J. Do not, at any time during testing, allow the facility to be operated in a manner which subjects equipment to conditions that are more severe than the maximum allowable operating conditions for which the equipment was designed.
3.02 FACTORY ACCEPTANCE TESTING (FAT)

A. Prior to delivery of the electrical control panels, the Contractor shall coordinate a Factory Acceptance Testing (FAT) of all equipment to ensure the equipment is programmed to operate as intended in the Contract Documents.

B. After installation of the equipment has been completed and the equipment is presumably ready for operation, before others operate it, the manufacturer's field service technician shall inspect, operate, test and adjust the equipment. The inspection shall include at least the following points where applicable:

1. Soundness (without cracks or otherwise damaged parts).
2. Completeness in all details, as specified and required.
3. Correctness of setting, alignment and relative arrangement of various parts.
4. Adequacy and correctness of packing, sealing, and lubricants.

C. The operation, testing and adjustment shall be as required to prove that the equipment has been left in proper condition for satisfactory operation under the conditions specified.

D. All mechanical and electrical equipment shall be checked to ensure that it is in good working order and properly connected. During FAT, all various pumps, compressors, and other remaining equipment shall be tested through their full range of operations. Performance curves shall be established and submitted in the FAT test report. All systems shall be cleaned and purged as required. All sumps, tanks, basins, chambers, pump wells and pipelines which are hydraulically checked shall be drained and returned to their original condition once the testing is complete.

3.03 OPERATIONAL ACCEPTANCE TESTING (OAT)

A. OAT shall not begin until all equipment meets the testing requirements outlined in the FAT work plan submittal.

B. The Contractor shall coordinate with the District’s chemical suppliers to supply the appropriate chemicals following FAT and prior to OAT.

C. During OAT testing, all instruments and controls shall be calibrated through their full range. All other adjustments required for proper operation of all instrumentation and control equipment shall be made.

D. During OAT testing, all equipment and valve controls with the exception of the interconnection between the booster station and the District’s raw water delivery system shall be tested with the control logic developed by the programmer and
prove that the equipment operates as specified. The Contractor shall make any adjustments required to the equipment and hardware furnished under their scope of work. The District shall be responsible for any changes required to the PLC and SCADA programming to operate the facility.

E. During OAT, perform all other tasks needed for preparing and conditioning the treatment facilities for proper operation.

3.04 SEVEN-DAY PERFORMANCE TESTING (7-Day Test)

A. The 7-Day Test shall not begin until all equipment, instruments, and control logic meet the testing requirements outlined in the OAT work plan submittal and only upon District’s approval. All FAT and OAT testing and instrument calibration shall be complete and all individual tests on the well pump, metering pump systems, pump control valves, and HVAC completed.

B. Prior to 7-Day Test, the Contractor shall have completed training requirements under SECTION 01735 – TRAINING REQUIREMENTS.

C. The District will furnish all operating personnel (other than vendor's or subcontractor's service personnel) needed to operate equipment during the 7-Day Test; however, said personnel will perform their duties under Contractor's direct supervision. Until performance tests are completed and units and systems are accepted by the District as substantially complete, the Contractor shall be fully responsible for the operation and maintenance of all new facilities.

D. The District will provide all necessary electricity. However, the Contractor shall provide all necessary personnel of the various construction trades, i.e., electricians, plumbers, etc, and field service personnel of the major equipment suppliers on an 8 hour per day basis at the facilities and on a 24 hour per day basis on-call during the 7-Day Test.

E. District to furnish all chemicals, labor, power, etc., to operate plant during 7-day Performance Test. District will not provide labor for the remedying of repairs.

F. Prior to the 7-Day Test, the District shall receive spare parts, safety equipment, tools and maintenance equipment, lubricants, approved operation and maintenance data and the specified operation and maintenance instructions.

G. Prior to the 7-Day Test, the entire potable water piping system shall be thoroughly flushed to the satisfaction of the District.

H. During the 7-Day Test, the interconnection with the District’s water system will be. Only the District has authorization to operate valves that open the interconnection with District’s system. All necessary clearances for valve operation must be approved by the District prior to the 7-Day Test.
I. During the 7-Day Test, all equipment and valve controls shall be placed in fully automatic mode, and the well site shall be placed on-line. All equipment and valve controls including the interconnection between the well system and the District’s raw water system shall be tested with the control logic developed by the programmer and prove that the equipment operates as specified. The Contractor shall make any adjustments required to the equipment and hardware furnished under their scope of work. The District shall be responsible for any changes required to the PLC and SCADA programming to operate the facility.

J. District to conduct 7-day Performance Test in presence of water treatment equipment manufacturer factory technician. Factory technician shall be required to be on-site a minimum of two separate days during this period.

K. The facility must be run 24 hours/day for seven consecutive days without interruption of service. If there is any major equipment or process failure during the 7-day Performance Test, once the cause of the failure is resolved by Contractor, the 7-day performance test shall be repeated (starting from day 1 of 7 days) until the system can be operated free from any mechanical or process failures over a consecutive seven-day period.

3.05 DISCHARGE OF WATER

A. Discharged water includes but is not limited to rainwater, groundwater, water pumped or otherwise removed from excavations, whether introduced to the excavation or naturally occurring groundwater, wash water, water used for testing, flushing and chlorination, water removed from existing pipelines and water used by the Contractor for any other purpose.

B. The Contractor shall follow requirements of the Regional Water Quality Control Board, Best Management Practices for discharge to surface waters, as applicable. The Contractor shall also follow applicable requirements of U.S. Army Corps of Engineers Section 404 Permits, California Department of Fish and Game Streambed Alteration Agreements and Regional Water Quality Control Board Water Quality certification or waiver, each as applicable.

C. All water discharged from or flowing from the jobsite shall be of such purity and cleanliness as not to introduce any contaminants into any watercourse, stream, lake, reservoir, or storm drain system.

D. The Contractor shall be responsible for caring for the drainage on the entire work area and the disposal of such drainage from commencement of work until contract completion. Silt, eroded materials, construction debris, concrete or washings thereof, petroleum or paint products or other hazardous substances, shall not be introduced, or placed where they may be washed by rainfall or runoff, into any water course, stream, lake, reservoir, or storm drain system.
E. Water shall cause no erosion of earth, whether disturbed or not disturbed, or of excavated or dredged earth stored on site, or of material imported for fill or other purposes.

F. No soil or other material shall be discharged in a quantity that will have an adverse affect on the receiving waters. Discharge shall not cause or contribute to a violation of any water quality standard.

G. **Discharge Onsite**
   The Contractor is required to adhere to the following effluent limits for discharge to the onsite grounds. Discharges shall not be directed to an existing surface water body.
   
   1. Total chlorine residual less than 0.1 mg/L.
   
   2. pH greater than 6.5 and less than 8.5.

   The Contractor may discharge water onsite once the discharge water has been sampled to show effluent limits are not exceeded. In the event any of the samples do not meet the requirements specified above, the Contractor shall stop discharge immediately and notify the Engineer.

   During discharge events, samples shall be taken from the discharge stream at the farthest available location downstream of the well, prior to discharge on ground.

   The Contractor shall prepare and submit a Chlorination/Dechlorination Discharge Plan to the Engineer which describes all planned activities prior to discharge onsite. The Contractor shall submit copies of the plan to the Engineer a minimum of 2 weeks prior to discharges from the well/pump for review. The discharge plan shall include the following:

   1. Drawings showing plan view of piping system to be used, and piping components.
   
   2. Map showing piping discharge path to location onsite.
   
   3. Description of planned BMPs for prevention of erosion along the discharge path and at the discharge point.

   4. Estimated discharge rate, duration, and total volume of discharge water.
   
   5. Description of means to control discharge flow.

   Contractor shall be responsible for all costs of sampling, testing, and disposal of liquids discharged from the jobsite.
3.06 MAINLINE AND STATION PIPING PRESSURE TESTING

A. General
After installation and flushing of any newly installed main lines, station piping, and appurtenances has been completed, all piping shall be hydrostatically tested, as specified herein. Hydrostatic testing shall occur after the pipe is backfilled but prior to permanent resurfacing and connection to the existing water system. Valves and other flanged fittings may be left exposed during hydrostatic testing provided sufficient thrust restraint is provided by the Contractor as necessary. The Contractor shall provide the Engineer with a minimum of five (5) working days notice prior to the requested date and time for hydrostatic tests. All testing shall be performed in the presence of the Engineer.

Thrust blocks shall have been in place for a minimum of seven (7) days prior to testing. Pipe with mortared joints shall not be filled with water within twelve (12) hours of the time the last joint has been completed and the interior mortar placed. Do not subject the pipe to internal hydrostatic pressure until all mortared joints have cured at least thirty-six (36) hours.

Separate tests shall be made on pipelines that can be sectionalized by valves. The Contractor shall furnish all labor, materials, tools, and equipment for testing and make all necessary connections and provide all necessary bulkheads, blind flanges, spool pieces, backflow devices, piping and appurtenances, as needed.

B. Isolation
The new pipelines shall remain isolated from the existing water treatment plant, well, water main, tank until after acceptance of the flushing and hydrostatic testing. The Contractor shall provide a hydrostatic, flushing, and bacteriological testing plan complete with locations of bulkheads, or blind flanges, or steel plates or other methods to maintain isolation from the potable water supply, to the Engineer for approval, prior to testing. All isolation equipment shall remain in-place until the new water line has passed the pressure test, passed the chlorination test, passed the bacteriological test and is approved by the District for connection.

C. Fill Rate
Fill pipeline at a rate of two (2) feet per second so as not to cause any surges or exceed the rate at which air can be released through the air valves. During filling, check all air valves to verify that they are venting correctly.

D. Test Pressure
Pipeline and mainline valves shall be tested at a pressure of not less than 1.25 times the stated working pressure of the pipeline measured at the highest elevation along the test section and not less than 1.5 times the stated working pressure at the lowest elevation of the test section. The test pressure shall not exceed the thrust restraint design pressures or 1.5 times the pressure rating of the pipe or joint, whichever is less.
Valves shall not be operated in either direction at a differential pressure exceeding the rated valve working pressure. The test pressure shall not exceed the rated working pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves or butterfly valves.

The pressure gage reading at the time of test shall be located at the highest point of the section of pipe being tested. A blind flange shall be utilized at the connection to any pump discharge heads. Test pressure shall be maintained for a minimum period of one (1) hour. Apply and maintain the test pressure by continuous pumping if necessary for the entire test period. The pump suction shall be in a barrel or similar device or metered such that the amount of water required to maintain the test pressure may be measured accurately. The Engineer shall reserve the right to evaluate test pressure at any point along the section being tested.

E. Allowable Leakage
Leakage is defined as the quantity of water required to hold the test pressure for the duration of the test period.

1. The allowable leakage for steel (flanged or welded), ductile iron (flanged), threaded, compression fitted, and soldered pipe, shall be zero.

2. The leakage test shall be performed immediately after the hydrostatic pressure testing at 150 psi for an additional duration of 30 minutes.

3. If leakage exceeds the allowable loss, the leaking areas shall be located and repaired as required by the Engineer. All defective pipe, fittings, valves, and other appurtenances discovered shall be removed and replaced with reliable material. Additional flushing shall be performed as necessary. The hydrostatic test shall be repeated until the leakage does not exceed the rates specified above.

F. Correction of Defects
If the leakage exceeds the allowance, the installation shall be repaired or replaced and pressure tests shall be repeated until conformance to the leakage test requirements specified herein have been met. All visible leaks from the piping, valves, flanges or gaskets shall be repaired even if the pipeline passes the allowable leakage test. All work associated with finding and fixing leaks and performing additional testing shall be performed at no additional cost to the District.

G. Contractor’s Report
The Contractor shall keep records of each piping test, including:

1. Description and identification of piping tested.
2. Description of test procedure.
3. Date of test.
4. Witnessing by Contractor and Engineer.
5. Test evaluation.
6. Remarks, to include such items as;
   a.Leaks (type, location)
   b. Repairs made on leaks.

3.07 PUMPING AND MECHANICAL EQUIPMENT

A. All pump and mechanical equipment shall be tested in accordance with the manufacturers recommended instructions. 

B. Pumps shall be tested for rotation, line balance, vibration, performance and efficiency. The flow and head shall be measured in the field to determine if the pump is operating on the approved catalog curve and within acceptable efficiency according the Hydraulic Institute standards. Full load running amps and horsepower shall be within the nameplate of the specific motor. Any observable defects shall be remedied by the pump manufacturer.

C. Mechanical devices such as the Sand Separator shall be tested in accordance with the manufacturers recommended Installation, Operation and Maintenance manuals.

3.08 ELECTRICAL

A. All electrical equipment shall be tested including time delays, automatic and hand operation of the pumping plant, fans, and thermostats. Refer to the applicable Electrical sections for additional testing requirements.

3.09 TRAINING

A. Furnish all labor, materials, equipment, and incidentals necessary to train District staff on the equipment, products, and systems furnished under these contract documents.

B. Training shall be conducted by a qualified representative for the equipment being trained. Instructors shall be completely knowledgeable in the products and systems for which they are providing training, and experienced in conducting classes. Sales representatives are not qualified instructors unless they possess the detailed operating and maintenance knowledge required for proper class instruction. If, in the opinion of the Engineer, the scheduled training was not provided by an appropriately knowledgeable person, such training shall be rescheduled and repeated with a suitable instructor at no additional cost to the District.

C. For electrical control systems, see Electrical General in Section 16010.

D. Training shall be provided for those systems and equipment as listed in the table below or as otherwise defined in the Specifications.
### Equipment

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<th>Related Specification</th>
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END OF SECTION
DIVISION 16 ELECTRICAL

ELECTRICAL GENERAL

SECTION 16010

PART 1: GENERAL

1.01 SCOPE OF WORK

A. The following list of components and areas of work is a summary of the work required in the drawings and specifications. The list is not comprehensive of the total work required nor is it in any specific order. It is merely being provided as an aid to the bidder. Work not listed herein, but described in the plans or specifications, is also part of the overall scope of work.

1. 480 volt, 3 phase, 225 amp, wallmount panelboard.
2. NEMA 3R, single phase ventilated transformer
3. 120/240 volt, 1 phase, 100 amp, wallmount Panelboard
4. Custom wallmount pump motor control panels.
5. Wallmount PLC control panel
6. PLC and Operator Interface (OI) programming

   a. Configuration and Programming of the PLC and OI is by Application Programmer, an Owner furnished function. Application programmer is defined in Qualifications.

   b. Setup, configuration, programming, and software testing of the Programmable Logic Controllers and Operator Interfaces used in this project will be by Application Programmer.

   c. Control Descriptions may be adjusted during construction as needed and project circumstances dictate. Application Programmer will make modifications to control descriptions (and associated PLC and OI configurations) as needed during construction and start-up.

   d. PLC and OI system will be programmed in the latest version of software at time of project conception. Programming software to be furnished by Application Programmer.
e. Existing PLC control system will be replaced under the Construction project. The new system will control the existing systems, new systems, and modified existing systems.

f. Application Programmer will be available to startup systems as they become available. The Contractor shall notify the Application programmer of start-up and testing dates via the 3 week look-ahead construction schedule.

7. Miscellaneous equipment as shown on Contract Drawings.

8. Communications system. Contractor to coordinate, configure, test, and place communications system(s) into operation with assistance of Owner’s Radio Communications Technicians. Hardware and cable issues shall be corrected by Contractor as soon as possible such as not to delay start-up.

9. Instrumentation

a. Furnish NSF/ANSI 61 certified products that have undergone testing for any device, valve, instrument, or assembly that will come into contact with drinking water.

b. Mounting supports or other accessories as detailed and as recommended by the instrument manufacturer for the application.

c. Contractor shall calibrate, configure and test all instrumentation and document results.

10. Coordination and timely installation of critical path equipment and services such that construction may be facilitated. The Electrical Contractor and System Integrator should not assume that submittals, manufacturing, installation, start-up will be based on their own schedule. The Electrical Contractor and System Integrator scope of work is part of a much larger project and will need to be coordinated. Expect that additional cost in time and labor will be required beyond normal optimistic projections.

11. Conduit – support systems, wire, and grounding system, for equipment interconnection, and operation.

12. All necessary process piping, shut off, sample and calibration valves, drains, pressure reducers and calibration equipment for connection of instrumentation.
13. Trenching, backfilling, compaction and resurfacing for all new underground conduit routes, concrete pads, and pull boxes.

14. Coordination and equipment for connection of power utility and telephone services per utility drawings and standards.

15. Site electrical devices, lights and receptacles.


17. System startup, calibration, testing and documentation.

B. Electro-mechanical equipment to be installed in this project may be specified in other divisions but will interface to equipment provided under Electrical Specifications. Obtain submittals for those devices, review, coordinate and provide all interfacing equipment, software, communications, I/O, and testing to integrate the equipment to the extent possible and as intended.

C. Install electrical and control portion of electro-mechanical equipment specified in other sections. Reference those specifications, pertinent details, and follow all manufacturer instructions to erect, install and commission equipment. Furnish all electrical equipment, interconnecting wire, and make connections to place equipment in operation.

D. All electrical equipment and materials, and methods - including installation, calibration, and testing - shall conform to the applicable codes and standards listed in this and other Sections. All electrical materials and work shall conform to published standards of the National Electric Code (NEC) current issue, Institute of Electrical and Electronic Engineers (IEEE), and Underwriters Laboratories Inc (UL).

1.02 RELATED SPECIFICATIONS

A. The following specification sections are part of the [Electrical Specifications].

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</table>
1.03 QUALIFICATIONS AND REQUIRED WORK SCOPE

A. Electrical Contractor

1. Management and installation of the entire electrical and control system required for this project shall be by an Electrical Contractor meeting qualifications as defined herein.

   a. Contractor shall be capable of looking at electrical equipment submittals, prior to installation, comparing hookup requirements to the drawings, and noting any deficiencies.

2. Electrical Contractor shall select, furnish, and install all commodity electrical materials (conduit, wire, supports, fittings, ductbanks, etc) that are generally not “custom” or uniquely manufactured for this project. Custom electrical panels, controls, and instrumentation shall be furnished by Systems Integrator.

3. Shall be competent in and familiar with management and subcontracting of specialty electrical and instrumentation supply and engineering work as requires of a Systems Integrator as described herein.

4. Electrical Contractor must be competent in performance, supervision and coordination of work required and performed by equipment suppliers and Systems Integrator (Subcontractors).

5. The Electrical Contractor (EC) shall meet the following minimum qualifications:

   a. Has a current C10 Electrical Contractor’s License issued by the State of California Department of Consumer Affairs.

   b. EC shall be regularly engaged in similar industrial power and controls electrical contracting for the Water and Wastewater Industry.
c. EC shall have successfully performed work of similar or greater complexity (as measured in contract value on industrial power and controls projects) on at least three (3) previous projects.

d. EC shall carry all insurances as defined and required by the special provisions and as required by law.

e. EC shall be competent in methods and materials execution and selection associated in the type of electrical and instrumentation work specified in this Division.

1) EC shall be familiar with and understand codes and requirements from NFPA70, NFPA110, and all other governing national or local codes as required for work scope as described in the drawings and specifications.

2) EC shall know and understand common terms and abbreviations used in this Industry. Not all terms and abbreviations will be defined in the drawings and specifications.

f. EC shall comply with State law which requires that all personnel installing electrical components are certified by the State of California as “Electrician” or “Electrician Trainee.” Apprentices may install electrical components only under direct supervision of a certified Electrician.

B. System Integrator

1. Systems Integrator shall be a supplier to the Electrical Contractor and must be competent in performance, supervision and coordination of work required in this contract.

2. This includes, but is not limited to, all work necessary to select, furnish, construct, supervise installation, configure, calibrate, test, and place into operation all transmitters, instruments, control panels, motor controls, alarm equipment, communications, monitoring equipment, and accessories.

3. The System Integrator shall have on staff a Project Engineer with three years prior experience on similar sized projects. This Project Engineer shall coordinate the technical aspects of this project and prepare the submittals and drawings. The Project Engineer shall attend all coordination meetings when specifically requested by the Engineer.

4. The System Integrator (SI) shall meet the following minimum qualifications:
a. SI shall be regularly engaged providing electrical and control systems for the Municipal Water and Wastewater Industry.
b. SI shall have an Electrical Engineer on staff registered in the State of California as a Professional Engineer.
c. SI shall be capable of labeling all electrical panels as manufactured or customized by the System Integrator with appropriate Underwriters Laboratories (UL) label prior to factory testing or shipment to project site.
d. SI shall have successfully completed work of similar or greater complexity and on similar facilities on at least ten previous projects under the present company name.
e. SI shall be actively engaged in the following disciplines for the last 5 consecutive years.
   1) Design and manufacturing of custom Control Panels, Motor Controls Centers, and associated devices and equipment as specified in this division.
   2) Programming and commissioning of SCADA, PLC and Operator Interface hardware.
   3) Instrumentation - selection, purchase, calibration, start-up and commissioning.
   4) Testing, calibration, start-up, and commissioning of control systems as applied to the Water and Wastewater industry.
f. SI shall employ personnel on this project who have successfully completed ISA or equal training courses on general purpose instrumentation.
g. SI shall have a permanent, fully staffed and equipped service facility within 200 miles of the project site for a minimum of 1 year prior to bid date with personnel and equipment required to maintain, repair and calibrate the instrumentation system.

5. The companies listed below have been determined to meet the minimum qualifications specified in this Section and are pre-qualified for performing work as System Integrators on the project. Other System Integrators may submit a statement of qualifications, proving requirements above, and listing relevant project experience on similar completed projects. Include project references with phone numbers including the Owner, Engineer and Electrical Contractor. See submittals section of this specification section.

a. Tesco Controls, Inc. (916) 395-8800
b. Transdyne (925)-225-1600
c. Primex Control Systems (707) 449-0341
d. Wunderlich-Malec (925) 460-9921
e. Technical Systems, Inc (TSI) (707) 678-4444
C. Application Programmer

1. The Applications Programmer will be a part of the construction management team and their work is not in contract.

2. The Application Programmer work is limited to programming and configuration, and associated startup and testing services of the PLC, and Operator Interface. All other work is by Contractor.

3. The application programmer will further define the specific portion of the control description during the construction of the project.

4. The Application Programmer will assist to coordinate the project program installation and testing work and further define the control descriptions.

5. The Application Programmer will attend coordination meetings when specifically requested by the Construction Manager.

1.04 CONTRACT DOCUMENTS

A. The resolution of conflicting information within the contract electrical documents shall put precedence on electrical drawings over that of electrical specifications.

B. The Drawings and specifications are intended to be descriptive of the type of electrical system to be provided with sufficient detail to construct. Minor omission of detail shall not relieve a qualified contractor from the obligation to provide a complete operational system if it can be determined that the particular detail is usual and customary for similar systems.

C. The following specifications may incorporate specific equipment or materials that do not have equal equipment listed. These items are standards because of their familiarity, serviceability, and/or spare parts inventory. However, equal alternate equipment or materials (noted in the submittal cover letter) will be considered for use on this project if submitted. The Engineer may reject said equipment for the purpose of adherence to standards.

D. Contract drawings are diagrammatic and indicate general arrangement of systems and equipment.

1. Exact locations and layouts of electrical products shall be defined during submittal, assembly, or field fit during construction. Field measurements take precedence over dimensioned drawings. Drawing intent is to show initial size, capacity, approximate location, orientation, and general relationship of equipment in area shown but may not show exact detail or arrangement.
2. However, when materials, locations, sizes, or methods are specifically dimensioned, detailed or noted, the drawings shall take precedence over electrical specifications in the event of conflict. In no case, is NEC, UL, or other applicable governing standards to be overridden.

E. The Contractor is encouraged to visit site and shall thoroughly examine existing conditions before submitting his bid proposal to perform any work. He shall compare site conditions with data given on the plans or in these Specifications. No allowance shall be made for any additional costs incurred by the Contractor due to his failure to examine each site or report any discrepancies to the Engineer.

F. The Contractor shall examine the architectural, mechanical, structural, and electrical and instrumentation submittals and equipment furnished under other specifications divisions in order to determine conduit routing, stub-up locations, and final terminations for all conduits and cables. Conduits shall be stubbed up as near as possible to equipment electrical terminals. The exact locations and routing of cables and conduits shall be governed by structural conditions, physical interferences, and the physical location of wire terminations on equipment. If the Contractor installs equipment conflicting with the architectural, mechanical, structural, instrumentation or electrical equipment provided under this and other specifications sections, the Contractor shall replace without additional cost.

G. All equipment shall be installed and located so that it can be readily accessed for operation and maintenance. If accessibility appears to be compromised, the location of equipment or stub ups shall be modified to the extent possible.

H. Where conduits are shown on the Drawings, or stated to be furnished but not explicitly shown, as part of the scope of work; the Contractor shall provide all fittings, boxes, wiring, etc. as required for completion of the raceway system in compliance with the NEC and the applicable specifications in this Section.

I. No changes from the Drawings or specifications shall be made without written approval of the Engineer. Should there be a need to deviate from the Contract documents, submit written details and reasons for all changes to the Engineer for review.

J. The Contractor shall maintain a neatly and accurately marked full size set of Contract Drawings recording the as built locations and layout of all electrical and instrumentation equipment, routing of raceways, junction and pull boxes, and other diagram or drawing changes. Drawings shall be kept current weekly, with all “change orders”, submittal modifications, and construction changes shown. Drawings shall be subject to the inspection
by the Engineer at all times, progress payments or portions thereof may be withheld if drawings are not accurate or current.

K. When documents are changed, they shall be marked with erasable colored pencils using the following coloring scheme:

   Additions - red
   Deletions - green
   Comments - blue
   Dimensions - black

L. Prior to acceptance of the work, the Contractor shall deliver to the Engineer one set of record full size drawings neatly marked accurately showing the information required above.

1.05 PROJECT COORDINATION

A. Prior to submittal, the Electrical Contractor shall coordinate with equipment suppliers to verify sizes, mounting, connections, storage, and delivery of equipment. If there are any issues whereby the solution will be in conflict with plans and specifications, or that are undefined and need direction, they shall be brought to the attention of the Engineer or Construction Manager via the RFI process.

B. Where connections must be made to existing or new operational facilities, the Contractor shall schedule all the required work with Engineer, including the power shutdown period. Carry out each shutdown so as to cause the least disruption to the operation of the installation.

   1. The Contractor shall limit all unscheduled shutdown periods to less than 15 minutes and only with prior approval of the Station operator.

   2. Carry out shut downs of durations greater than 15 minutes only after the time and date schedule and sequence of work proposed to be accomplished during shutdown has been favorably reviewed by the Engineer. Submit shutdown plans at least 2 days in advance of when the scheduled shutdown is to occur.

   3. Provide temporary power to all existing facilities utilizing a portable generator. The generator shall be utilized for all shutdowns that exceed 15 minutes and run continuously for the duration of the primary power shutdown. All cost for operating the generator including equipment, fuel and labor shall be provided.

   4. The Engineer reserves the right to delay, change, or modify any scheduled shutdown at any time, at no additional cost to the Owner, when the risk of such a shutdown would jeopardize the
operation of the water distribution system and/or water plant operation.

1.06 SUPERVISION

A. The Contractor shall schedule all activities, manage all technical aspects of the project, coordinate submittals and drawings, and attend all project meetings associated with this Section. The Contractor shall coordinate and confirm that the project schedule is being adhered to and all work is being completed within the scheduled time frames.

B. The Contractor shall supervise all work in this Section, including the electrical system general construction work, from the beginning to completion and final acceptance.

C. The Contractor shall coordinate, obtain, prepare, and/or complete the documentation required within this division. All documentation shall be complete and delivered prior to final acceptance.

1.07 INSPECTIONS

A. General

1. Contract work or materials shall be subject to inspection at any time by the Engineer. If equipment, material, or installation method does not conform to the Contract documents, or does not have a favorably reviewed submittal status and has been determined to be unsatisfactory by the Engineer, then the Contractor shall remove said material from the premises; and if said material has been installed, the entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by the Contractor.

2. The Engineer may inspect and test the fabricated equipment at the factory before shipment to job site. See Electrical Specifications [Factory and Field Testing] for requirements.

3. Work shall not be closed in or covered over before inspection and approval by the Engineer. All costs associated with uncovering and making repairs where non-inspected work has been performed shall be borne by the Contractor.

4. The Contractor shall cooperate with the Engineer and provide assistance at all times for the inspection of the electrical system under this Contract. The Contractor shall remove covers, provide access, operate equipment, and perform other reasonable work which, in the opinion of the Engineer, will be necessary to determine the quality of the work.
B. Milestones requiring inspection and signoff.

1. Underground conduit and grounding system complete. Do not cover any portion of conduit prior to inspection. Conduits must be labeled with temporary tags per Electrical Specifications [Conduit and Boxes] and [Grounding].

2. Factory testing. Coordinate test date with Engineer 2 weeks prior to test scheduled date.

3. Installation of electrical equipment. Equipment is anchored in place, conduit connections are complete, no wire is yet pulled into conduit. Permanent conduit tags must be in place per Electrical Specifications [Conduit and Boxes] and [Grounding].

4. Wire termination complete. Do not energize equipment. All wire tags must be installed and wires terminated per Electrical Specifications [Low Voltage Wire and Data Cable]. Pre-energization testing to commence after inspection.

5. Testing per Electrical Specifications [Factory and Field Testing]. All testing per Electrical Specifications [Factory and Field Testing] shall be witnessed unless specifically declined by the Engineer. Schedule tests with Engineer 2 weeks prior to test date.

6. Start-up per Electrical Specifications [Factory and Field Testing]. Schedule tests with Engineer 2 weeks prior to test date.

7. Punch list – final inspection. Schedule final walkthrough with Engineer one week prior to intended project completion date. All items on punchlist must be complete prior to scheduling walkthrough.

1.08 JOB CONDITIONS

A. Construction Power and Telephone Service

1. The Contractor shall coordinate, furnish and install, temporary utility services required during construction of the project, such as temporary electrical power and telephone service. Temporary services shall be installed in accordance with the applicable codes and regulations of the serving utilities.

2. Upon completion of the project, remove temporary services. All equipment and material shall be the property of the Contractor.
B. Equipment Storage

1. The Contractor shall provide adequate protection for all equipment and materials during shipment, storage and construction.

2. Equipment and materials shall be completely and sufficiently sealed and covered and set on a pallet above grade so that they are protected from weather, wind, dust, water, or construction operations.

3. Equipment shall not be stored outdoors. Where equipment is stored or installed in an area with susceptibility to moisture, such as unheated buildings, untested piping, etc., provide an acceptable means to prevent moisture damage, such as plastic cover and a uniformly distributed heat source to prevent condensation.

C. The project site is located where outside temperatures vary between 10 deg F. to 110 deg F. Humidity in this area will range from 10% to 100%.

1.09 AREA CLASSIFICATIONS

A. Area classifications are shown on the site electrical plans. The area enclosed by walls or the entire drawing area shall be classified as shown unless otherwise described in notes.

B. All electrical equipment, enclosures, conduit, and supports shall be formally rated for or, at minimum, meet the intent of the rating as interpreted by Engineer.

C. If no area classification rating is shown on the drawings, classification shall default to a NEMA 12 rating for indoors, and NEMA 4 rating for outdoors (non corrosive) and NEMA 4X for corrosive areas both indoors and outdoors.

1.10 SUBMITTAL REQUIREMENTS

A. General

1. Requirements described herein are specific to electrical submittals and are secondary to those described in other general specifications sections. Any additional requirements described here that are beyond those described in those sections shall be provided as described. Conflicts shall be resolved by giving priority to general specifications.
2. The Contractor shall ensure that the System Integrator and/or equipment suppliers provide the submittal documentation required in this section. Submittals shall be neat, orderly, complete (without un-needed parsing), and indexed.
   
a. Like equipment shall be submitted complete in a single submittal. For instance, all general electrical materials shall be in a single submittal. All instrumentation, all control panels, or all MCCs and so on shall be submitted complete where possible.
   
b. Submittals that are broken down without sufficient cause will be rejected for future inclusion into a combined submittal.
   
c. Do not separate submittals by area.
   
d. Do not separate submittals by specification division unless agreed to in advance.
   
e. Submittals for work scope covered in this contract are expected to be as follows. This list is intended to be a guideline and not to be specific of all submittals required. Project circumstances or leadtimes or availability will each impact the order and division of submittals.

   1) General electrical materials – conduit, wire, labels, etc.
   2) Power Distribution and Motor Controls
   3) Seismic Calculations
   4) Instrumentation
   5) Factory and Field Testing forms and procedures
   6) O&M Manuals

3. The Contractor shall coordinate submittals with the work so that project will not be delayed. This coordination shall include scheduling the different categories of submittals, so that one will not be delayed for lack of coordination with another. Time extensions will not be allowed due to failure to properly schedule submittals.

4. No material or equipment shall be delivered to the job site until the submittal for such items has been reviewed by the Engineer and marked "no exceptions noted" or "make corrections noted".

5. The equipment specifications have been prepared on the basis of the equipment first named in the Specifications. The Contractor shall note that the second named equipment, if given, is considered acceptable and equal equipment, but in some cases additional design, options, or modifications may be required to meet Specifications or functional installation.
6. Exceptions to the Specifications or Drawings or equipment or procedures submitted as “equal” to specified equipment shall be clearly identified in a letter at the front of the submittal. Submittal data for “equal” equipment or procedures shall contain sufficient details so a proper evaluation may be made by the Engineer. The Contractor is responsible for verifying proper application/operation of substituted equipment.

7. The opinion of the Engineer will be the final determination whether a substitution request meets the design intent.

8. Deviations from the Contract documents shall not be incorporated into the work without prior written approval of the Engineer. A "Change Order" directive from the Engineer is required prior to incorporating any deviation from the Contract documents that has costs associated. The cost differential associated with this change order must be negotiated with the Owner to amend the Contract to reflect the costs or savings.

B. Submittal Procedures

1. Identify all submittals by submittal number on letter of transmittal. Submittals shall be numbered consecutively and resubmittals shall have a letter suffix. For example:

   a. 1st submittal:  1
   b. 1st resubmittal:  1A
   c. 2nd resubmittal:  1B, etc.

2. Within 30 calendar days after contract award, the Contractor shall furnish to the Engineer all submittals (electronic) required for this Division. Interconnection drawings, training documents test procedures, and O&M Manuals as applicable shall be submitted timely as to not delay the project.

   a. Submittals shall be delivered entirely electronically via email (no hard copy required). However, General Contractor supervision must not be circumvented by sending submittals direct to Engineer.

   b. Electronic Submittals shall be viewable using a PDF reader.

   c. Electronic (PDF) submittals must follow all applicable requirements for indexing, bookmarks, highlighting, selection indicators (box, highlight) etc. Use of native PDF files (not scans) are required if one exists on the World Wide Web (WWW).
3. Submittal Preparation

a. Electronic submittals shall be assembled in accordance with the specifications with table of contents, bookmarks, tabs, subtabs, etc. utilizing the electronic bookmarks feature available in the PDF assembler. Only one PDF file is allowed for each submittal. Multiple (.PDF) files will not be acceptable.

b. Use of native PDF files (not scans) are required if one exists on the www. Ignoring this requirement is cause for submittal rejection.

c. Submittal shall be appropriately labeled with the project name, contract number, equipment supplier's name, specification section(s), and major material contained therein.

d. An index shall be provided. This index shall itemize the contents of each tab and subtab section.

e. Field equipment shop documents, panel equipment shop documents, drawings, and bill of materials shall be grouped under separate tabs. Shop documents shall be ordered in the same sequence as their corresponding Contract specification subsection.

f. All spare parts shall be listed separately at the end of the Bill of Materials list.

g. Data summary sheets shall be provided for each individual piece of instrumentation. The data summary sheets shall have the following information preceding their corresponding catalog data:

1) Instrumentation type and tag name.
2) Location/description.
3) The manufacturer's model and part number with all options.
4) Range, span, units, input and output signals.
5) Description of component.
6) Contract specification subsection number reference.

4. The reviewed submittals will be annotated "Make Corrections Noted", "No Exceptions Noted", "Revise and Resubmit Noted Items", or "Rejected without Review." The following actions shall then be taken by the Contractor:
a. "No Exceptions Noted" - The Contractor may proceed with the work covered in this submittal. No resubmission is necessary.

b. “Make Corrections Noted” - The Contractor may proceed with the work covered in this submittal incorporating the changes noted. However, the Contractor shall revise the submittal in accord with the changes noted and resubmit six (6) copies of drawings, bill of materials, and catalog data denoting changes within 14 calendar days when requested by the Engineer for record keeping purposes.

c. "Revise and Resubmit Noted Items" - The Contractor shall not proceed with the work covered in this submittal. The Contractor shall revise and correct the submittal in accordance with the comments and resubmit six (6) copies within 14 calendar days for approval.

d. "Rejected without Review" submittal - The Contractor shall not proceed with the work covered in this submittal. The submittal did not address the work scope as defined by the submittal’s title or the previous submittal comments have not been addressed in full. The Contractor shall revise and correct the submittal in accordance with the specifications, and resubmit six (6) copies within calendar 14 days for approval.

5. Resubmittals shall address all comments by the Engineer. A submittal response letter shall be submitted that addresses each comment by the Engineer with a standardized response of “revised” or with a written explanation. Partial re-submittals (that do not address all comments) may be returned without review at the discretion of the Engineer.

6. The Contractor shall be responsible for the Engineer's review cost for each resubmittal in excess of the second resubmittal. These costs will be back-charged to the Contractor and will be deducted from his progress payments.

C. Electrical Equipment -- Submittal data shall be grouped by equipment type. Each submittal shall be as complete as possible covering the entire project and scope of supply. Drawings or equipment submitted individually that are not on the critical path will not be accepted for individual review. The electrical submittals shall include (as a minimum):
1. Table of Contents

2. Comment Letter: The Project Engineer of the System Integrator shall note all deviations from Contract Documents and the reason(s) for the deviation. They may use this forum to inform the Engineer or installing Contractor of important information related to the project. RFIs must be submitted separately. Re-submittals shall include written responses to every comment provided by the Engineer during the previous review.

3. Bill of Materials: The Contractor and System Integrator each shall provide Bill of Material for electrical components formatted as shown below. Generic names or part numbers as defined by a distributor or Integrator are not acceptable. Only the originating manufacturer's name and part number shall be listed. Provide separate bill of materials for each panel, MCC, instrument list, etc.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Qty</th>
<th>Tag#</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Part #</th>
</tr>
</thead>
</table>

4. Shop Drawings:
   a. Equipment elevations with enclosure details drawn to scale or dimensioned with relative scale.
   b. Electrical One-line, Elementary, and wiring diagrams
   c. PLC I/O wiring diagrams

5. Catalog Data shall include the following: (features and options shall be highlighted, circled, or “arrowed.”)
   a. Instrumentation data summary sheets (by Contractor)
   b. Manufacturer's technical information brochure
   c. Physical size and mounting details and illustrations
   d. Calibration Range
   e. Input/output signals
   f. Electric power, air, and/or water supply requirements.
   g. Options selected and available (Cross out items not included)
   h. Materials of construction of components

6. Construction Sequence Plan: Include equipment delivery schedules and installation schedules for each piece of equipment. Include demolition and shutdown requirements during installation.
D. Shop Drawings - Shop drawings shall be furnished for each electrical panel even if one was not shown explicitly on the Drawings. Shop drawings shall be numbered in sequence. Blank drawings or drawings that contain no specific project data will not be accepted for review.

All drawings shall be generated with a computer utilizing AutoCAD or similar drafting program. Drawings shall be no smaller than 11" x 17". The lettering shall be legible and no smaller than 0.75 inch in height.

Drawings shall be custom prepared for this project and shall have borders and a title block identifying the project, manufacturer, system or location, drawing number, drawing title, AutoCAD file name, project engineer, date, revisions, and type of drawing. Diagrams shall carry a uniform and coordinated set of wire colors, wire numbers, and terminal block numbers. The shop drawings shall include the following as a minimum:

1. Electrical one-line diagrams detailing all devices associated with the power distribution system. The following applicable information or data shall be shown on the one- or three- line diagram: location, size and amperage rating of bus; size and amperage rating of wire or cable; breaker ratings, number of poles, and frame sizes; power fail and other protective devices; fuse size and type.

2. Detailed analog and digital I/O diagrams showing the wiring requirements for each instrument or device connection. Reference the Drawings for an example of each I/O card drawing requirements. If one is not included in the Drawings, then one may be obtained from the Engineer upon request.

3. Elementary (wiring) diagrams shall be provided for all relay logic, programmable logic controls, motor controls, power supplies, and other wiring. All elementary (wiring) diagrams shall be drawn in JIC EMP/EGP format and standards showing ladder rung numbers and coil and contact cross referencing numbers.

4. Equipment exterior and interior scaled drawings of front, side, elevation, deadfront, front panel devices, and backpan components. Show fabrication methods and details; including material of construction, paint color, door latch and lock, and ventilation system. Show shipping split locations and offloading information. Submit base plan showing allowed conduit entrance areas and bolt hole locations.

5. Drawings shall show UL required information as needed to UL label the equipment in accordance with UL procedures for label applied.
6. Submit full size drawing of all nameplates and tags, as specified herein, to be used on project. Submittal to include the following:

   a. Dimensions of nameplate.
   b. Exact lettering and font for each nameplate.
   c. Color of nameplate.
   d. Color of lettering.
   e. Materials of construction.
   f. Method and materials for attachment.
   g. Drawing showing location of nameplates on each, panel and enclosure.

E. Seismic Anchor Design Calculations

1. All switchgear, motor controls centers, transformers, cabinets, raceways, supports, and electrical materials shall be so installed as to remain in a secure and captive position when subjected to a horizontal force in accordance with the current, applicable, and more stringent of California Building Code (CBC) or International Building Code (IBC) requirements. Method of securing shall constrain equipment against both vertical and horizontal forces and overturning forces.

2. Calculations as prepared by a structural engineer registered in the State of California shall be submitted in accordance with code requirements for earthquakes forces on all specified equipment. Calculations shall include wind loading forces for equipment installed outdoors.

1.11 OPERATING AND MAINTENANCE INFORMATION

A. Operational Training

1. At time of completion, the Contractor shall provide a period of not less than 6 hours training for instruction of operation and maintenance personnel in the use of systems. Instruct all personnel at one time in one session. Make necessary arrangements with manufacturer's representative. Provide product literature and application guides for user's reference during instruction.

B. Operations and Maintenance Manuals

1. Provide Operation and Maintenance manuals per specifications as described in “Submittal Requirements” in this section with the following additional requirements:
a. A comprehensive index.

b. A complete "Record" set of favorably reviewed electrical submittals as provided under subsection “Submittal Requirements” illustrating all components, piping, and electrical connections.

c. A complete list of the equipment supplied, including serial numbers, ranges, catalog cuts, and pertinent data.

d. Full specifications on each item.

e. Detailed service, maintenance and operation instructions for each item supplied. Schematic diagrams of all electronic devices shall be included. A complete parts list with stock numbers shall be provided for the components that make up the assembly. All of these shall be originals, no copies.

f. Special maintenance requirements particular to this system shall be clearly defined, along with special calibration and test procedures.

2. Submit electronic readable PDF file format (CD disk copies (2) or email with attachments or download links) of the proposed O&M manuals for review by the Engineer. Submittals shall be delivered timely to the Engineer to allow for review period, corrections, and re-submissions as necessary.

a. General Contractor supervision must not be circumvented by sending submittals direct to Engineer.

b. O&M Submittals shall be published 1\textsuperscript{st} electronically and 2\textsuperscript{nd} on hard copy paper stock.

c. Electronic Submittals shall be transmitted with the hard copy submittals and be viewable using a PDF reader.

d. Electronic submittals shall be assembled in accordance with the specifications for hard copy submittals with table of contents, bookmarks, tabs, subtabs, etc. utilizing the electronic bookmarks feature available in the PDF assembler.

e. Electronic (PDF) submittals must follow all applicable requirements for hard copy submittals including indexing, item selection indication, bookmarks, etc.
3. Provide four (4) hard copy O&M manuals per specifications as described in SUBMITTALS REQUIREMENTS in this section.
   
a. Deliver approved hard-copy O&M manuals to the project site and Owner prior to pre-operational testing or equipment start-up.

C. At the end of the project hard copy and soft copy electronic PDF files, shall be updated to "as-built" conditions.

D. Provide two (2) sets of compact disk (CD) containing all shop drawings, application programs, configurations, calculations, documents or other computer electronic files prepared for this project in native file format and updated to reflect as-built conditions.

PART 2: PRODUCTS

2.01 QUALITY

A. All equipment and materials shall be new, in current production, and the products of reputable suppliers having adequate experience in the manufacture of these particular items. For uniformity, only one manufacturer will be accepted for each type of product.

B. Products specified that have become obsolete (out of current manufacturing, or have been superseded by another product) shall be cross-referenced to a replacement product(s) and provided in lieu of the specified product(s) for no additional cost. Under no conditions, shall products be submitted or furnished that are known (on manufacturer’s list of obsolescence) and expected to be removed from current production within 12 months after project submittal. Products found to have been furnished this way will be removed and replaced at Contractor’s expense.

C. All equipment shall be designed for the service intended and shall be of rugged construction, of ample strength for all stresses which may occur during fabrication, transportation, erection, and continuous or intermittent operation. All equipment shall be adequately braced and anchored and shall be installed in a neat and workmanlike manner. Appearance and safety, as well as utility, shall be given consideration in the design of details. All components and devices installed shall be standard items of industrial grade, unless otherwise noted, and shall be of sturdy and durable construction suitable for long, trouble free service. Light duty, fragile and competitive grade devices of questionable durability shall not be used.
D. Products that are specified and include a manufacturer, trade name or catalog number are intended to establish a standard of quality, performance, warranty and service. Products that are specified “or equal,” do not prohibit the use of equal products of other manufacturers provided they are submitted, identified and promoted as equal, and favorably reviewed by the Engineer prior to procurement and installation.

E. Products submitted as “equal” to the named products will be reviewed for conformance with the specifications and in comparison with the first named product. If the equal product meets specifications, but does not have a feature or performance characteristic that is available with the first named product, and that feature or performance is required for this project, then the submitted equal product may be rejected on those grounds.

F. In the event that some claims of the manufacturer of submitted “equal” product are called into question by the Engineer, the Contractor, may be required to prove those claims either prior to installation or during startup of product. If the product does not meet the claims made or specifications, the product may be rejected by the Engineer and a replacement product must be submitted by the Contractor in its place. All cost for the rejected product, installation, testing, and removal will be the responsibility of the Contractor.

G. Underwriters Laboratories (UL) listing is required for all substituted equipment when such a listing is available for the first named equipment. Extra parts, labor, panel space, power supplies, circuit breakers, and/or GFIC devices shall be provided as necessary for incorporation of specified non-UL components.

H. When required herein or requested by the Engineer, the Contractor shall submit equipment or material samples for test or evaluation. The samples shall be furnished with information as to their source and prepared in such quantities and sizes as may be required for proper examination and tests, with all freight and charges prepaid. All samples shall be submitted before shipment of the equipment or material to the job site and in ample time to permit the making of proper tests, analyses, examinations, rejections, and resubmissions before incorporated into the work.

2.02 NAMEPLATES & TAGS

A. Equipment exterior nameplates - Nameplate material shall be rigid laminated black plastic with beveled edges and white lettering; except for caution, warning, and danger nameplates the color shall be red with white lettering. The size of the nameplate shall be as shown on the drawings. No letters are allowed smaller than 3/16”. All nameplates located outdoors
shall be UV resistant. Securely fasten nameplates in place using two stainless steel screws, type 316L, if the nameplate is not an integral part of the device. Epoxy cement or glued on nameplates will not be acceptable. Engrave the nameplates with the inscriptions as approved by the Engineer in the submittal.

1. For each major piece of electrical equipment provide a manufacturer's nameplate showing the Contract specified name and number designation, and pertinent ratings such as voltage, # of phases, ratings, etc.

2. For each device with a specific identity (pushbutton, indicator, instrument, etc.) mounted on the exterior or deadfront of a piece of equipment provide a nameplate with the inscription as shown on the Drawings and described herein.

3. Where no inscription is indicated on the Drawings or described herein, furnish nameplates with an appropriate inscription providing the name and number of device.

4. Install Safety Signs in accordance with the latest OSHA requirements.

   a. Entrances to electrical rooms and stations: Danger Sign requirements, ELECTRICAL ROOM, HIGH VOLTAGE (define voltage, example 480 VAC) KEEP OUT, AUTHORIZED PERSONNEL ONLY.

   b. Equipment enclosures, cable tray and wireway where 120 VAC or higher and 50 V DC and higher exist: Danger Sign requirements, HIGH VOLTAGE (define voltage, example 480 VAC) AUTHORIZED PERSONNEL ONLY.

   c. Equipment such as motor control centers, control panels, etc., where more than one source may be present in an enclosure or cubicle: Danger Sign requirements, VOLTAGE (define voltage, example 120 VAC control voltage or 480 VAC power) FROM MULTIPLE SOURCES IN THIS ENCLOSURE.

   d. Equipment such as switchboards, switchgear, panelboards and motor control centers: Warning Sign requirements, WARNING, SERVICE ENTRANCE DISCONNECT FOR 1 OF ___ (define quantity) SERVICES TO THIS BUILDING. OTHER SERVICE ENTRANCE DISCONNECTS ARE LOCATED AT (define locations).
5. Caution, warning and danger nameplates shall be red with white lettering

B. Equipment Interior Nameplates - Nameplate material shall be clear plastic with black machine printed lettering as produced by a KROY or similar machine; except caution, warning, and danger nameplates shall have red lettering. The size of the nameplate tape shall be no smaller than 1/2" in height with 3/8" lettering unless otherwise approved by the Engineer. Securely fasten nameplates in place on a clean surface using the adhesion of the tape. For each device with a specific identity (relay, module, power supply, fuse, terminal block, etc.) mounted in the interior of a piece of equipment provide a nameplate with the inscription as shown on the Drawings and described herein. Where no inscription is indicated on the Drawings or described herein, furnish nameplates with an appropriate inscription providing the name and number of device used on the submittal drawings. Stamp the nameplates with the inscriptions as approved by the Engineer in the submittal.

C. Equipment Tags - When there is no space or it is impractical to attach an engraved plastic nameplate with screws, as is the case with most field devices and instruments, the Contractor shall attach a tag to the equipment with the same inscriptions as specified above in paragraph A. The tag shall be made from stainless steel material and the size of the nameplate shall be no smaller than 3/8"h x 2"w with 3/16" machine printed or engraved lettering unless otherwise approved by the Engineer. The tag shall be attached to the equipment with stainless steel wire of the type normally used for this purpose.

2.03 FASTENERS

A. Fasteners for securing equipment to walls, floors, or ceilings, shall be stainless steel. The minimum size fastener shall be 3/8 inch diameter.

2.04 COMPONENTS

A. Switches and Pushbuttons

1. Switches (HS) and pushbuttons (HC) for general purpose applications shall be water and oil tight as defined by NEMA 4X, corrosion resistant as defined by NEMA ICS 6-110.58, U.L. listed, standard 30 mm diameter, with plastic holding nut.

2. Switches and pushbuttons shall have contacts rated NEMA A600 or 10 amperes continuous and 600 VAC. Provide NO and NC contacts as required.
3. Engraved black legend plates shall be provided to define each switch and pushbutton function.

4. Selector switch handles and pushbutton caps shall be black unless otherwise noted on drawing. Lock-out stop caps shall be red.

5. Selector switches for hand-off-auto (HOA) applications shall have the hand position to the left, off in center, and auto in the right position.

6. Pushbuttons and selector switches in hazardous locations shall have hermetically sealed contacts or explosion proof enclosures.

7. Lockout stop pushbuttons shall include padlocking attachment. Pushbutton type shall be coordinated with padlock attachment type.

8. Switches and pushbuttons shall be Allen-Bradley 800H, or equal.

B. Indicating Lights

1. Indicating Lights for general purpose applications shall be NEMA 4X, corrosion resistant as defined by NEMA ICS 6-110.58, U.L. listed, 30 mm diameter, with plastic lens, plastic holding nut, and miniature bayonet lamp base.

2. Lamp shall be full voltage 120 VAC with 28 chip (min) High Intensity LED.

3. Indicating lights shall have contacts rated NEMA A600 or 10 amperes continuous and 600 VAC. Provide NO and NC contacts as required.

4. Engraved black legend plates shall be provided to define each lights function.

5. Indicating light type and color of lens shall as follows or as otherwise shown on the Drawings:

   a. Open/On Green
   b. Closed/Off Red
   c. Alarm Amber or Blue
   d. Power On White

6. Indicating lights designated "PTT" on wiring diagram or shown with push-to-test wiring shall be provided with a push-to-test switch and wiring.
7. Indication lights shall be Allen-Bradley 800H, or equal.

C. Relays and Timers

1. Termination points on all devices 50V and above shall be finger-safe.

2. General: Relays and timers shall be provided with N.O. or N.C. contacts as shown on the Drawings. All spare contacts shown shall be provided. Contacts shall be rated 10 amps minimum at 120 VAC, 60 Hz unless otherwise shown on the Drawings. Coil voltage shall be 120 VAC unless otherwise described or shown on the Drawings. Relays and timers shall be designed for continuous duty. All relays shall be U.L. listed. All relays and sockets shall be the product of a single manufacturer. The following is a summary of abbreviations associated with relays and timers:

- CR – Control relay
- TR – Timing relay
- TDOE – Time delay on energization
- TDOD – Time delay on de-energization
- PR – Power Relay
- PFR – Phase Fail Relay
- VR – Voltage Sensor Relay

3. Sockets for plug-in relays and timers shall be standard industrial type DIN rail mount with barrier type pressure plate screw terminals. Sockets shall be rated 300 VAC, 10 amps minimum.
   a. Blade 8 or 11 pin for coil voltage above 90 volts AC or DC.
   b. Octal 8 or 11 pin for coil voltage below 90 volts AC or DC.

4. Control relays (CR) shall be plug-in type with neon indicating lights and clear see-through sealed housing to exclude dust. Provide IDEC Type RR, or equal. Two form-C contacts (minimum) shall be provided on each relay.

5. Time delay relays on energization (TR-TDOE) shall be solid state plug-in relays with adjustable timer ranges from 1 second to 10 hours selectable unless other ranges are shown. Provide LED timer energized indicator lamp. Time delay relays shall be IDEC RTE, or equal.

6. Time Delay Relays (TR-TDOD)
   a. Time delay relays on de-energization (TR-TDOD)
(continuous power control input) shall be solid state plug-in relays with a timer adjustable range from 1 second to 10 hours selectable unless other ranges are shown. Provide LED timer energized indicator lamp. Time delay relays shall be IDEC RTE, or equal.

b. Time delay relays on de-energization (TR-TDOD) (true off) shall be solid state plug-in relays with a timer adjustable range from 1 second to 10 minutes unless other ranges are shown. True off time delay relays shall be IDEC GT3F-2, or equal.

7. Power relays (PR) shall be plug-in type and clear see-through sealed housing to exclude dust. Provide Magnecraft Type 389FXCXC-120A, or equal. 3PDT contacts rated 20A or 1 HP at 240 VAC (minimum) shall be provided on each relay. Furnish compatible blade type relay socket model 70-788EL11-1 or equal.

2.05 MOLDED CASE CIRCUIT BREAKERS

A. GENERAL

1. Circuit breakers and motor circuit protectors shall be manufactured by Eaton Cutler-Hammer, Square D, G.E., Siemens, or equal.

2. Circuit breakers shall be the bolt-on type.

3. Multiple-pole circuit breakers shall be designed so that an overload on one pole automatically causes all poles to open. The use of tandem or dual circuit breakers in a normal single-pole space to provide the number of poles or spaces specified are not acceptable.

4. Molded case circuit breakers shall be operated by a single toggle-type handle and shall have a quick-make, quick-break switching mechanism. An automatic trip of the breaker shall be clearly indicated by the handle position. Contacts shall be non-welding silver alloy and have flash reduction arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.

5. Minimum interrupting capacity:
   a. 480 volt circuit breaker shall have a minimum interrupting capacity of 42,000 amperes.
   b. 120 or 208 or 240 volt breaker shall have a minimum interrupting capacity of 22,000 amperes
6. Circuit Breakers protecting full voltage or solid state reduced voltage motor starters shall be motor circuit protector (MCP) breakers with adjustable magnetic trip unless otherwise noted on the drawings.

7. Circuit breakers shall be UL listed for series application.

8. Where indicated circuit breakers shall be current limiting.

9. Where indicated on Drawings, provide UL listed circuit breakers for continuous duty at 100% of their ampere rating in the intended enclosure.

10. Furnish add-on features such as auxiliary position status contacts, trip indication contacts, shunt trip coils, etc, as shown in the drawings.

B. TRIP UNIT – Molded Case Circuit Breakers

1. Circuit Breakers less than 400 volt shall have thermal-magnetic (TM) trip units and inverse time-current characteristics. All other circuit breakers shall have trip units as Defined herein.

2. The trip unit shall be Eaton type Digitrip 310+ or equal.

3. Each molded case circuit breaker microprocessor-based tripping system shall consist of three (3) current sensors, a trip unit and a flux-transfer shunt trip. The trip unit shall use microprocessor-based technology to provide the adjustable time-current protection functions. True RMS sensing circuit protection shall be achieved by analyzing the secondary current signals received from the circuit breaker current sensors, and initiating trip signals to the circuit breaker trip actuators when predetermined trip levels and time-delay settings are reached.

4. Interchangeable rating plugs shall establish the continuous trip ratings of each circuit breaker. Rating plugs shall non-adjustable. Rating plugs shall be interlocked so they are not interchangeable between frames, and interlocked such that a breaker cannot be closed and latched with the rating plug removed.

5. Furnish 24VDC power supply with terminal blocks and 0.5A miniature circuit breakers to distribute power to each circuit breaker trip unit that requires it. Circuit breaker trip units shall be operable and adjustable with zero current flowing through the circuit breaker. The power supply shall be connected after the main breaker and above any feeder circuit breakers.

6. System coordination shall be provided by the following microprocessor-based time-current curve shaping adjustments:
   a. Adjustable long-time setting (set by adjusting the trip setting dial to an amount not to exceed rating plug)
b. Adjustable short-time setting and delay with selective flat or $I^2t$ curve shaping,
c. Adjustable instantaneous setting
d. Adjustable ground fault setting and delay with selective flat or $I^2t$ curve shaping.

7. The microprocessor-based trip unit shall have both powered and unpowered thermal memory to provide protection against cumulative overheating should a number of overload conditions occur in quick succession.

8. Furnish internal ground fault protection with adjustable settings. Provide neutral ground fault sensor for four-wire loads.

9. Breakers shall have built-in test points for testing the long-time delay, instantaneous, and ground fault functions of the breaker by means of a test set.

### 2.06 MOTOR CONTROL ACCESSORIES

A. Control Power Transformer:

1. Control power transformer shall be epoxy encapsulated for dust and moisture protection. The internal wiring shall be copper and have 105 deg. C insulation rating. The unit shall feature barriered screw terminals for connection to electrical circuits. Provide with time-delay, slow-blow secondary fuse rated to protect the transformer and interrupt 10,000 amperes at 120VAC. Two primary fuses rated for 480 VAC and AIC as shown in the Drawings shall be provided. Transformer minimum size and voltage ratings shall be as shown on Contract drawings. Control power transformer shall be Micron Impervitan, Cutler Hammer MTE or equal.

B. Variable Frequency Drive:

1. Each variable frequency drive (VFD) shall be provided as a standalone unit. The VFD shall be of the latest technology capable of driving variable or constant torque motor loads at variable speeds to control and/or maintain a process variable (level, flow, pressure, etc.) by varying the motor speed. The VFD shall have the following attributes:

   a. The VFD shall use high efficiency sinusoidal PWM (pulse width modulation) control of IGBT power transistors.
b. Alpha-numeric human interface module (HIM) digital display with keypad to view and adjust diagnostic and status indicators.

c. Continuously operable in ambient temperatures, 32°F to 122°F (0°C to 50°C), and relative humidity, 95% non-condensing.

d. Automatic fault reset to automatically restart the drive after any type of fault condition -- up to three attempts. When the drive is locked out after its automatic reset attempts the operator shall be able to reset the VFD by cycling power or HIM.

e. DC digital inputs for start, preset speed and direction; relay outputs for alarm and run; 4-20 mA input for speed command.

2. Contractor

3. The VFD shall be an Allen-Bradley Power Flex 525, or equal.

4. Contractor shall provide recommended spare parts for each frame of VFD.

2.07 DEVICES

A. Switches

1. General purpose commercial grade switches shall be manufactured in accordance with UL 20. Switches shall be one pole, brown, 20 amps at 277 VAC, 1HP at 120 VAC, 2 HP at 240 VAC. Switches shall have copper alloy contact arm with silver cadmium oxide contacts. Switches shall have slotted terminal screws and a separate green grounding screw. Provide Leviton 1221, or equal.

2. Wall mount commercial grade motion detector switches (denoted with M next to switch symbol in drawings) shall utilize passive infrared detection with 180 deg field of view to determine if the space is occupied by personnel. The device shall be capable of switching incandescent (800W at 120V) and fluorescent (1200VA at 120V) lamps with electronic ballasts. The device shall feature a manual-off-auto switch. A delay off time adjustment shall be settable from 30 seconds to 30 minutes. The device shall incorporate a photocell with light intensity adjustment to keep the switch from activating when light levels are above setting. Provide Leviton ODS10, or equal.
3. Timer Switches (denoted with T next to switch symbol in drawings) shall provide a variable time range countdown of lighting circuit. Depressing touchplate turns lights on for the dial setting located behind the touchplate. Dial setting ranges of 1 minute to 18 hours shall be attainable. An illuminated LED indicates the load is on and blinking LED accompanied by annunciator sound indicates end of time cycle. Device shall be capable of switching incandescent (600W at 120V) and fluorescent (900W at 120V) lamps with electronic ballasts. Timer Switch shall be Leviton 6652, or equal.

4. Time Clock Switches (denoted with TC next to switch symbol in drawings) shall provide a programmable automatic time on/off of lighting circuit. Settings each 30 minutes for 24 hours shall be attainable by setting from front of switch. An illuminated LED indicates the load is on. Device shall be capable of switching incandescent (900W at 120V) and fluorescent (1200W at 120V) lamps with electronic ballasts. Timer Switch shall be Leviton 6124, or equal.

5. Thermostat Switches (T in circle on drawings) shall have a plastic NEMA 4X rated housing with stainless steel temperature sensing coil externally mounted. A face mounted dial shall allow temperature settings for heating and cooling from 40 to 104 deg F. The switch shall be rated for 120/240 volt at 10A inductive/16A resistive, SPDT. Temperature switch shall be Esapco TH15 or equal.

6. Special purpose switches shall be provided with the amperage, voltage, and configuration as shown on the Drawings. Switches used as motor disconnects for single phase motors shall be horsepower rated.

B. Receptacles

1. General purpose receptacles shall be commercial grade, duplex and rated 20 amps, 120 VAC, 2 pole, 3 wire grounding, NEMA 5-20R configuration, specification grade, and side wired to screw terminals. Face color shall be brown when paired with stainless steel covers. General purpose receptacles shall be specification grade Leviton 5362-B or equal.

2. Ground fault circuit interrupter receptacles shall be used where noted as GFI on plan or where in outdoor NEMA 3R locations. GFI receptacles shall be commercial grade, duplex, brown, 20A, 120V, back and side wired, with "test" and "reset" buttons. "Daisy Chain" connecting multiple receptacles from one GFI unit is not acceptable. GFI receptacles shall be Leviton 8898, Leviton MGNF2-B, Leviton 7899, or equal.
3. Boxes shown in NEMA 3R environments and outdoor locations shall be weatherproof while in-use. Furnish in-use weatherproof covers and weatherproof boxes for these areas.

4. Definite purpose receptacles and plugs in NEMA 4 or 4X environments where a receptacle is shown and a device is to be connected continuously, shall be listed as UL type 4, 4X, (Plug) and NEMA 3R (flip cover). Receptacles, plugs, and housings shall be fabricated of impact resistant plastic with o-rings and gaskets to prevent the entrance of water, vapors, and chemicals when unplugged or plugged. Circular plugs shall be retrofitted onto equipment so as to be compatible with the receptacles to maintain in-use ratings. Furnish Hubbel Watertight Wiring Devices and Accessories, or equal.

2.08 PANELBOARDS AND TRANSFORMERS

A. Panelboards:

1. General
   
   a. The Contractor shall furnish panelboards of a type indicated on the one-line Contract drawings and specified herein.

   b. Furnish and install padlock lock-off attachment for each circuit breaker.

   c. Panelboards shall comply with the applicable sections of UL, NEC, and NEMA and shall be Cutler Hammer Pow-R-Line, Square D, ITT or equal.

   d. A machine-typed circuit directory with clear plastic cover shall be supplied mounted on the inside of door in a frame when equipment is shipped. Circuit directory shall be as approved in the Submittal.

2. Interiors

   a. Interiors shall be completely factory assembled with bolt-on devices.

   b. Branch circuit breakers shall include padlock lockout provisions. Provide Cutler Hammer QLPB123PL or equal. Main breakers shall include padlock hasp suitable for frame size.

   c. Full size insulated neutral bars shall be included. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection.
d. Main bus bars shall be plated copper seized in accordance with UL standards to limit temperature rise on any current carrying part to a maximum of 50 degrees C above an ambient 40 degrees C maximum.

e. A copper ground and neutral bus shall be included in all panelboards with terminal screws.

3. Boxes

a. Provide minimum gutter space in accordance with the National Electric Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.

4. Trims

a. Provide a hinged door over all circuit breaker handles. Doors in panelboard trims shall not uncover any live parts. Doors shall have a catch, lock and trim.

b. Surfaces of the trim assembly shall be properly cleaned, primed and a finish coat of gray ANSI 61 or 49 or to match MCC if contained within.

c. Surface trims shall be same height and width as box for surface mount, and ¾” (min) beyond box on all sides for flush mount.

5. Panelboard Ratings

a. Panelboards shall have voltage, phase and short circuit (AIC) ratings as shown on the drawings.

b. Breakers shall be a minimum of 100 ampere frame. Breakers 15 through 100 amperes trip size shall take up the same pole spacing.

c. Panelboards shall be labeled with a UL short circuit rating. When series ratings are applied with integral or remote upstream devices, a label shall be provided. Series ratings shall cover all trip ratings of installed frames. It shall state the conditions of the UL series ratings including:

1) Size and type of upstream device
2) Branch devices that can be used
3) UL series short circuit rating
B. Power Transformer:

1. The power transformer shall be ventilated dry type. Voltage and KVA ratings shall be as shown on the Contract Drawings. The transformer shall be as manufactured by Cutler Hammer, Jefferson, ACME, Square D, G.E., or equal.

2. Transformer shall meet latest DOE 2016 minimum efficiency standards.

3. Coils shall be manufactured of electrical grade aluminum (if stand-alone) or copper (if within a MCC or Switchboard) and shall be adequately braced for short circuit ratings and defined in ANSI and NEMA standards.

4. Transformers rated 31KVA and above shall have two 2½ percent taps above and below normal full capacity (ANFC and BNFC).

5. The transformer shall carry full load continuously at rated voltage and frequency without exceeding the average temperature rise of 115°C above an ambient temperature of 40°C. Insulation shall be rated for 220°C (UL class 220°C).

6. Impedance (Z): 4.0% +/- 0.3% or above to keep downstream fault currents to a minimum.

7. Low noise. For transformers installed within electrical equipment, vibration isolators shall be installed between the transformer and its mounting surface to reduce case vibration and associated noise.

8. For stand alone transformers, the transformer housing shall be securely fastened to the mounting surface with bolted connections sized appropriately to withstand seismic zone 4 forces.

9. The transformer shall be finished with two coats of enamel to resist rust and corrosion.

10. Transformers located inside electrical structures or enclosures shall be provided with adequate ventilation for heat removal as required.

11. Transformer neutral shall be grounded in accordance with Article 250-26 and 450-10 of NEC and any applicable local ordinances. Installation and protection of the transformer grounding conductors and attachments shall be per NEC 250-24.
2.09 RADIO SYSTEM

A. RADIO MODEM

1. Unlicensed 150-174 Mhz licensed narrowband radio for continuous communications to multiple addresses. The radio shall be system addressable to minimize interference from adjacent systems with different system addresses. The radio shall utilize a RJ45 port for Ethernet communications input and TNC connector for antenna lead connection output. The radio shall operate on 24 VDC radio with full performance over a temperature range of -30 deg C to +60 deg C. The radio shall be MDS Orbits LN, order code ECRL1BNNNNS1D1USUNNN, no equal.

2. Contractor shall provide four (4) hours of training for four (4) EID staff members on radios.

B. ANTENNA

1. Each antenna system shall be furnished and installed complete and functional for the intended use. An antenna system shall include but not be limited to, antenna, antenna pole, mounting hardware, lightning arrestor, and coaxial cables with connectors.

2. Antenna system shall be meet the following specifications:
   a. Antenna shall be installed and supported as shown on the Drawings. Support members shall have sufficient strength to withstand local wind conditions and shall be protected from sun exposure and weather damage.
   b. Support hardware such as clamps, orientation mounts, and offset brackets shall be steel protected with a hot dip galvanized finish or stainless steel. Clamps and mounts shall be heavy duty in order to transfer the full antenna load to the support tower or mast. Bolts and screws shall be stainless steel.
   c. The Yagi radio antenna shall be 7.3 dB gain, broadband, vertically polarized, directional type Yagi, VSWR <1.5:1, 50 ohm impedance, Kathrein Scala Div. CL-150/URM 147-174 or equal.

C. TRANSMISSION CABLE

1. Provide 50 Ohm, 0.4” weatherproof coaxial cable from lighting arrestor to antenna. The coax cable shall have a braided outer conductor of copper, copper-clad aluminum inner conductor with
foam dielectric. The coax cable shall be jacketed for corrosive environment and ultra-violet exposure. The coax cable shall be capable of a minimum bending radius of 1.5 inch. The cable shall be installed as one continuous length from the antenna to the lighting arrester. Antenna cable shall be Times Microwave LMR-400 coax cable or equal.

2. Cable end “N” connectors shall be furnished for field installation after the cable is run in conduit. Provide straight or right angle connectors as required for the installation as required.

3. Pigtail connector. Provide low loss connection cable for connecting the Radio antenna connection to the lightning arrester. Pigtail shall have compatible connectors for the radio and lightning arrester.

4. Furnish an antenna lighting arrester with “N” connector on the antenna coaxial transmission line. The lighting arrester shall be grounded to the control panel ground buss by a #8 AWG or larger bonding wire. The lighting arrester shall be insulated from the backpan. The lightning arrester shall be a PolyPhaser IS-50NX-C2 or equal.

5. The cable shall be carefully installed to prevent damage to the jacket and routed with a minimum bending radius of 8 inches except where required at the conduit to free-air transition.

6. Provide connector weatherproofing kits for outdoor exposed connectors. All mating connectors that are exposed to weather shall be wrapped with a sealing material designed to protect against water and dirt entry into the connectors.

2.10 SPARE PARTS

A. The Contractor shall supply all spare parts prior to start of field tests. All parts shall be sealed in plastic bags and delivered to the site in a heavy duty plastic storage bag. Bag shall be clearly labeled with part name & number and the corresponding equipment tagname.

B. The Contractor shall make available any replacement parts that are not manufacturer's normal stock items for immediate service and repair of all the instrumentation equipment throughout the warranty period.

C. The following spare parts shall be provided as part of this Contract:
   1. Ten fuses for each type of fuse below 31 amps, 3 of each type above
   2. Two lamps per color LED type.
   3. Two relays for each type of control, and time delay relay.
PART 3: EXECUTION

3.01 CONSTRUCTION METHODS

A. Equipment shall be assembled and wired by the manufacturer prior to shipment. Field modifications or changes are not allowed without a written "change order" to the Contract. Field changes, however large or small, shall be executed using the components, materials, wiring, labeling, and assembly methods identical to that of the original supplied equipment.

B. Electrical plugs, receptacles, cords, and connectors required to power or interface the equipment and panels shall be furnished and installed by the Contractor.

C. Factory as-built drawings for each custom manufactured control panel or MCC shall be shipped with the equipment and placed inside in waterproof envelopes.

3.02 EQUIPMENT FABRICATION

A. All electrical equipment, including custom manufactured equipment, shall meet the requirements of Underwriters Laboratories (UL) and bear the appropriate label. Panels shall be affixed with UL label prior to shipment and be built in accordance with the UL guidelines and procedure that corresponds to the UL label. Custom control panels shall bear a UL-508 label, minimum, with additional UL labels as required per intended service.

1. Design and furnish a Low Voltage Limited Energy Circuit for any device(s) not bearing a UL listing or registration that are required to be installed into a UL labeled panel.

2. Revise voltages for any electrical parts and equipment that are specified that do not bear the UL listing or registration.

B. Panel cutouts for devices (i.e. indicating lights, switches) shall be cut, punched, or drilled and smoothly finished with rounded edges. Exposed metal from cutouts that are made after the final paint finish has been applied shall be touched up with a matching paint prior to installing device.

C. Equipment doors shall swing freely and close and latch with proper alignment.

D. Component within the electrical equipment shall be securely mounted on an interior subpanel or backpan and arranged for easy servicing. Mounting bolts and screws shall be front mounted for device removal without special tools or removal of entire mounting panel.
E. A ground bus shall be provided in each enclosure or cabinet. It shall have provisions for connecting a minimum of ten grounding conductors. Screw type lugs shall be provided for connection of grounding conductors. All grounding conductors shall be sized as shown on plans or in accordance with NEC Table 250-95, whichever is larger.

F. Bolts and screws for mounting devices on doors shall have a flush head which blends into the device or door surface. No fastening devices shall project through the outer surfaces of equipment.

3.03 WORKMANSHIP

A. All work in this division shall conform to the codes and standards outlined herein.

B. Installation shall be performed by qualified personnel providing first class workmanship per Electrical Specifications [Electrical General, Qualifications].

C. Maintain equipment installed (or to be installed) in new condition. Protect equipment from damage while in Contractor care from dust, water, or mishaps that are typical to construction sites.

D. Confirm that equipment and materials are correct for their intended duty and will be installed per manufacturer guidelines. Equipment and components found to be installed inconsistent with manufacturer guidelines and/or these specifications will not be acceptable and subject to removal and replacement.

E. Upon completion of daily work, remove excess materials, scraps, and debris from the work area and from the inside of equipment.

F. Upon notification, stop work on any portion of the installation that is determined to be non-compliant with contract or being installed by unqualified personnel.

G. Perform all work to correct improper installations at no additional cost to the owner.

H. Equipment furnished under this contract or provided to Contractor for installation shall be installed in accordance with manufacturer's instructions, installation calculations, and contract documents.
3.04 EQUIPMENT SHIPMENT AND STORAGE

A. Shipment -- Any equipment whose destination (jobsite) is more than 25 miles from the factory 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.

B. Storage -- From the time of receipt until the equipment is installed and energized, the equipment shall be considered in storage. While in storage, a 120V, 1 phase source of power shall be made available and connected to space heaters in all items of equipment so equipped. Equipment not provided with space heaters shall be provided with a light bulb or electric heater while in storage to prevent moisture condensation. Unless stored indoors, it shall be at least 1 foot above grade covered with at least 2 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.

3.05 DAMAGED PRODUCTS

A. Damaged products that cannot be repaired to new condition shall be replaced with new products. All equipment and materials shall be in like-new condition at start-up and commissioning.

B. Any equipment furnished outside of contract to the Contractor shall be repaired or replaced if damaged while in the Contractor's care. The Contractor shall pay for the parts and/or services of the original equipment manufacturer (OEM) to troubleshoot, assess, and repair damaged equipment.

C. Minor cosmetic damage shall be repaired 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.

3.06 INSTALLATION

A. General

1. Install all products per manufacturer's recommendations and the Drawings.

2. Provide all necessary hardware, conduit, wiring, fittings, and devices to connect the electrical equipment provided under other Sections.
3. Protect wiring insulation from wear by installing rubber cushions, bushings, or strip insulation, or by fastening the wiring to a rigid surface with zip ties and anchors.

4. Provide additional devices, wiring, conduits, relays, signal converters, isolators to complete interfaces of the electrical and instrumentation system.

5. Changing normally open contacts to normally closed contacts or vice versa

6. Adding additional relays to provide more contacts as necessary.

7. All programmable devices (not specifically excluded herein) shall be programmed, set-up and tested by the Contractor prior to startup. Programming and set-up parameters shall be adjusted or changed as directed by the Engineer during start-up and throughout the warranty period.

8. Coordinate with the Engineer and setup all alarm, process, and operation setpoints.

9. Keep a copy of the manufacturer’s installation instructions on the jobsite available for review at all times prior to and during the installation of the associated equipment.

B. Panels and enclosures:

1. Install panels and enclosures at the location shown on the Plans or approved by the Engineer.

2. Install level and plumb.

3. Seal all enclosure openings to prevent entrance of insects and rodents.

4. Clearance about electrical equipment shall meet the minimum requirements of NEC 110.26

C. Conduits and Ducts:

1. Install all conduits and ducts per Electrical Specifications [Conduit and Boxes] and [Grounding].

2. Minimum wire bending space at terminals and minimum width of wiring gutters shall comply with NEC tables 312-6 (a) & (b).
D. Wiring, Grounding, and Shielding:
   1. Observe proper grounding and shielding practices as this application environment is generally noisy. The shield of shielded cables shall be terminated to ground at one end only, the origination end. The shield at the other end shall be encased in an insulated material to isolate it from ground.

E. Cutting and Patching:
   1. The Contractor shall do all cutting and patching required for installing his work. Any cutting which may impair the structure shall require prior approval by the Engineer. Cutting and patching shall be done only by skilled labor of the respective trades. All surfaces shall be restored to their original condition after cutting and patching.

F. Cleaning and Touch up:
   1. At the completion of the work, all parts of the installation, including all equipment, exposed conduit, and fittings, shall be thoroughly cleaned of grease and metal cuttings. Any discoloration or other damage to parts of the building, the finish, or the furnishings, due to the Contractor's failure to properly clean the system, shall be repaired by the Contractor.
   2. The Contractor shall thoroughly clean any of his exposed work requiring same.
   3. Vacuum and clean the inside of all electrical and instrumentation enclosures prior to applying power.
   4. The Contractor shall paint scratched or blemished surfaces with the necessary coats of quick drying paint to match existing color, texture and thickness. This shall include all prime painted electrical equipment including but not limited to enclosures, poles, boxes, devices etc.

3.07 APPLICATION OF POWER

A. The Engineer will direct the energization and de-energization of all existing and new equipment. The Contractor is not authorized to energize or de-energize any equipment unless they have been given written permission to do so or while in the presence of the Engineer.

   1. Any equipment that is under repair, demolition or installation shall be locked off and tagged out of service with Contractor supplied padlocks and tags.
2. The Contractor is required to comply with NFPA 70E and specifically in regards to safety when working on live equipment. Obtain work permits when needed to do live work.

B. The Contractor is responsible for grounding of high and medium voltage cabling and/or bus during installation and removal of equipment. The contractor is responsible for complying with all California Electrical Safety Orders (ESO) and Occupational Safety and Health Act (OSHA) safety requirements and procedures while working in or near medium voltage equipment.

3.08 WARRANTY

A. The Contractor shall warrant all electrical and instrumentation equipment & software for a period of 1 year from date of final acceptance. Standard published warranties of equipment which exceed the preceding specified length of time shall be honored by the manufacturer or supplier.

B. The Contractor shall have a staff of experienced personnel available to provide on-site warranty service on 2 working days notice during the warranty period. Such personnel shall be capable of fully testing and diagnosing hardware & software and implementing corrective measures.

3.09 FINAL ACCEPTANCE

A. Final acceptance will be given by the Engineer after the equipment testing is complete, each deficiency has been corrected, final documentation has been provided, and all the requirements of Contract documents have been fulfilled.

B. At the end of the project, following the completion of the field tests, and prior to final acceptance, the Contractor shall provide the following:

1. Each "operation and maintenance" manual shall be modified or supplemented to reflect all field changes and as-built conditions.

2. Two (2) disk copies of all final documentation to reflect as-built conditions.

C. Keys: Submit two sets of all keys for locks supplied on this project. Wire all keys for each lock securely together. Tag and plainly mark with lock number or equipment identification, and indicate physical location, such as panel or switch number.

END OF SECTION
DIVISION 16 ELECTRICAL

CONDUIT AND BOXES

SECTION 16110

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Labor, materials, equipment, tools, safety gear, test equipment, incidentals, services, and transportation for a complete electro-mechanical installation as shown on the Drawings, included in these Specifications, or as can be reasonably implied from project descriptions.

B. The scope of work includes:

1. Furnish and install conduits, wireways, raceways, cable trays, junction boxes, pull boxes, and associated hardware. Provide conduit, fittings, hardware, hangars, mounting channel, and other parts for a complete raceway installation.

2. Furnish and install grounding system required by drawings, or if not shown or defined, as required by Article 250 of the NEC.

3. Installations shall be designed and installed with components meeting the NEMA area designation.

C. Work includes that specified in Electrical Specifications [Electrical General].

1.02 REFERENCES

A. Electrical Specifications [Electrical General]
B. Electrical Specifications [Low Voltage Wire & Data Cable]
C. Electrical Specifications [Grounding]
D. Project Drawings

1.03 QUALIFICATIONS

A. Material furnished under this specification shall be installed by qualified installers meeting requirements specified in Electrical Specifications [Electrical General, Qualifications].

1.04 SUBMITTAL REQUIREMENTS

A. Provide submittals and drawings as specified in Electrical Specifications [Electrical General, Submittal Requirements].
PART 2: PRODUCTS

2.01 CONDUIT, RACEWAYS AND WIREWAYS

A. GENERAL - Conduit, raceways, and wireways, wiring methods, materials, installation shall meet all requirements of the NEC, be UL labeled for the application, and meet the minimum following specifications.

1. All wiring shall be installed in conduits, raceways, or wireways when interconnecting equipment and devices.
   a. The minimum size conduit shall be 3/4-inch unless indicated otherwise on the Drawings or for special connections to equipment.
   b. Provide cords and cord seals for devices or instrumentation requiring waterproof seal to maintain NEMA 4 or 4X ratings. Example devices include lighting and pipe mounted instruments that are located below grade.

2. Conduits may connect into junction boxes or wireways as shown in the drawings or as requested by Contractor and approved by Engineer. Junction boxes (circle with J in drawings) can be as simple as a condulet or JIC box, or larger box as determined by contractor and needed for the installation. Drawing may or may not depict junction box requirements that may be required by code. Wireways or junction boxes shall be rated for area (as noted in the Drawings), or furnish minimum NEMA 4 if not noted.

3. The Contractor shall use conduit material types (SPEC per conduit schedule) as defined below or as otherwise shown in the contract drawings or as specifically called out in the conduit schedule.
   a. Non-exposed underground portions of conduit run shall be PVC-40 for all signals and voltages unless otherwise shown in the conduit schedule.
b. Exposed conduit material (not underground and beyond
transition) shall be per the following table unless specifically
noted otherwise in the plan drawings. The conduit schedule
denotes the conduit type for non-exposed (under-ground, in-
concrete, etc.) and does not apply or coordinate with this
table. Exposed condulets, elbows, fittings, device boxes, and
hardware shall be of the same material and finish as the
adjacent conduit.

<table>
<thead>
<tr>
<th>Location</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEMA 1 or 12</td>
<td>Galvanized rigid steel (GRS)</td>
</tr>
<tr>
<td>NEMA 3R</td>
<td>Galvanized rigid steel (GRS)</td>
</tr>
<tr>
<td>NEMA 4</td>
<td>PVC-Coated Steel (GRS-PVC)</td>
</tr>
<tr>
<td>NEMA 4X</td>
<td>PVC-Coated Steel (GRS-PVC)</td>
</tr>
<tr>
<td>Class 1 Div 1 or 2</td>
<td>PVC-Coated Steel (GRS-PVC)</td>
</tr>
<tr>
<td>hazardous</td>
<td></td>
</tr>
</tbody>
</table>

4. Conduit stubs and transitions:

a. Conduit transitions shall be GRS-PVC for 6” on either side of
the transition point (minimum) or as shown in drawing
details. Conduit transition is defined as conduit sections
emerging from or through concrete or earth or from below to
above grade or through walls or vaults, non-exposed to
exposed.

b. Beneath pad mounted electrical equipment, where not
exposed, shall be installed or trimmed to 2” or less above
slab and have bushing or end bell installed. Overall height of
conduit entering into the base of equipment shall be enough
for bushings/bells to be installed but be high enough for
conduit tags to be installed.

c. Uniform in height for each panel or section. Conduits end
bushings/bells shall not vary in height above slab more than
½” from lowest to highest.

d. Conduits shall be spaced apart such that bushings and end
bells may be installed without interfering with the adjacent
conduits.

e. Transitions to PVC shall include PVC coated locknuts to
shield exposed steel pipe threads.
f. Through walls – shall protrude approximately 2” and include end bell or bushing. Pack space around conduit with non-shrink grout if the thru-hole was core drilled.

g. Conduits for future use shall be capped with coupling and plug. Identify each end with conduit labels.

h. Existing conduits that are no longer able to be used due to removal of a section or shown demolished and that protrude above graded shall be cut flush and filled with grout.

5. Conduit Tags

a. All conduits listed in the “Conduit and Wire Routing Schedule” shall have conduit tags at both ends of each conduit run with tag number from schedule identified. This shall include ends within underground pull boxes.

b. All conduits shall have temporary tags during construction. Temporary tags may be made from duct tape with handwritten ink marking or suitable equivalent. Temporary tags shall be removed by Contractor at time of installation of permanent tags.

c. Tag material shall be rigid laminated red plastic with white lettering. The size of the tag shall be ¼” thick by ¾” round or ¾” x 1” rectangle minimum.

d. Letter height shall be ¼” minimum. Engrave the tags with the conduit number or acronym. Labeling shall be neatly installed for visibility and shall be clearly legible. Securely fasten tags in place using 20ga stainless steel tie wire through a pilot hole on the tag.

e. Conduit tags shall be Custom manufactured per specification.

6. Supports

a. Cross section of a single channel shall be 1-5/8" x 1-5/8" and cross-section of a double channel shall be 1-5/8" x 3-1/4". The channel wall thickness shall be 12 gauge as applicable.

b. One-Hole clamps shall be intended for pipe mounting on support channels and equipped with clamp-backs. The clamps shall be Efcor, Thomas and Betts, Appleton or equal
c. Spacers, provided to support underground conduits in concrete encasements, shall be plastic. The spacers shall be Carlon, Johns-Manville, Underground Products or equal.

d. Anchors shall be expansion type for securing equipment to concrete foundations, floors and walls. Anchors shall have length identification mark on the exposed end of the bolt. Provide Hilti Kwik Bolt 3, or equal.

e. Stanchions shall be provided as needed to mount equipment and electrical components. Stanchions shall be shop fabricated from welded 4" c-channel, 12" x 12" x ¼" steel base plate, coated with a rust inhibiting primer and top coat of gray polyurethane gloss paint. Attach equipment to the stanchion direct or on a ¼" aluminum sheet sized for the equipment supported.

f. Conduit Hangers shall be trapeze construction, with double channel, 3/8-inch rods and nuts. Suspend from suitable structural support.

g. Support material and finish shall be per the following table unless otherwise noted in the drawings. Brackets, fittings and hardware shall be of the same material and finish.

<table>
<thead>
<tr>
<th>Location</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoors NEMA 12</td>
<td>Galvanized steel</td>
</tr>
<tr>
<td>Outdoors NEMA 3R</td>
<td>Galvanized steel</td>
</tr>
<tr>
<td>Outdoors NEMA 4</td>
<td>Stainless Steel type 316</td>
</tr>
<tr>
<td>Corrosive areas NEMA4X</td>
<td>PVC bonded, 40 mil, factory applied</td>
</tr>
</tbody>
</table>

h. Equipment mounting racks shall be designed by installer for rigid equipment and conduit mounting. Racks shall be bolted or welded construction and sized for equipment or as shown on the drawings.

i. Strut channels shall be used for mounting equipment to walls and for supporting conduit runs. Double strut channel type shall be used for fabricating equipment mounting racks as required and/or as detailed on the drawings. Add additional supports to rigid mounting locations as needed to prevent wobbling and to meet seismic requirements. All field cut surfaces of the strut channels shall be deburried and coated to prevent rust.
B. Galvanized Rigid Steel Conduit - (GRS)

1. Manufactured from high-strength steel and hot dipped zinc galvanized inside and out. Conduit and fittings shall meet UL 514B, UL 6, and conform to NEMA RN 2. Conduit shall be capable of being used as an equipment grounding conductor per NEC 250.

2. Provide galvanized rigid steel factory sweeps and elbows for 90 degree transitions.

3. Cast fittings and device boxes shall be malleable iron or aluminum. Appleton type FS/FD or equal.

4. In hazardous locations, fittings shall meet and be listed UL 886.

5. All fittings, hubs, couplings, pulling elbows and connectors shall be threaded-type. Set-screw type and compression-type are not acceptable. All thread conduit is not allowed over 1/2" exposed length. Cover plates shall be cast iron with sealing gasket in NEMA 3R locations.

6. Conduits entering enclosures shall be fitted with insulated grounding bushing; O-Z "HBLG", Appleton "GIB", or approved equal. All grounding bushings shall be tied to the grounding system with properly sized bonding conductors per the NEC code.

7. Combination expansion-deflection fittings installed exposed shall be Type XD as manufactured by Crouse-Hinds Co.; Type DX as manufactured by O.Z. Gedney Co.; Type DF as manufactured by Appleton Electric Co., or equal.

C. Galvanized Rigid and Coated Steel Conduit (GRS-PVC)

1. Galvanized Rigid Steel conduit with a 40-mil thick polyvinylchloride exterior coating and a 2-mil urethane interior coating meeting NEMA RN-1, UL-6 and ETL PVC-001. The bond of the PVC to the zinc coated pipe must be stronger than the tensile strength of the PVC.

2. Provide PVC coated galvanized rigid steel factory sweeps and elbows for 90 degree transitions.

3. Cast fittings and device boxes shall be malleable iron or aluminum with a 40-mil thick PVC coating meeting the same

4. In hazardous locations, fittings shall meet and be listed UL 886.
5. Provide PVC coated threaded-type fittings, hubs, pulling elbows, couplings, and connectors; set-screw type and compression-type are not acceptable. Form 8 conduit fittings, ½" through 4", must have a tongue-in-groove gasket to effectively seal out the corrosive elements. Covers shall be supplied with plastic encapsulated stainless steel cover screws. Form 8 fittings shall be UL and type 4X and IP69 listed.

6. A “PVC Coated Sealing Locknut” shall be used on all exposed male threads transitioning into female NPT threads which do not have sealing sleeves, including transitions from PVC couplings/female adapters to PVC Coated GRC elbows in direct burial applications. “PVC Coated Sealing Locknuts” are not to be used in place of a myers hub

7. A PVC sleeve extending one pipe diameter or two inches, whichever is less, shall be formed at every female fitting opening except unions. The inside sleeve diameter shall be matched to the outside diameter of the conduit.

8. All junction and metal pull boxes shall be galvanized with exterior surfaces PVC coated to 40 mils thickness.

9. Unistrut, strut clamps, pipe straps, and clamp back spacers, shall have 40 mil thick PVC coating. All mounting anchors shall be stainless steel.

10. Conduits entering enclosures shall be fitted with insulated grounding bushing. All grounding bushings shall be tied to the grounding system with properly sized bonding conductors per the NEC code.

11. Installers of PVC Coated Conduit must be certified by the manufacturer and be able to present a valid, unexpired certified installer card.

12. GRS-PVC conduit to be Robroy Plasti-bond, Perma-Cote, KorKap, T&B OCAL or equal.

D. PVC Conduit, Schedule 40 or 80 (PVC-40, PVC-80)

1. Shall be high impact schedule 40 or 80 polyvinylchloride suitable for use underground, direct burial and for use with 90 C wires, and shall conform to UL 651. Shall be UL listed and labeled for "direct" burial.

2. A copper bonding conductor shall be pulled in each raceway and bonded to equipment at each end with approved lugs.
3. Each underground run shall be placed in a trench with a five (5) inch sand bed evenly compacted on all sides, top and bottom unless otherwise noted.

4. Elbows, and risers shall be per exposed conduit transition detail. PVC conduit is not allowed above ground except where specifically called out on the Drawings.

5. PVC fittings shall have solvent-weld-type conduit connections. Fittings and device boxes shall be PVC with factory fabricated conduit connections. Provide Carlon or equal.

6. Conduits entering enclosures shall be fitted with a glued male adapter, lock ring and bushing to prevent wire chafing. Conduits entering panels through concrete to an open bottom or entering a pull box shall have a glued end bell fitting.

7. PVC conduit shall be stored on a flat surface and shielded from the sun.

E. Liquid Tight Flexible Metal Conduit (up to 2”) - (FLEX)

1. Liquid Tight Flexible Metal conduit shall be highly flexible, moisture and oil-proof with black thermoplastic rubber cover that is extruded over a galvanized flexible steel conduit.

2. Liquid tight Flexible Metallic Conduit shall be sunlight, oil, and flame resistant and be manufactured for extreme temperature environments (-75 deg F to +302 deg F). Conduit shall be approved for the installation of electrical conductors in indoor and outdoor applications.

3. Liquid tight Flexible Nonmetallic Conduit shall be listed to UL standard UL 360.

4. Liquid tight flexible metallic conduit shall be installed in accordance with Article 351, Part B of the National Electrical Code (NEC) and other applicable sections of the NEC and/or local electrical codes.

5. Liquid tight Fittings shall be listed for the use with Liquid tight Flexible Metallic Conduit and conform to UL514B.
   a. Outdoors when extension of GRS-PVC: PVC coated galvanized steel with insulated bushings.
   b. Outdoors when extension of GRS: Galvanized steel with insulated bushings
   c. Indoors: Galvanized steel with insulated bushings.

6. Flexible Metallic Conduit shall be Anaconda HCX or equal.
2.02 DEVICE BOXES

A. BOXES

1. Device boxes shall be of zinc-galvanized malleable iron or cast aluminum with shape and size best suited for the particular application, rated for the location installed, and shall be supported directly to structure by means of screws, anchors, or bolts.

2. Box dimensions shall be in accordance with size, quantity of conductors, and conduit clearances per NEC articles 314 requirements.

3. Boxes exposed to the weather or in moist locations shall be weatherproof (WP) by means of gasketing under a weatherproof cover.

4. Boxes connected to GRS-PVC conduit runs shall be PVC coated with 40 mil coating.

B. DEVICE PLATES and COVERS

1. Indoor general purpose device plates and covers shall be stainless steel. Plates or covers shall be attached with stainless steel screws. An engraved plastic label denoting circuit breaker number and panelboard name shall be affixed to each cover with #4 stainless steel screws.

2. Weatherproof switch, outlet, and receptacle boxes shall be fitted with gasketed covers rated for wet locations. Each access cover shall have a padlockable cover to maintain security and weatherproof integrity even when a plug is connected to the receptacle. Screws and hinge springs shall be stainless steel. Weatherproof access covers shall be Leviton 5977-CL, Cooper 4966, or equal.

2.03 PULL BOXES

A. JUNCTION BOXES

1. Where required for best installation or where specifically called out in the Drawings, junction boxes shall have JIC type construction with hinged door, NEMA 4X rating, manufactured of type 304 stainless steel or as otherwise shown. Door shall be fastened with clamps and stainless steel screws. No devices, screws, rivets, or bolts shall protrude through the exterior surface unless specifically shown on the Drawings. Boxes shall be Hoffman, Circle AW, or equal.
B. UNDERGROUND BOXES

1. Underground pull boxes shall be prefabricated “Christy Box” size and type as noted in the Drawings or equal. Size shall be as shown or dimensioned on the Drawings. Provide larger boxes as needed to meet code or as determined in field to allow for adequate pull area at Contractor discretion. Extension sections shall be provided as necessary to reach the depth of underground conduits with maximum depth of 48”. All boxes shall have galvanized steel hold down bolts and hardware. Boxes shall be H/20 loading rated and have traffic rated covers. Steel covers or lids shall be galvanized and grounded with bonding jumper to the local grounding circuit per NEC. Pull box covers shall be labeled electrical, signal, utility, and telephone, whichever applies. Pull boxes shall be Christy Concrete Products, Brooks or equal.

C. PULL BOX AND VAULT IDENTIFICATION

1. Engrave or bead weld box covers with minimum thickness of ¼” x 1” lettering with pullbox name (i.e. PBX-XXX) and purpose (electrical, signal, fiber, telephone, etc.). Provide an additional identifier “high voltage” for boxes with 600 volts or higher.

2. Utility pull boxes shall be labeled per Utility Company standards.

PART 3: EXECUTION

3.01 WORKMANSHIP

A. All work in this Section shall conform to the codes and standards specified in Electrical Specifications [Electrical General, Workmanship].

3.02 INSTALLATION

A. System:

1. Install all products per Electrical Specifications [Electrical General, Installation].

B. Rigid Conduits and Ducts:

1. Exposed conduits shall be neatly arranged with runs perpendicular or level and parallel to walls. Bends shall be concentric.

2. Except as expressly indicated or approved, all conduits shall be surface mount on block walls, concealed behind gypsum walls, and buried to required depth below floor slabs.
3. Pipe threads shall be treated with conductive thread compound.

4. Installation of the GRS-PVC conduits must be in accordance with the manufacturer's installation procedures using recommended tools.
   a. Apply touch up compound at each fitting sealing sleeve edge to improve watertight seal.
   b. To ensure compliance, the installer(s) must be "manufacturer certified" before installation can proceed.
   c. Certification available by contacting manufacturer's representative and attending a brief instructional course. Valid and unexpired certification card shall be available for review per installer.

5. Repair GRS-PVC coating utilizing a touch-up compound as provided by the manufacturer of the conduit of the same material as the coating. Overlap beyond the damaged area to cover the PVC coating. Contact from touchup compound to PVC is required to maintain integrity. The entire conduit shall be replaced if the repair exceeds 1" combined length.

6. A maximum of three equivalent 90 degree elbows are allowed in any continuous run. Install pull boxes where required to limit bends in conduit runs to not more than 270 degrees or where pulling tension would exceed the maximum allowable for the cable.

7. Route all above grade conduits parallel or perpendicular to structure lines and/or piping. Conduits installed above grade shall be braced in place with stanchions. Expansion joints shall be installed every 100 feet. Bends shall be concentric.
   a. Combination expansion-deflection fittings installed exposed shall be Type XD as manufactured by Crouse-Hinds Co.; Type DX as manufactured by O.Z. Gedney Co.; Type DF as manufactured by Appleton Electric Co., or equal

8. Care shall be exercised to avoid interference with the work of other trades. This work shall be planned and coordinated with the other trades to prevent such interference. Process Pipe, mechanical and HVAC shall have precedence over conduits for routing and space requirements.

9. Seal each bottom entrance conduit into the MCC and other electrical enclosures with plugging compound sealant to prevent the entrance of gasses, insects and rodents. Plugging compound sealant shall be Gardner Bender Duct Seal or equal.
10. Exposed conduit stubs for future use shall be capped with coupling and plugged. Drill hole in plug for pull rope as necessary.

11. Explosion proof seal-off fittings shall be provided on all conduits that enter or leave hazardous areas per requirements of the National Electrical Code, Chapter 5 and UL 886. The seal-off fitting shall prevent hazardous gases and/or flames from passing from one type area to another through the conduit system. Ceramic or other non-asbestos fiber material and sealing compound shall be placed in the fitting to complete the seal.

12. Hazardous location conduit outlet boxes shall be used in hazardous locations for change in direction, access to conductors and as pull and splice boxes.

13. All spare conduits shall have 1/8" nylon pull ropes installed.

C. Flexible Conduit and Cords

1. Final connections to vibrating equipment such as motors, heaters and fans shall be made with liquid tight flexible conduit.

2. Flexible conduit lengths shall not be greater than 36 inches for sizes up to 2 ½” and 48 inches for 3” and larger conduit.

3. Flexible conduit shall include a ground conductor for equipment bonding in circuits over 30 VDC or as shown in the conduit schedule.

4. Flexible conduit shall only be installed in exposed or accessible locations.

5. Where equipment is cord connected, submersible rated, and conduit connections are not possible without modification, devices and equipment may be free-air cord connected in lieu of flexible conduit. Connection to adjacent rigid conduit shall be through liquid-tight cord connector fitting specifically designed for the purpose and sized appropriately for the cord. Cord connectors shall be rated similar to the adjacent conduit they are connected to: Stainless steel, galvanized or plastic.

D. Excavation and Back Filling:

1. Trenches for conduit below floor slabs and other underground electrical conduit shall be excavated to the required depths per utility requirements or specific detail. Conduits under floor slabs shall have minimum trench depth to contain bends without any portion of the radius visible at finished grade.
2. Underground conduits outside of structures, excluding utility conduits, shall have a minimum cover of 24 inches except under roadways where minimum cover shall be 30 inches or as otherwise shown in the Contract Drawings. Back filling shall be done only after conduits have been inspected. Excavation and back fill of conduits shall conform to the requirements of other applicable Specifications sections unless modified on plans, and to other entities (Utilities, etc.) as required.

3. Install spacers to support underground conduits. Horizontal and vertical separation shall be maintained by plastic spacers set every four feet. Spacers shall be Carlon Snap-Loc or equal.

4. At all times during the installation of the electrical system, the Contractor shall provide barricades, fences, guard rails, etc., to safeguard all personnel, including small children, from excavated trenches.

E. Underground pullboxes:

1. Pullboxes shall be located in areas that will experience the least traffic loading and in the general vicinity as shown in the Drawings. Boxes in pavement shall be set at final grade and boxes in planter areas shall be set 1" above final grade. Boxes shall not be buried by landscape material.

2. Steel pull box lids shall be grounded per NEC 250.4(A)(5) and 314.4.

3. Boxes shall be set on compacted base and base rock to minimize settling of the box over time. If the box is located in a paved traffic area, a 6" x 6" concrete ring shall be poured around the box below the pavement.

F. Device Mounting Heights:

1. Mounting heights of fixtures and devices shall be as follows unless otherwise indicated or when height has to be adjusted to be over or under counter tops.

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall switches</td>
<td>48 inches</td>
</tr>
<tr>
<td>Convenience outlets</td>
<td>18 inches</td>
</tr>
<tr>
<td>Telephone outlets</td>
<td>18 inches</td>
</tr>
<tr>
<td>Bracket fixtures</td>
<td>7 feet 6 inches</td>
</tr>
</tbody>
</table>
G. Cutting, Coring, Patching and Repairing:

1. The Contractor shall do all cutting and patching required to install his work. Any cutting which may impair the structure will require prior approval. Cutting and patching shall be done only by skilled labor of the respective trades. Where it becomes necessary to cut into existing work for the purpose of making electrical installations, locate existing post tension cables, rebar and electrical services prior to core drilling using ground penetrating radar or similar technologies. All surfaces shall be restored to their original condition after cutting and patching.

3.03 FIELD ASSISTANCE

A. General: Provide all equipment and supplies necessary to perform all testing. The Owner Representative shall have the option to witness and participate in the on-site tests performed by the installer.

B. Per Electrical Specifications [Factory and Field Testing].

3.04 WARRANTY

A. Provide warranty as specified in Electrical Specifications [Electrical General, Warranty].

END OF SECTION
DIVISION 16 ELECTRICAL
LOW VOLTAGE WIRE & DATA CABLE
SECTION 16120

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Labor, materials, equipment, tools, safety gear, test equipment, incidentals, services, and transportation for a complete electro-mechanical installation as shown on the Drawings, included in these Specifications, or as can be reasonably implied from project descriptions.

B. The scope of work includes:
   1. Furnish and install wire, splices, lugs, or other miscellaneous devices as defined in this specification.
   2. End to end wiring and terminations for each system, device, instrument, and piece of equipment shown in the Drawings as new, or rehabilitated, or reconnected.
   3. Testing of conductors and completed wired systems.
   4. Installations shall be designed and installed with components meeting the NEMA area designation.

C. Work includes that specified in Electrical Specifications [Electrical General].

1.02 REFERENCES

A. Electrical Specifications [Electrical General]
B. Electrical Specifications [Conduit and Boxes]
C. Electrical Specifications [Grounding]
D. Project Drawings

1.03 QUALIFICATIONS

A. Material furnished under this specification shall be installed by qualified installers meeting requirements specified in Electrical Specifications [Electrical General, Qualifications].

1.04 SUBMITTALS AND DRAWINGS

A. Provide submittals and drawings as specified in Electrical Specifications [Electrical General, Submittal Requirements].
PART 2: PRODUCTS

2.01 WIRING AND ELECTRICAL DEVICES

A. GENERAL

1. General
   a. Provide wiring and electrical devices specified herein and install field and internal panel wiring as shown on the Contract Drawings.
   b. This section applies to all wires or conductors used internal (non-field) to electrical equipment or external for field wiring.
   c. Field wire quantity and size shall be per “Conduit and Wire Routing Schedule.”

2. Analog Signals
   a. Analog signal transmission between electric or electronic instruments shall be 4-20 milliamperes and shall operate at 24 volts DC unless otherwise specified. Milliampere signals shall be current regulated and shall not be affected by changes in load resistance within the unit's rating.
   b. Provide powered current isolators wherever the loops' load resistance exceeds the originating current signal transmitter's rating. Associated shunt resistors shall be located on rail-mounted terminal blocks. Exposed resistor leads shall be insulated with heat-shrink tubing.

B. LOW VOLTAGE WIRE AND CABLE (through 600V except instrument signals)

1. General: Low voltage conductors shall be used for power, control, lighting and miscellaneous circuits. This Section applies to all wires or conductors used internal for all electrical equipment or external for field wiring. Wire shall be new, plainly marked with UL label, gauge, voltage, type of insulation, and manufacturer's name.
   a. Conductors shall be copper with a minimum of 98% conductivity.
   b. Class C stranding. Solid conductors may be used for lighting and receptacle circuits.
c. Wire shall be rated 600 volt (min).

d. Size all conductors per NEC minimum or as shown on the drawings.

   1) Minimum #12 AWG for wires used in power transmission circuits or as defined on the drawings.

   2) Minimum #14 AWG for wires used in signal transmission circuits or as defined on the drawings.

2. Wire colors and sizes shall not change within the circuit.

3. Wire shall be properly fused or breaker protected at or below the maximum amperage rating allowed by the NEC.

4. Control and Power Wiring:

   a. Field wire in conduit:

      1) Type XHHW-2, XLPE insulation, rated 90 °C in wet or dry locations, oil resistant.

      i Use for power circuits carrying voltages higher than 200 volts phase to ground.

      2) Type THHN / THWN, PVC with nylon jacket insulation, rated 90 °C in dry locations and 75 °C in wet locations, oil resistant, UL83.

      i Use for power circuits with voltages below 200 volts phase to ground, or control circuits.

      3) Minimum #12 AWG for wires used in power transmission circuits or as defined on the drawings.

      4) Minimum #14 AWG for wires used in signal transmission circuits or as defined on the drawings.

   b. Field wire in tray (Tray Cable type TC):

      1) Individual cables - Insulation type THHN/THWN, rated 90 °C in dry locations and 75 °C in wet locations, oil resistant, UL83.

      2) 3 or more conductor plus ground wire in a single cable.
3) UL Listed as sunlight resistant, direct burial, and open wiring.

4) Conductor sizing per ICEA Publication P-54-440 for cable tray and ICEA P-46-426 for conduit

5) Minimum #12 AWG for wires used in power transmission circuits or as defined on the drawings.

6) Minimum #14 AWG for wires used in signal or control transmission circuits or as defined on the drawings.

c. Power cord

1) Flexible wire cord shall be type SOW, SOOW, or G and be provided in 2, 3, or 4 conductor plus ground as required for connected load.

2) EPR insulation, 90 deg C rating, oil and abrasion resistant overall jacket plus individual conductor jackets. 600V rated

3) Conductors shall be stranded copper.

4) Cord shall be installed with cord grips on each end where it enters termination enclosures.

d. VFD Motor Supply Cable

1) VFD motor supply cable shall be shielded and designed for use with AC variable frequency drives. The cable shall be used to interconnect a variable frequency drive to the controlled motor.

2) The VFD cable insulation shall disperse voltage spikes, harmonics, and power distortions associated with variable frequency drives. Cable shall be plainly marked with UL label, gauge, voltage, type of insulation, and manufacturer's name.

3) Conduits requiring VFD supply cable shall be specifically listed in the conduit schedule in “NOTES” column designation defined as VFD CABLE.

4) Power conductor size shall be as listed in the conduit schedule. Length shall be as required to extend from VFD to motor connection terminals. Conductor
stranding shall be fine wire, three black conductors with white numbers and one green/yellow ground. Conductor stranding shall be class C or finer.

5) Insulation for conductors shall be rated for 1000 volts (min). Insulation shall be oil and UV resistant rated -25°C to 90°C.

6) For Cable sizes 12 AWG to 2 AWG the cable construction shall be tinned copper with XLPE insulation under dual shielding of foil tape and copper braid construction, and outer PVC jacket. The VFD motor supply cable shall be Olflex/Lapp USA Wire and Cable Inc. OLFLEX Slim series, Belden 295xx or equal.

7) For cable sizes above 2AWG to 500MCM the cable construction shall utilize 3 symmetrical grounds next to 3 power conductors with XLPE insulation and foil and braid shield. The VFD motor supply cable shall be Olflex/Lapp USA Wire and Cable Inc. OLFLEX VFD Symmetrical series or equal.

e. Nonfield control panel or factory installed equipment internal wiring:

1) Insulation - Type MTW, NFPA standard 79, UL 1063 with tinned copper.

2) Minimum #16 AWG for wires used for individual conductor circuits 100 volts and above.

3) Minimum #18 AWG for wires used for individual conductor circuits below 100 volts.

5. Instrument wiring:

a. Field: Instrument cables shall have 600V tray cable rated insulation and 100% individual shielded twisted pair #16 conductors with drain wire. Single twisted shielded pair (TSPR) cables shall be Belden 9342, or approved equal. Three wire twisted shielded cables (#18 TS3W) shall be Belden 1119A or equal.

b. Non-Field: Instrument cables shall have 300V rated insulation and 100% individual shielded twisted pair #18 conductors with drain wire. Single twisted shielded pair (TSPR.) cables shall be Belden 8760, or approved equal. Three wire shielded cable shall be Belden 8770 or equal.
c. Field multi-pair instrument cable as required per conduit schedule shall have 300V rated insulation and 100% individual shielded twisted pair #18 conductors with drain wire. Multiple twisted shielded pair (T.S.PR.) cables shall be Belden 9773 thru 9777, or equal.

d. Multi-pair cable is not allowed (unless specifically called out in conduit schedule or on plans) for use in field or non-field applications. One T.S.PR cable is required for each signal.

6. Manufacturer Supplied Cables

a. Cables and wiring for special systems provided by the manufacturer with the equipment shall be installed per the manufacturer’s recommendations.

7. Data Cable

a. Data network category 6 cable (indoor) shall consist of 4 pair unshielded twisted pair #24 awg solid copper conductors. The cable shall be rated by IEEE for service intended – plenum and dry.

   1) Cable: IEEE Category 6, various manufacturers.
   2) Connectors: Standard RJ-45 with boot.

b. Data network cable (outdoor) shall consist of 4 pair foil and braid shielded twisted pair #24 awg solid copper conductors with anti-crosstalk divider, and drain wire. Rated Level 2 Category 5e Outdoor Carrier by IEEE for use in plenum, conduit, wet or dry.

   1) Cable: IEEE Category 5e, Ubiquiti Tough Carrier, Belden, or equal
   2) Connectors: Grounded RJ-45 with drain wire crimp.

8. Temporary motor or panel hook-up

a. Temporary cable may be cord without conduit or PVC conduit with wiring. In either case, the cabling must be protected from damage during construction. Sections may be located out of harms way, buried, or sleeved in steel conduit as needed.
b. Power Circuits: Provide 2, 3, or 4 conductor plus ground power supply cable(s) for temporary pump connections or electrical power circuits. Cables shall be sized for breaker rating amperage, (minimum).

c. Provide multi-conductor (TC) cables for digital control circuits. Provide quantity of conductors as needed.

d. Provide instrument wiring for 4-20 ma instrumentation.

e. Voltage drop in power circuits shall not exceed 15% during motor start and 5% during operation.

C. COLOR CODE

1. All wires #8 and below shall have wire insulation the color specified. Wires #6 and larger may be black with color electrical tape at termination points.

2. No other colors shall be used without prior approval.

[Remainder of Page Intentionally Left Blank]
3. Color code - color code of all wire shall conform with the following table:

**WIRES COLOR CODE TABLE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Phase/Code Letter</th>
<th>Panel Wire Color</th>
<th>Field Wire Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>480V, 3 Ph</td>
<td>A</td>
<td>Brown</td>
<td>Brown</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Orange</td>
<td>Orange</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>Gray</td>
<td>Gray</td>
</tr>
<tr>
<td>240V or 208V, 3 Ph</td>
<td>A</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Red (Orange if high leg)</td>
<td>Red (Orange if high leg)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Blue</td>
<td>Blue</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>240 / 120 V, 1 Ph</td>
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<td>Black</td>
</tr>
<tr>
<td></td>
<td>L2</td>
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<td>Red</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>120 VAC Control</td>
<td>N/A</td>
<td>Red</td>
<td>Red</td>
</tr>
<tr>
<td>120 VAC Digital Inputs</td>
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<td>Purple</td>
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<td>125 VDC Power</td>
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<td>Gray</td>
</tr>
<tr>
<td>125 VDC Control</td>
<td>N/A</td>
<td>Gray</td>
<td>Gray</td>
</tr>
<tr>
<td>125 VDC Common</td>
<td>-</td>
<td>Gray</td>
<td>Gray</td>
</tr>
<tr>
<td>24 VDC Power</td>
<td>24+</td>
<td>Blue</td>
<td>Blue</td>
</tr>
<tr>
<td>24 VDC Control</td>
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<td>Blue</td>
</tr>
<tr>
<td>24 VDC Common</td>
<td>24-</td>
<td>Brown</td>
<td>Brown</td>
</tr>
<tr>
<td>24 VDC Digital Inputs</td>
<td>N/A</td>
<td>Blue</td>
<td>Blue</td>
</tr>
<tr>
<td>24 VDC Digital Outputs</td>
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<td>Blue (Yellow for foreign)</td>
<td>Blue</td>
</tr>
<tr>
<td>12 VDC Power</td>
<td>12+</td>
<td>Pink/White</td>
<td>Pink/White</td>
</tr>
<tr>
<td>12 VDC Common</td>
<td>12-</td>
<td>Black/White</td>
<td>Black/White</td>
</tr>
<tr>
<td>Intrinsically Safe</td>
<td>N/A</td>
<td>Light Blue</td>
<td>Light Blue</td>
</tr>
<tr>
<td>Shielded Pair 4-20mA</td>
<td>+</td>
<td>Red</td>
<td>Clear</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td>Ground</td>
<td>G</td>
<td>Green</td>
<td>Green</td>
</tr>
</tbody>
</table>
2.02 WIRE MARKING

A. All panel, enclosure and field wiring shall have wire labels on both ends of each wire. Labeling shall be neatly installed for visibility and shall be clearly legible. Each conductor of instrument shielded signal wiring shall be labeled. Wire labels shall be machine printed with on white heat shrinkable tubing. Each label shall fit a minimum 23 characters, 3/16” in height before shrink. Tubing shall be oversized for the wire and shrunk into place using an electric heat gun. The “shrunk” label shall have just enough give to allow the label to be rotated. Hand lettered wire labels are not acceptable and shall be replaced at the Contractor's expense. Provide Brady “PermaSleeve” or equal.

1. **Node Style Wire Identification** - All wires that are electrically the same (connected to common termination points) and do not pass through a contact or other switching device shall have the same wire identification. The wire labeling code for each end of the same wire shall be identical.

   a. The wire identification code for **internal panel** wiring shall be the number/letter as designated on the Contract elementary and/or approved shop drawings.

   b. Wire labeling for **field** wiring shall contain the panel/equipment name as a prefix and the termination point name. (I.E. PLC50-A103 or P10-124). The hierarchy of label names is 1) PLC panel name, 2) MCC equipment name, and 3) Equipment name. Therefore, wires from PLC50 to the MCC50 P10 cubicle will be labeled PLC50-XXX. Wires from MCC50 P10 to field pressure switch PSH10 will be labeled P10-XXX.

   c. Wire labels shall be exactly per interconnection submittal and/or control panel drawings -- abbreviations determined in the field are not allowed. Abbreviations may be used in the wire label as submitted and approved in the interconnection drawings submittal.

   d. Wire labels for lighting and receptacle circuits shall consist of the panel board and circuit number and a unique node number. (I.E. LP#3-A, LP#3-B, LP#3-N)

   e. Wire labels may be omitted on “neutral jumpers” less than 8” in length.
2.03 ELECTRICAL TAPE / SHRINKABLE INSULATORS

A. Vinyl tape shall be 7 mil, 600 volt rated, flame retardant, hot and cold weather resistant conforming to UL510. Provide 3M Scotch Super 33+ vinyl tape or equal.

1. Vinyl tape for color coding shall be 7 mil, ¾” width, vinyl tape conforming to UL 510. Provide 3M Scotch Super 33+ vinyl tape or equal.

B. Rubber Tape: EPR rubber, 90 deg C continuous rated. Provide 3M 130C rubber tape or equal.

C. Varnished Cambric Tape: Adhesive backed, 7 mil, bias cut cotton tape, coated with yellow insulating varnish. Provide 3M Scotch 2510 or equal.

D. Shrinkable insulators shall be heat shrinkable, polyolefin thick wall sleeves, end caps and cable repair sleeves are designed for use in splicing, sealing and re-jacketing of direct bury secondary cables. The insulators shall comply with UL 486D and be rated up to 1000 Volts. They shall provide long-term reliable performance overhead, underground or submerged with mechanical and environmental protection. Shrinkable insulators shall be 3M ITCSN or 3M IMCSN per manufacturer instructions for the application or equal.

PART 3: EXECUTION

3.01 WORKMANSHIP

A. All work in this Section shall conform to the codes and standards specified in Electrical Specifications [Electrical General, Workmanship].

B. Perform work to remedy non-compliant installations after inspection.

C. Upon notification, stop work on any portion of the installation that is determined to be substandard or being installed by unqualified personnel.

3.02 FABRICATION AND INSTALLATION

A. System:

1. Install all products specified in Electrical Specifications [Electrical General, Installation].

2. Panels shall be completely factory wired and tested before shipment.

3. All spare PLC input / output points shall be wired to terminal blocks.

4. A minimum of 20% spare unwired terminals shall be provided in each panel.
B. Wiring Methods:

1. **Wiring Separation:** Wires carrying 100 volts and above shall be physically separated from lower voltage wiring by using separate bundles or wire ways with sufficient distance to minimize the introduction of noise, crossing only at 90 degree angles.

2. **Harness:** All wiring shall be neatly bundled and laced with plastic tie-wraps, anchored in place by screw attached retainer. Where space is available, wiring shall be run in slotted plastic wireways with dust covers. Wireways shall be sized such that the wire fill does not exceed 60%. Tie-wraps shall be T&B TY-RAP or equal.

3. **Retainers:** Wireways, retainers, and other devices shall be screw mounted with round-head 316 stainless steel screws or mechanically mounted by push-in or snap-in attachments. Glue or sticky back attachment of any type or style shall not be used. Retainers shall be T&B TC series or equal.

4. **Hinge Loops:** Where wiring crosses hinged surfaces, provide a "U" shaped hinge loop protected by clear nylon spiral wrap. The hinge loop shall be of sufficient length to permit opening and closing the door without stressing any of the terminations or connections. Spiral wrap shall be Graybar T25N or equal.

5. **Routing:** Wires and cable shall be routed such as to maintain separation between 100 Volt or higher from 100 volt or lower wiring being run in the same duct or bundle. Wires and cables shall have sufficient length to allow slack and to avoid any strain or tension in the wire or cable.

   a. Wires shall be routed in slotted plastic wireways with snap covers. Wires carrying 120 VAC shall be separated as much as possible from other wires and signal cables, and shall be routed only in ducts for 120 VAC. If the power wiring has to cross the signal wiring, the crossing shall be as close to a right angle as possible. Wireways for 24 VDC wiring shall be used for all other wires and cables. Routing of 120 VAC in combined wireways shall be minimized. Wires and cables shall be placed in the wireways in a straight, neat and organized fashion and shall not be kinked, tangled or twisted together. Additional wire ducting shall be provided for use by the electrical subcontractor for routing field wires to their landing points in the each electrical and instrumentation panel.
b. Provide 2" minimum separation between wireway and terminal blocks.

c. Wiring not routed in wireways shall be neatly bundled, treed, and laced with plastic ties.

C. Wire Terminations

1. Single wire and cable conductors shall be terminated according to the requirements of the terminal device as follows:

   a. Crimp-on terminals: shall be UL listed, self-insulating sleeve type, with ring or rectangular type tongue, suitable for the size and material of the wire to be terminated, and for use with either solid or stranded conductors.

   b. Terminal Blocks: Remove the last +/- 0.25 inches insulation from of the conductor and insert it under the pressure plate to full length of the bare portion of the conductor. Tighten the screw to close the pressure plate onto the conductor. No more than two conductors shall be installed in a single terminal. All strands of the conductor shall be captured under the pressure plate.

   c. Screw-less terminals: wire shall be stripped back and inserted per the terminal manufacturer's instructions.

   d. Motors with pigtail leads: Install terminal connectors on the motor pigtails and the cable to be connected. Terminals shall be non-insulated crimp-on type applied with a ratchet-type crimping tool. The terminals shall be bolted together with a nut, bolt and lock washer combination. The connection shall be wrapped with four (4) layers varnished cambric tape, six (6) layers of rubber tape and six (6) layers of vinyl electrical tape, each half lapped.

2. When stripping insulation from conductors, do not score or damage conductor.

3. The drain wire and stripped end of outer jacket of shielded cables shall be covered with heat shrink insulating tubing. The drain wire shall be covered along its full bare length between the cable jacket cover and the terminal lug and placed on end outer jacket to cover foil.
4. Condulets with wire nut connections shall be supplied for wire termination to devices with leads instead of terminals (i.e. solenoid valves, level probe, etc.).

D. Wire Splicing  
1. No wires shall be spliced without prior approval.  
2. Where splices are allowed or approved they shall conform to the following:  
   a. Wire splicing devices shall be sized according to manufacturer’s recommendations.  
   b. Splices of #10 and smaller, including fixture taps, shall be made with nylon self-insulated twist on wire nuts; T & B "Piggys", Ideal "Wing-Nut" or equal.  
   c. Splices of #8 and larger shall be hex key screw, two way connectors, insulated with molded high-dielectric strength plastic; NSI Polaris IPL or IPLD Series terminal blocks or equal.

E. Wire Installation  
1. Exercise care in pulling wires and cables into conduit or wireways so as to avoid kinking, stressing the cables, or damaging the insulation. Use a UL listed pulling compound for lubrication within conduits as necessary. The raceway construction shall be complete and protected from weather before cable is pulled in. Swab conduits before installing cables and exercise care in pulling, to avoid damage to the insulation or conductors.  
2. All wire and cables (with the exception of coaxial antenna cable) shall be installed within UL listed raceways or enclosures. Install all wires and cables in one continuous length unless splices are per Contract Drawings, required to connect equipment or submitted and favorably reviewed.  
3. Bundle incoming wire and cables in panels. Zip-tie at intervals of 2” and neatly spread into trees and connect to their respective terminals. Allow sufficient slack in cables for alterations in terminal connections. Do not bundle, tape or tie wires within conduits.
3.03 WARRANTY

A. Provide warranty as specified in Electrical Specifications [Electrical General, Warranty].

END OF SECTION
DIVISION 16 ELECTRICAL

GROUNDING

SECTION 16450

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Labor, materials, equipment, tools, safety gear, test equipment, incidentals, services, and transportation for a complete electro-mechanical installation as shown on the Drawings, included in these Specifications, or as can be reasonably implied from project descriptions.

B. The scope of work includes:

1. Furnish and install grounding system required by Drawings, or if not shown or defined, as required by Article 250 of the NEC. Ground conductors shall be sized for the protective device, minimum.

2. Furnish and install conduits, junction boxes, underground boxes, and associated hardware. Provide hardware, conduit, fittings, and other parts for a complete grounding installation.

3. Installations shall be designed and installed with components meeting the NEMA area designation.

C. Work includes that specified in Electrical Specifications [Electrical General].

1.02 REFERENCES

A. Electrical Specifications [Electrical General]
B. Electrical Specifications [Low Voltage Wire & Data Cable]
C. Project Drawings

1.03 QUALIFICATIONS

A. Material furnished under this specification shall be installed by qualified installers meeting requirements specified in Electrical Specifications [Electrical General, Qualifications].

1.04 SUBMITTAL REQUIREMENTS

A. Provide submittals and Drawings as specified in Electrical Specifications [Electrical General, Submittal Requirements].
B. Submit manufacturer’s product information for connections, clamps, rods, terminals, and grounding system components.

PART 2: PRODUCTS

2.01 GROUNDING SYSTEM

A. General

1. Grounding conductors shall be sized as shown on the Drawings or in accordance with NEC table 250, whichever is larger.

2. Components of the grounding electrode system shall be manufactured in accordance with UL 467 - Standard for Safety Grounding and Bonding Equipment.

B. Grounding System

1. The utility service ground shall be tied to a building ground grid consisting of a "UFER" and/or ground rod type grounding system.

2. The UFER shall consist of minimum 25 feet minimum of code sized bare copper wire conductor laid at 3 foot nominal depth encased with of concrete or ground or as detailed on the Contract Drawings. UFER ground shall be located where soil moisture content will be maximized.

3. Ground enhancement material shall be permanent and be designed to lower earth resistance in all soil conditions. Once set, material shall have resistivity of not more than 20 ohm-cm resistance. Material shall be set by mixing it with water to form a slurry and shall not dissolve or decompose once cured. Ground enhancement material shall be Erico Ground Enhancement Material (GEM), Lyncole XIT, or equal.

4. The main ground bonding wire from the ground rod shall extend up into the utility service panel with readily visible UL approved "ground clamp" attached to the ground bus.

5. Install bare copper ground bond wires from the UFER ground to the various locations shown on the Drawings.

C. Raceway Grounds

1. Metallic conduits shall be assembled to provide a continuous ground path. Metallic conduits shall be bonded using insulated grounding bushings.
D. Equipment and Enclosure Grounds

1. Electrical and distribution equipment shall be connected to the grounding system. Cables shall be sized as specified.

E. Components

1. Ground rod shall be ¾” x 10 ft solid steel with 10-mil copper-cladding.
2. Provide ground well enclosures for all outdoor ground rods. Furnish Christy type F8 or equal unless otherwise shown on the Drawings.
3. Ground rod clamps shall be bolt-on type as manufactured by O-Z Gedney type GRC, or equal.
4. Grounding and bonding wires shall be installed in all PVC conduits and nonmetallic raceways and connected to the ground bus and all equipment.
5. Each electrical enclosure shall have a copper ground bus. Screw type fasteners shall be provided on all ground busses for connection of grounding conductors. Ground bus shall be a Challenger GB series, ILSCO CAN series or equal.

PART 3: EXECUTION

3.01 WORKMANSHIP

A. All work in this Section shall conform to the codes and standards specified in Electrical Specifications [Electrical General, Workmanship].

3.02 INSTALLATION

A. Grounding System:

1. Install all products per Electrical Specifications [Electrical General, Installation].
2. Each nonmetallic conduit shall contain a code sized grounding conductor.
3. The system neutral conductor and all equipment and devices required to be grounded by the National Electrical Code shall be grounded in a manner that satisfies the requirements of the National Code.
4. The system neutral (grounded conductor) shall be connected to the system's grounding conductor at only a single point in the system. This connection shall be made by a removable bonding jumper sized in accordance with the applicable provisions of the National Electrical Code if the size is not shown on the Drawings. The grounding of the system neutral shall be in the enclosure that houses the service entrance main overcurrent protection.

5. Utilize mechanical connections in accessible locations and exothermic connections in non-accessible or buried locations.

6. The secondary on all transformers shall be grounded.

7. All raceway systems, supports, enclosures, panels, motor frames, and equipment housings shall be permanently and effectively grounded.

8. Install insulated grounding conductor with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards and distribution panels with 12ga. conductor to grounding bus.

9. All receptacles shall have their grounding contact connected to a grounding conductor.

10. Branch circuit grounding conductors for receptacles or other electrical loads shall be arranged such that the removal of a lighting fixture, receptacle, or other load does not interrupt the ground continuity to any other part of the circuit.

11. Attachment of the grounding conductor to equipment or enclosures shall be by connectors specifically provided for grounding. Mounting, support, or bracing bolts shall not be used as an attachment point for ground conductors.

12. Install grounding electrode conductor and connect to reinforcing steel in foundation footing. Electrically bond building steel to ground system. Bond metal siding not attached to grounded structure.
B. Ductbanks

1. Provide #4/0 AWG bare, stranded ground conductor in approximately the center of the ductbank where shown on plans and for all ductbanks containing cables rated 2kV or greater.

2. Ground wire, where required, shall be strapped to a conduit every 5 feet.

3.03 FIELD QUALITY CONTROL

A. Inspections:

1. Engineer shall inspect ground system prior to cover.

B. Testing:

1. Complete applicable test forms if provided in testing specifications [Factory and Field Testing]. If form is not provided, furnish results on a vendor standard form.

2. Test each grounding connection to determine the ground resistance. The grounding test shall be IEEE 81.2 and NETA 7.13. The current reference rod shall be driven at least 100 feet from the ground rod or grid under test. The measurements shall be made at 10-foot intervals beginning 20 feet from the test electrode and ending 80 feet from it, in direct line between the ground rod or center of grid and the current reference electrode.

END OF SECTION
PART 1: GENERAL

1.01 SCOPE OF WORK

A. This Section defines factory and field testing requirements of electrical and instrumentation equipment and as specified in this section and in Electrical Specifications. All equipment provided under Electrical Specifications and electrical equipment provided under other sections shall be tested as specified herein.

B. The System Integrator and/or Electrical Contractor shall provide all labor, tools, material, power, and technical supervision to perform the specified tests and inspections.

C. The Electrical Contractor shall be present during field testing and assist the System Integrator in testing all equipment. The Electrical Contractor shall be ready to correct any wiring problems found during testing.

D. The Application Programmer (defined in Electrical Specifications [Electrical General].) and/or Construction Manager will be actively engaged in Operational Testing and Commissioning. These efforts shall be combined efforts of the Application-Programmer/Construction-Manager/Engineer and Contractor. The Contractor shall facilitate test as outlined herein such that hardware, software and application programming are tested completely and all applicable test documentation is completed.

E. It is the intent of these tests to ensure that all equipment is operational within industry and manufacturer’s tolerances and is assembled in accordance with design plans and Specifications.

F. The Owner and/or Construction Manager may witness testing in effort to insure quality and verify results. The Contractor is required to provide notification 2 weeks prior to any test that are intended to be documented and submitted for approval or are final tests. The Owner and Construction Manager must specifically decline witness of each test to be performed, and the test must be successful, and it must be documented on the day of test, in order for it to not have to be repeated in the presence of an authorized witness. Only the Owner or Construction Manager may assign an authorized witness.
G. All tests shall be documented in writing by the person performing the test on the test forms submitted (and similar to those shown at the end of this section) and signed by the Engineer as satisfactorily completed. The Electrical Contractor or System Integrator performing tests shall keep a detailed log of all tests that failed or did not meet Specifications, including date of occurrence and correction.

H. The Contractor shall perform all applicable testing of Owner supplied or existing equipment as a unit and as part of a system. Testing shall include documentation and witness sign-off.

I. The radio and communications equipment shall be completely configured by the Contractor for permanent operation. Radio diagnostics, addresses, and configuration shall be recorded and provided with testing submittals. Provide data in tabular format on Excel spreadsheet. Contractor is required to test every path, link, repeater until optimum results are obtained. Test form example is not provided for this purpose and must be generated by the Contractor.

1.02 REFERENCES

A. Electrical Specifications [Electrical General]
B. Project Drawings
C. Additional testing may be specified in other Electrical Specifications.

1.03 FACTORY AND FIELD GENERAL REQUIREMENTS

A. Testing General

1. Prior to any field testing Operation & Maintenance Manuals shall have been submitted and approved.

2. The test forms shall be completed by the contractor during testing and calibration of all equipment. All tests shall be witnessed by the Owner’s Representative. Completed test forms shall be given to the Owner’s Representative the day of the test. Complete two sets of test forms if Contractor wants to keep a copy.

3. The Contractor shall give the Engineer 10 working days notice of the dates and time for inspections and testing.


5. As a minimum, all the tests indicated/specified on the test forms shall be performed and test forms filled out by the Contractor.

6. Prepare and submit formal test procedures and forms at least two weeks prior to the start of testing. Testing shall not commence until
the test procedures have been reviewed and approved. Submit a combined test procedure submittal with separate sections for factory and field tests.

7. If the results of any of tests are unacceptable, the Contractor shall make corrections and perform the tests again until they are acceptable; these tests shall be done at no additional cost.

B. Failure to Meet Test

1. Any system, material or workmanship which is found defective on the basis of these tests shall be reported immediately following the test. The Contractor shall replace the defective material or equipment and have tests repeated.

C. Safety

1. Testing shall conform to the respective manufacturer's recommendations. All manufacturers’ safety precautions shall be followed.

2. Safety, as shown herein and in other divisions, shall be a combination of all methods and practices described. Safety practices may not be determined based on the least restrictive requirement, but instead, on the most restrictive requirement. Obtain clarification if there is any question prior to performing tests.

3. The procedures stated herein are guidelines for the intended tests, the Contractor shall be responsible to modify these tests to fit the particular application and ensure personnel safety. Absolutely no tests shall be performed in such a fashion that personnel safety is jeopardized.

4. The Contractor shall have two or more personnel present at all tests.

5. Two non-licensed portable radios shall be provided by the Contractor for use during testing.

6. Contractor shall comply with California Electrical Safety Orders (ESO) and Occupational Safety and Health Act (OSHA): All test and procedures shall comply with ESO and OSHA as to safety, protective clothing, clearances, padlocks and barriers around electrical equipment energized during testing.

7. The first set of tests to be performed (pre-energization) shall determine the suitability for energization and shall be completed with all power turned off.
1.04 QUALIFICATIONS

A. System Integrator Representative
   1. The system integrator representative shall have 1 year experience in field testing of equipment working for the System Integrator or equivalent. If the representative does not demonstrate necessary experience or competence during testing or start-up, the System Integrator shall provide a representative meeting the required competence and experience.

B. Electrical Contractor Representative
   1. The Electrician shall have 5 years minimum experience working with industrial control systems and have a Journeyman level experience rating.

1.05 SUBMITTAL REQUIREMENTS

A. The Contractor shall ensure that the System Integrator, and all equipment suppliers provide the submittal documentation required in this section. Submittals shall be complete, neat, orderly, and indexed. The Contractor shall check all submittals required under this Division for the correct number of copies, adequate identification, correctness, and compliance with the Contract Specifications and Drawings, and initial all copies certifying compliance.

B. The System Integrator shall assemble and submit for approval complete testing procedures and forms at least two weeks prior to the start of testing. Contractor is responsible for compiling testing procedures and forms from multiple sub-contractors as required.

C. Test submittal shall include: (as applicable)
   1. Proposed procedure for operational testing whether it is performed in the factory or field. Procedure shall include method, simulated I/O requirements, bypass piping, telemetry, and necessary materials and equipment to conduct test.

   2. Test forms (for all tests, factory and field, and regardless of who performs tests). Test forms shall be electronically completed prior to submittal with entry spaces filled to the extent possible. The only remaining data that shall require completion during the test is the test data itself. Test forms shall be provided as illustrated at the end of this section or equal.

   3. Approved shop one-line, elementary diagrams and PLC I/O drawings.
4. Control strategies photocopied at 75% reduction with room at the side of page for comments on each paragraph or control strategy.

PART 2: PRODUCTS

2.01 TEST EQUIPMENT

A. Test equipment required to perform testing and document results shall be provided by Contractor, or System Integrator.

B. Test instruments shall be calibrated to references traceable to the National Institute of Standards and Technology. Instrument calibration shall be current to one year from date of start-up. Test equipment accuracy shall be at least twice the accuracy of instrument being calibrated. Test instrument certificates of calibration shall be on-hand and provided prior to testing.

C. All test equipment to be used as part of the testing shall be listed in the submitted testing sheets. Contractor supplying the component or system to be tested shall provide all necessary test equipment.

D. The overall accuracy of each input and output loop shall be checked to ensure that it is within manufacturer's Specification tolerances. In no case shall the error exceed 0.25% or 0.04 mA.

PART 3: EXECUTION

3.01 FACTORY TESTING

A. General Requirements

1. The System Integrator shall conduct a thorough and complete factory test witnessed by Engineer per the criteria specified herein. Factory test shall be held within 150 miles of project location.

2. Temporary wiring and equipment shall be provided and connected during these tests to simulate the complete assembled system.

3. The testing shall not be started until the manufacturer has completed fabrication, wiring, setup, programming; quality control testing; and can demonstrate the system is complete and operational.

4. The equipment required for factory testing shall consist of, but is not limited to, control panels, MCCs, and/or miscellaneous electrical panels as provided under this contract.
5. Two digital multimeters/signal generators (minimum +/- 0.1% accuracy) with clip-on leads shall be supplied and utilized during testing for measurement of digital and analog outputs.

6. All factory tests shall be conducted at the System Integrator's facility. All factory tests shall be completed prior to shipment to the jobsite. The equipment shall be fully assembled, and connected (and programmed) similar to as it will be installed.

7. The length of the factory testing shall be a minimum of one (1) working day(s) (8 hours per day).

8. If the equipment is not ready for factory testing, the test will be cancelled and rescheduled for a later date. The Contractor shall be responsible for paying liquidated damages for expenses incurred by the Owner Representative to come to a cancelled test. One thousand dollars ($1000.00) in liquidated damages shall be deducted from his contract each occurrence.

9. Faulty and/or incorrect hardware or software operation of major portions of the system may, at the discretion of the Engineer, be cause for suspension, cancellation, or restarting of the factory test, at no additional cost to the Owner or extension in Contract time.

10. The Systems Integrator shall develop, furnish, and install a test program to be loaded into PLCs to verify all Logic Controller I/O Point to Point Tests prior to start of applications program testing. Systems Integrator shall use a computer running PLC programming software to confirm I/O calibration and status, force outputs and communications configuration.

11. The factory test will be considered complete only when the integrated system has successfully passed all tests. No electrical equipment shall be shipped to jobsite without completed test documentation.

12. During the testing period, under the supervision of the System Integrator, the Owner's Representative shall have unlimited and unrestricted access to the usage and testing of system hardware, configuration, software, meters and tools.

13. The System Integrator shall pay all expenses incurred by his personnel including labor, material, transportation, lodging, daily subsistence, and other associated incidental costs during the factory testing.
14. Acceptance and witnessing of the factory tests does not relieve or exclude the Contractor from conforming to the requirements of the Contract Documents.

15. Upon conclusion of factory testing, and at the request of the Application Programmer, the System integrator shall remove the PLC, OI, and communication equipment for Application Programmer's use and programming. The System Integrator shall provide equipment to Application Programmer immediately or ship unit within 2 working days. The System Integrator shall not be responsible for equipment while in Application Programmer's care.

16. All modifications to documentation as a result of the factory tests shall be corrected and completed before the submittal and delivery of "Operation and Maintenance" Manuals.

17. Copies of the completed and witnessed factory testing forms shall be included in the Operation and Maintenance Manual.

B. Factory Tests

1. Structured Factory Tests: The associated factory tests are to be performed by the System Integrator and witnessed by the Owner's Representative. The associated test forms shall be completed during each stage of the test.

a. Visual and Mechanical Inspection Tests

b. Wiring Tests

   1) Contractor shall confirm correct panel wiring per System Integrator panel shop drawings. Panel shop drawings shall be compared with Contract P&IDs and other Drawings to verify all hardware logic are accounted for. Panel drawings used in factory tests shall be redlined and inserted into Factory Testing Results submittal.

c. MCC and Control Panel Pre-Operational Tests

d. Logic Controller I/O Point to Point Tests

e. Simulated Alarm Tests

   1) Simulate the digital and/or analog signals at the terminals to verify that each PLC I/O point is functional and properly programmed. Verify that all
parameters (i.e., setpoints, enable/disable toggle bits, timers, etc.) for the alarms operate according to the Specifications. Multiple alarm states (i.e., LO, LO-LO, HI, HI-HI, etc.) shall be checked.

2. Unstructured Factory Tests: The various unstructured tests shall include, but are not limited to, the following.
   a. Simulate the equipment failure and power fail/restart of PLC. Check the effects of each failure on maintaining operations with the remaining equipment.
   b. The factory tests, as a minimum, shall simulate all normal and abnormal operating conditions including steady state, change of state, variable changes, fluctuations, transients, upsets, start-up, shutdown, power failure, and equipment failure conditions.
   c. Measure and test all power supplies for correct voltage. Operate rechargeable devices under battery power to test run duration, alarms and automatic recovery.

3.02 FIELD TESTING

A. General Requirements

1. Field testing is broken down into 4 components
   a. Pre-Energization testing
   b. Pre-Operational Testing
   c. Operational Testing
   d. Commissioning

2. Project wide, all Pre-Energization testing must be completed prior to Pre-Operational testing, all Pre-Operational testing must be completed prior to Operational Testing, and all Operational Testing must be completed prior to Commissioning.
   a. Any deviation of this order, whether on a component level or larger scale, must be approved.
   b. Out of order testing, if allowed, will be evaluated on a case-by-case basis when brought to the attention of the Owner’s Representative. The Owner’s Representative may require that the entire system, or portions thereof, be retested once the missing component(s) are installed and functional.
3. All equipment supplied by the Contractor or others shall be tested by Contractor per these specifications.

4. Two digital multimeters/signal generators (minimum +/- 0.1% accuracy), AC current meters, torque wrench, and other specialized test equipment shall be provided by the Contractor for use during testing.

5. If the equipment is determined not to be ready for testing, the test will be cancelled and rescheduled for a later date.

6. Faulty and/or incorrect hardware or software operation of major portions of the system may be cause for suspension, cancellation, or restarting of the area of testing, at no additional cost or extension in Contract time.

7. During the Operational testing period, under the supervision of the System Integrator, the Owner’s Representative shall have unlimited and unrestricted access to the usage and testing of all hardware and software in the system.

8. The System Integrator shall pay all expenses incurred by his personnel including labor, material, transportation, lodging, daily subsistence, and other associated incidental costs during field testing.

9. Acceptance and witnessing of the tests does not relieve or exclude the Contractor from conforming to the requirements of the Contract Documents.

10. All modifications to documentation as a result of the tests shall be corrected and completed before the delivery of "as-built" documentation.

11. Copies of the completed and witnessed field testing forms shall be included in the Operation and Maintenance Manual.

12. The various contractors on this project (General Contractor, Electrical Contractor, and System Integrator) shall assume the lead role in testing activities as listed below. The Contractor shall obtain assistance of suppliers and/or manufacturers representatives for any major equipment testing.

   a. Electrical Contractor:
      1) Pre Energization Tests
         a) Visual Mechanical Tests
         b) Wire Insulation and Continuity Tests.
      2) Commissioning.
b. System Integrator:

1) Pre-Operational Tests
   a) Visual Mechanical Tests
   b) Control panel pre-operational test
   c) MCC pre-operational test
   d) Motor Tests.
   e) PLC I/O point to point tests.
   f) Instrumentation switch tests
   g) Instrumentation transmitter tests.

2) Operational Tests.
3) Commissioning.

c. General Contractor

1) Test Scheduling.
2) Operational Tests.
3) Commissioning.

d. Application Programmer (software systems)

1) Operational Tests.
2) Commissioning.

B. Electrical Field Tests – The following test shall be performed within each test category. Complete test forms for each electrical panel, instrument, and/or device. Provide separate form for each component to be tested.

1. Pre-Energization Inspections and Tests:

   a. Visual and Mechanical Inspection Tests
   b. Wire Insulation and Continuity Tests
   c. Grounding System Tests
   d. Panelboard Tests
   e. Breaker Tests

2. Pre-Operational Tests:

   a. Control Panel Pre-operational Tests
   b. Motor Testing
   c. Harmonic Measurement
   d. Instrumentation Switch Calibration Tests
   e. Instrument Transmitter Calibration Tests
   f. PLC I/O point tests.
   g. Communication Tests
1) The Contractor shall verify that all communications via radio, telephone, wireline, fiber optic, or other are functional and ready for operational testing. Revise all configurable parameters without additional cost to the Owner as required for an optimally functional system.

2) Verify that all components of the communication system operate together under all operating and power restart conditions. If faults occur, investigate source of problem and correct. Revise all configurable parameters without additional cost to the Owner.

3) Change setpoints from SCADA and confirm that corresponding field setpoint changes correctly. Check every I/O point on every screen, trend, and database.

3. Operational Tests:

   a. After all the previous tests in this subsection are complete, the test forms are completed and signed-off, the Contractor shall conduct operational testing.

   b. Representatives from the General Contractor, Electrical Contractor, System Integrator, and Owner's Representative shall be present during testing. Operational testing shall be performed by Contractor in the presence of the Owner's Representative.

   c. During operational testing the Contractor shall follow the instructions of the Owner. The Owner may place restrictions on operation that must be followed by the Contractor during testing. Any accidents or fines caused by actions of the Contractor where warnings or restrictions were placed, shall be remedied or paid by the Contractor.

   d. Alarm Tests

      1) Generate the digital and/or analog signals at the primary device to verify that each PLC I/O point is functional and properly programmed. Verify that all parameters (i.e., setpoints, enable/disable toggle bits, timers, etc.) for the alarms operate according to the Specifications. Multiple alarm states (i.e., LO, LO-LO, HI, HI-HI, etc.) shall be checked.
e. Operational Control Tests

1) Generate the digital and/or analog signals at the primary device by raising or lowering the actual measured process. Inject signal into the terminals or utilize a “force” function within the device only as necessary. Verify that each control system is functional and properly configured and programmed.

2) Each line of control logic in the Control Strategies section shall be checked. When the complete control strategy has been checked, it shall be signed and dated by testing person and person witnessing test.

3) Verify that all parameters (i.e., setpoints, runtimers, totalization, etc.) operate according to the Specifications.

4) Verify that all data, setpoints, alarms are being received at SCADA correctly and that all I/O points on screen are true and accurate representations of field information.

f. Other Tests

1) Force a power failure and power fail/restart of PLC and all other systems. Check the effects of each failure on each piece of equipment and automatic recovery.

2) Force a PLC communication error. Demonstrate error detection, alarming, and recovery.

3) Perform additional operational testing that has not already been witnessed.

4) Perform any additional operational testing as necessary to confirm robust and error free operation under all operational conditions.

4. Trial Period

a. Station/Equipment shall be activated to automatically run for 5 days, 24 hours per day Monday through Friday.
b. During the trial period the Owner’s Representative will test all modes of operation and will look for errors and malfunctions. A punchlist will be generated to be completed by Contractor and re-tested prior to Commissioning.

c. If equipment failure occurs during the trial period, the Contractor shall repair or replace the defective equipment and shall begin another trial period, Monday through Friday.

d. This test shall be repeated until all new equipment functions acceptably and without failure for consecutive days.

C. Commissioning:

1. Commissioning shall not commence until Operational testing and System Training are complete with documentation submitted and with prior approval.

2. The Owner may delay Commissioning for a period up to 30 days, during which time all testing documentation will be reviewed and preparation for operation will be made. Costs for project delays during this review may not be forwarded on to the Owner.

3. Commissioning period

a. The new equipment shall be activated by the Contractor to operate in full automatic for 10 consecutive days, 24 hours per day. Commissioning shall only start on Mondays or Tuesdays.

b. During Commissioning, the Owner will monitor and run the station in normal automatic mode. If equipment failure occurs during Commissioning, the Contractor shall repair or replace the defective equipment and shall begin another commissioning period after repairs are complete.

c. Parallel, existing and/or back-up systems shall remain in place and functional during commissioning period. Demolition of parallel, existing or back-up systems shall not begin until commissioning is completed.

d. This test shall be repeated until the new equipment functions acceptably for a consecutive commissioning period.

e. Warranty will begin at the start of a successful commissioning period. However, if major hardware failure occurs during commissioning, the warranty and
commissioning will restart once the problem has been identified and repaired.

f. Provide an additional 16 hours of PLC programming to occur 30 days after start up for work as directed by the OWNER that is not included on the drawings and specifications. Provide an additional 16 hours of SCADA programming to occur 30 days after start up for work as directed by the OWNER that is not included on the drawings and specifications.

1) OWNER shall receive full credit as a contract deduct for any hours not used at OWNER's discretion.

3.03 WARRANTY:

A. Provide warranty per Electrical Specifications [Electrical General, Warranty].

1. The completion of the above tests does not relieve the Contractor from any warranties specified in the Electrical Specifications or other sections.

2. Warranty shall begin on the start date of a successful Commissioning period.

3.04 FINAL ACCEPTANCE:

A. Final Acceptance per Electrical Specifications [Electrical General].
SECTION 16600
TEST FORMS

Index of Forms:

PC    Power Conductor Test Form
CC    Control Conductor Test Form
IC    Instrumentation Conductor Test Form
GS    Grounding System Test Form
VM    Electrical Equipment Visual and Mechanical Inspection Form
CPO   Control Panel Pre-Operational Test Form
MOTOR Motor Test Form
HM    Harmonic Measurement Test Form
IOP   Programmable Logic Controller I/O Point-to-Point Test Form
ISC   Instrumentation Switch Calibration Tests Form
ITC   Instrumentation Transmitter Calibration Test Form

END OF SECTION
# POWER CONDUCTOR TEST FORM

**PROJECT NAME:**

**DATE OF TEST:**

**TESTING COMPANY:**

**TEST LOCATION:**

**EQUIPMENT #:**

---

### INSULATION TESTS

<table>
<thead>
<tr>
<th>CONDUIT</th>
<th>PHASE TO GROUND</th>
<th>PHASE TO PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>AB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA</td>
</tr>
</tbody>
</table>

---

**NOTES:**

1) Use single form for up to 25 power conduits. Use additional forms as necessary.

2) Disconnect both ends of wiring prior to megger tests.

3) Megger insulation resistances of all 600 volt insulated conductors using a 500 volt megger for 10 seconds minimum (30 seconds minimum for motor leads). Make tests with circuits installed in conduit and isolated from source and load. Each conductor shall be meggered conductor-to-conductor and conductor-to-ground. These tests shall be made on cable after installation with all splices made up and terminations installed but not connected to the equipment.

4) Each megger reading shall not be less than 22 Meg-ohms resistive. Corrective action shall be taken if values are recorded less than 10 Meg-ohms. Conductors with low ohm values, that do not match similar lengths of conductors the same size, shall be replaced at no additional cost to the Owner.

5) Values of different phases of conductors in the same conduit run showing substantially different Meg-ohm values, even if showing above 22 Meg-ohms shall be replaced.

---

**CERTIFIED BY:**

**SIGNATURE**

**COMPANY**

**DATE**

**WITNESSED BY:**

**SIGNATURE**

**COMPANY**

**DATE**

---

Frisch Engineering, Inc.  PC  Frischengineering.com
**CONTROL CONDUCTOR TEST FORM**

<table>
<thead>
<tr>
<th>COND. OF #</th>
<th>COND. TO GROUND</th>
<th>CONDUCTOR TO CONDUCTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<tr>
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<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

1) Use single form for each conduit.

2) Disconnect both ends of wiring prior to megger tests.

3) Megger insulation resistances of all 600 volt insulated conductors using a 500 volt megger for 10 seconds. Make tests with circuits installed in conduit and isolated from source and load. Each conductor shall be meggered conductor-to-conductor and conductor-to-ground. These tests shall be made on cable after installation with all splices made up and terminations installed but not connected to the equipment.

4) Each megger reading shall not be less than 22 Meg-ohms resistive. Corrective action shall be taken if values are recorded less than 10 Meg-ohms. Conductors with low ohm values, that do not match similar lengths of conductors the same size, shall be replaced at no additional cost to the Owner.

5) Values of different phases of conductors in the same conduit run showing substantially different Meg-ohm values, even if showing above 22 Meg-ohms shall be replaced.
NOTES:

1) Disconnect both ends of wiring prior to megger tests.
2) Megger insulation resistances of all 600 volt insulated conductors using a 500 volt megger for ten seconds. Make tests with circuits installed in conduit and isolated from source and load. Each conductor shall be meggered conductor-to-conductor and conductor-to-ground. These tests shall be made on cable after installation with all splices made up and terminators installed but not connected to the equipment.
3) Each megger reading shall not be less than 10 Meg-ohms resistive. Corrective action shall be taken if values are recorded less than 10 Meg-ohms. Conductors with low ohm values, that do not match similar lengths of conductors the same size, shall be replaced at no additional cost to the Owner.
4) Continuity Tests: Each instrumentation conductor twisted shielded pair shall have the conductor and shield continuity measured with an ohmmeter. Conductors with high ohm values, that do not match similar lengths of conductors the same size, shall be replaced at no additional cost to the Owner.

CERTIFIED BY: ___________________________ SIGNATURE ___________________________ COMPANY ___________________________ DATE ___________________________

WITNESSED BY: ___________________________ SIGNATURE ___________________________ COMPANY ___________________________ DATE ___________________________
GROUNDING SYSTEM TEST FORM

PROJECT NAME: ________________________                DATE OF TEST: ________________________
TESTING COMPANY: ________________________                TEST LOCATION: ________________________
TECHNICIAN: ____________________________                TEST LOCATION: ________________________
EQUIPMENT NAME: ________________________
SOIL CONDITION: circle one WET DRY MOIST
DAYS SINCE LAST RAIN # OVER 7 __________
TEST ROD LOCATION RELATIVE TO SYSTEM GROUND UNDER TEST (DISTANCE AND DIRECTION) __________

COMMENTS:

FALL OF POTENTIAL TEST

<table>
<thead>
<tr>
<th>DISTANCE (FT)</th>
<th>RESIST. (OHMS)</th>
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<tbody>
<tr>
<td>20</td>
<td>1.00</td>
</tr>
<tr>
<td>30</td>
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<tr>
<td>100</td>
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<tr>
<td>110</td>
<td>0.10</td>
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<tr>
<td>120</td>
<td>0.00</td>
</tr>
</tbody>
</table>

GRAPH OF MEASURED RESISTANCE VS. DISTANCE FROM TEST PROBE

NOTES:
1) Use ground resistance test meter and perform separate ground test for each building or independently derived grounding system.
2) Verify ground system is in compliance with drawings and specifications.
3) Perform the test not less than two days after the most recent rainfall and in the afternoon after any ground condensation (dew) has evaporated.
4) Investigate point-to-point resistance values which exceed 1.0 ohm. Correct (by adding additional grounding systems as necessary) and re-test. Consult design engineer if for direction on additional grounding materials and methods.
5) Connect all ground electrodes and/or UFER ground together and perform fall of potential test.
6) Perform fall-of-potential test in accordance with IEEE Standard 81 and NETA 7.13 on the main grounding electrode or system. Install test electrodes a minimum of 100 feet from system under test.
7) Measurements shall be made at 10 feet intervals beginning 20 feet from the test electrode and ending 80 feet from it in a direct line between the system being tested and the test electrode. Plot resistance readings on graphical chart above.
8) Perform point-to-point tests to verify low resistance between the main grounding system and all electrical equipment connected to the grounding system. Purpose is to check Cad-Weld connections and continuity point to point.

CERTIFIED BY: ____________________________                SIGNATURE                 COMPANY: ____________________________                DATE: ____________________________

WITNESSED BY: ____________________________                SIGNATURE                 COMPANY: ____________________________                DATE: ____________________________

Frisch Engineering, Inc. GS Frischengineering.com
## ELECTRICAL EQUIPMENT
### VISUAL AND MECHANICAL INSPECTION FORM

**PROJECT NAME:** __________________________  **DATE OF TEST:** __________________________

**TESTING COMPANY:** __________________________  **TEST LOCATION:** __________________________

**EQUIPMENT NAME:** __________________________  **EQUIPMENT #:** __________________________

### NAMEPLATE DATA (complete as applicable)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CHECK</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANUFACTURER:</td>
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<td></td>
</tr>
<tr>
<td>MODEL #:</td>
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<tr>
<td>VOLTAGE:</td>
<td></td>
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<tr>
<td>BUS AMPERAGE:</td>
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</tr>
<tr>
<td>BUS TYPE:</td>
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<td>VERTICAL BUS:</td>
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<td>GROUND BUS:</td>
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<td>U.L. #:</td>
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<tr>
<td>PHASE:</td>
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<tr>
<td>SERVICE:</td>
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<tr>
<td>BUS BRACING:</td>
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<tr>
<td>HORIZONTAL BUS:</td>
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<tr>
<td>ENCLOSURE:</td>
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<td>NEUTRAL BUS:</td>
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<tr>
<td>SERIES #:</td>
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</tbody>
</table>

### PHYSICAL INSPECTION CHECKLIST

ENTER A ACCEPTABLE R-NEEDS REPAIR OR REPLACEMENT NA-NOT APPLICABLE

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CHECK</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHECK NON-ELECTRICAL FASTENERS FOR TIGHTNESS</td>
<td></td>
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</tr>
<tr>
<td>TORQUE TEST ALL WIRING AND BUS CONNECTIONS</td>
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</tr>
<tr>
<td>VERIFY ANCHORAGE IS PER SPECS AND/OR CALCS</td>
<td></td>
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</tr>
<tr>
<td>CHECK BUS BRACING AND CLEARANCE</td>
<td></td>
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</tr>
<tr>
<td>CHECK MAIN GROUNDING CONNECTION AND SIZE</td>
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<td></td>
</tr>
<tr>
<td>VERIFY GROUND BUS BONDING</td>
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<td></td>
</tr>
<tr>
<td>VERIFY EQUIPMENT GROUNDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERIFY CONDUIT GROUNDS AND BUSHINGS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK NEUTRAL BUS AND CONNECTIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERIFY ALL BREAKERS AND FUSES ARE RATED PROPERLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSPECT FOR BROKEN OR DAMAGED EQUIPMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSPECT ALIGNMENT OF PANEL AND DOOR</td>
<td></td>
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</tr>
<tr>
<td>VERIFY REMOVAL OF ALL DEBRIS AND DUST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERIFY WIRE LABELS ARE INSTALLED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERIFY ALL WIRE TERMINATIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK FOR PROPER WIRE SIZES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK FOR PROPER WIRE COLOR CODES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VERIFY ALL NAMEPLATES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK FOR PROPER CLEARANCES AND WORKING SPACE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INSPECT ALL PAINT SURFACES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK HEATERS AND THERMOSTATS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK VENTILATION AND FILTERS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK IF DRAWINGS MATCH EQUIPMENT</td>
<td></td>
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</tr>
<tr>
<td>CHECK ACCURACY OF OPERATION &amp; MAINTENANCE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

1) Complete checklist above. Note any items that were found out of compliance.

2) Torque all electrical connections to values defined by equipment manufacturer or per NEC 110-14.

**CERTIFIED BY:**

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>COMPANY</th>
<th>DATE</th>
</tr>
</thead>
</table>

**WITNESSED BY:**

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>COMPANY</th>
<th>DATE</th>
</tr>
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Frisch Engineering, Inc.  VM  Frischengineering.com
## CONTROL PANEL PRE-OPERATIONAL TEST FORM

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>EQUIPMENT</th>
<th>CONTROL</th>
<th>OPERATOR</th>
<th>PANEL</th>
<th>PANEL</th>
<th>PANEL</th>
<th>PLC POWER</th>
<th>I/O</th>
<th>DEVICE CHECKS AND TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TAG #</td>
<td>SWITCHES</td>
<td>INTERFACE</td>
<td>METERS</td>
<td>LIGHTS</td>
<td>NAMEPLATES</td>
<td>SUPPLY</td>
<td>CARDS</td>
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<td>Height</td>
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<td></td>
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<td>Voltage</td>
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</tr>
</tbody>
</table>

### CATEGORY
- **TAG #**
- **POWER SUPPLY 1 (V)**
- **POWER SUPPLY 2 (V)**
- **POWER SUPPLY 3 (V)**
- **UPS**
- **PANEL LIGHTS**

### Function

### NOTES:
1. Set configurable parameters and verify voltage input prior to applying power.
2. Verify equipment powers up and operates correctly.
3. Perform trip functions and verify equipment returns to normal operation with only necessary operator intervention.
4. Complete checklist above by entering a checkmark (CM) for acceptable, or R for needs repair or attention, or NA for not applicable.

**Attention Required:**

**CERTIFIED BY:**

**SIGNATURE**

**COMPANY**

**DATE**

**WITNESSED BY:**

**SIGNATURE**

**COMPANY**

**DATE**

Frisch Engineering, Inc.  CPO  Frischengineering.com
MOTOR TEST FORM

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>DATE OF TEST:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TESTING COMPANY:</td>
<td>TEST LOCATION:</td>
</tr>
<tr>
<td>MOTOR NAME:</td>
<td>MOTOR TAG:</td>
</tr>
<tr>
<td>SERIAL #:</td>
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</table>

MOTOR NAMEPLATE DATA

<table>
<thead>
<tr>
<th>MFG:</th>
<th>PHASE:</th>
<th>TYPE:</th>
<th>P.F:</th>
<th>S.F:</th>
<th>NEMA:</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTS:</td>
<td>HP:</td>
<td>DUTY:</td>
<td>RPM:</td>
<td>CODE:</td>
<td>DESIGN:</td>
</tr>
<tr>
<td>FREQ:</td>
<td>FLA:</td>
<td>MODEL:</td>
<td>FRAME #:</td>
<td>ROTATION (CW/CCW):</td>
<td></td>
</tr>
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</table>

INSULATION RESISTANCE TEST PHASE-TO-GROUND/PHASE-TO-PHASE

| A: | / | B: | / | C: | / |

CONTROL SETTINGS AND TESTS

<table>
<thead>
<tr>
<th>MOTOR HEATER MEASURED AMPS:</th>
<th>(AMPS)</th>
<th>MOTOR OVERLOAD SETTING:</th>
<th>(AMPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTOR THERMAL TRIP TEST:</td>
<td></td>
<td>OVERLOAD RESET TEST:</td>
<td>(YES/NO)</td>
</tr>
<tr>
<td>MINIMUM SPEED (IF VFD):</td>
<td>(HERTZ)</td>
<td>COIL RESISTANCE:</td>
<td>AB</td>
</tr>
</tbody>
</table>

PHYSICAL MOTOR TESTS - ACTUAL MEASURED VALUES

<table>
<thead>
<tr>
<th>VOLTAGE (VOLTS)</th>
<th>AMPERAGE (AMPS)</th>
<th>POWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB:</td>
<td>V</td>
<td>A:</td>
</tr>
<tr>
<td>BC:</td>
<td>V</td>
<td>B:</td>
</tr>
<tr>
<td>CA:</td>
<td>V</td>
<td>C:</td>
</tr>
<tr>
<td>IMBALANCE:</td>
<td>%</td>
<td>IMBALANCE:</td>
</tr>
</tbody>
</table>

NOTES:

1) Perform coil resistance measurements on motor leads with a low-resistance ohmmeter. Note measurements.
2) Perform insulation-resistance test utilizing 500 volt megger and/or accordance with manufacturer's published testing procedures. Motors 200 HP and more test duration 10 minutes, 200 HP and less test duration 1 minute.
3) Perform DC overpotential tests on motors rated 1000 HP and 4000 volts or greater in accordance with ANSI/IEEE Standard 95.
4) Verify that pump/shaft seals are lubricated and that automated lubrication systems are functional.
5) Verify that motor protection/monitoring circuits are installed and connected per contract drawings and manufacturer requirements.
6) Verify that the motor space heater is functional.
7) Perform a rotation test to insure correct shaft direction by "bumping" motor. Reverse as necessary in appropriate place. Phase taping must remain in order on terminals left-to-right once completed.
8) Measure running current and evaluate relative to load conditions and nameplate full-load amperes.
9) Record the voltage and current on all phases while operating under full-load. If voltage or current imbalance is above 2 percent, or if current is above nameplate FLA or expected level, investigate cause and report on findings. Calculate imbalance by dividing (high minus low measurement) by the average measurement of all 3 phases.
10) Vibration tests shall be conducted in cases of discernable abnormal vibration or when ordered by the Engineer (due to perceived excessive vibration). Vibration shall not exceed 0.1 in./sec as measured opposite driven end of motor. Make necessary corrections to reduce vibration below limit at all operational speeds and loads.

COMMENTS:

CERTIFIED BY: __________________________________________ SIGNATURE ___________________________ COMPANY ______ DATE ____________

WITNESSED BY: ________________________________________ SIGNATURE __________________________ COMPANY ______ DATE ____________

Frisch Engineering, Inc. MOTOR Frischengineering.com
## HARMONIC MEASUREMENT TEST FORM

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>DATE OF TEST:</th>
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</thead>
<tbody>
<tr>
<td>TESTING COMPANY:</td>
<td>TEST LOCATION:</td>
</tr>
<tr>
<td>TECHNICIAN</td>
<td>EQUIPMENT NAME:</td>
</tr>
<tr>
<td>POINT OF MEASUREMENT:</td>
<td></td>
</tr>
</tbody>
</table>

(If available, take measurements on primary side of main breaker, otherwise, on secondary side of main breaker.)

**COMMENTS:**

<table>
<thead>
<tr>
<th>MEASURED HARMONIC VOLTAGE VALUES</th>
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<tbody>
<tr>
<td><strong>RUNNING CONDITION</strong></td>
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<td>--------------------------</td>
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<td>PUMP 1 SPEED</td>
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<td>0</td>
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<tr>
<td>70</td>
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<td>90</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

**NOTES:**
1) Measure the harmonics with a harmonic analyzer with each combination of pumps shown or as designated by Engineer at start-up in operation on the Utility source. Repeat test on generator (if applicable).
2) Use multiple forms and/or attach printouts of harmonic analyzer machine.
4) Expand this chart for pump stations/systems with more than 3 VFD pumps.
5) All harmonic conditioning equipment shall be on-line and operate other non-VFD loads as normal during test.

**CERTIFIED BY:**

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>COMPANY</th>
<th>DATE</th>
</tr>
</thead>
</table>

**WITNESSED BY:**

<table>
<thead>
<tr>
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<th>COMPANY</th>
<th>DATE</th>
</tr>
</thead>
</table>
# PROGRAMMABLE LOGIC CONTROLLER I/O POINT-TO-POINT TEST FORM

<table>
<thead>
<tr>
<th>I/O #</th>
<th>TYPE</th>
<th>TAG #</th>
<th>Description</th>
<th>Scale</th>
<th>Digital</th>
<th>Operator</th>
<th>SCADA</th>
<th>Pass/Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>@4mA</td>
<td>@8mA</td>
<td>@12mA</td>
<td>@16mA</td>
<td>@20mA</td>
</tr>
</tbody>
</table>

**NOTES:**
1) Connect signal generator to each I/O point for factory testing.
2) Utilize actual instrument to generate signals for field pre-operational tests where possible.
3) Verify function and accuracy of loop by switching the digital signal or modulating the analog signal from the connected device or instrument.
4) Field verify all instruments and indicators within loop of signal.
5) Confirm polarity of signals and calibration ranges are equivalent for all components in loop.
6) Include significant digits post decimal in scale columns.
7) Complete checklist above by entering a checkmark (CM) for acceptable, or R for needs repair or attention.

Attention Required:

CERTIFIED BY: ___________________________ SIGNATURE ___________________________ COMPANY ___________________________ DATE ____________

WITNESSED BY: ___________________________ SIGNATURE ___________________________ COMPANY ___________________________ DATE ____________

Frisch Engineering, Inc. IOP Frischengineering.com
## INSTRUMENTATION SWITCH CALIBRATION TESTS FORM

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>INSTRUMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME:</td>
<td>UNITS:</td>
</tr>
<tr>
<td>TYPE:</td>
<td></td>
</tr>
<tr>
<td>MODEL:</td>
<td></td>
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<tr>
<td>SERIAL #:</td>
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</table>

<table>
<thead>
<tr>
<th>PROCESS SETPOINT</th>
<th>INCREASING TRIP POINT</th>
<th>DECREASING TRIP POINT</th>
<th>DEADBAND</th>
<th>SETPOINT TIME DELAY</th>
<th>ACTUAL TIME DELAY</th>
</tr>
</thead>
</table>

### NOTES:

1) Field test instrumentation and associated control systems in accordance with the specifications and the manufacturer's instructions. Instrumentation shall function as intended under actual process conditions or shall be repaired or replaced at Contractor's expense.

2) Complete a separate calibration form for each instrument provided.

3) Simulate process variable in field by applying known pressure, temperature, opening/closing measured device, raising/lowering actual level, etc. as required to confirm calibration. This step must be witnessed by inspector.

### CERTIFIED BY:

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>COMPANY</th>
<th>DATE</th>
</tr>
</thead>
</table>

### WITNESSED BY:

<table>
<thead>
<tr>
<th>SIGNATURE</th>
<th>COMPANY</th>
<th>DATE</th>
</tr>
</thead>
</table>
# INSTRUMENTATION TRANSMITTER CALIBRATION TEST FORM

**PROJECT NAME:**

**DATE OF TEST:**

**TESTING COMPANY:**

**TEST LOCATION:**

**INSTRUMENT NAME:**

**INSTRUMENT TAG#:**

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>INSTRUMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME:</td>
<td>RANGE:</td>
</tr>
<tr>
<td>TYPE:</td>
<td>SCALE:</td>
</tr>
<tr>
<td>MODEL:</td>
<td>UNITS:</td>
</tr>
<tr>
<td>SERIAL #:</td>
<td>TRANSMITTER OUTPUT:</td>
</tr>
<tr>
<td>REMOTE SENSOR TYPE:</td>
<td>FACTORY SPECIFIED ACCURACY:</td>
</tr>
<tr>
<td></td>
<td>REMOTE SENSOR OUTPUT:</td>
</tr>
</tbody>
</table>

## DESIGNED VALUE

<table>
<thead>
<tr>
<th>INPUT SIGNAL</th>
<th>OUTPUT</th>
<th>ENG VALUE</th>
<th>CALCULATED TOLERANCES</th>
<th>INSTRUMENT DISPLAY</th>
<th>INSTRUMENT OUTPUT SIGNAL</th>
<th>PROCESS INDICATOR</th>
<th>LOGIC VALUE</th>
</tr>
</thead>
</table>

## ACTUAL VALUE

<table>
<thead>
<tr>
<th>INPUT SIGNAL</th>
<th>OUTPUT</th>
<th>ENG VALUE</th>
<th>CALCULATED TOLERANCES</th>
<th>INSTRUMENT DISPLAY</th>
<th>INSTRUMENT OUTPUT SIGNAL</th>
<th>PROCESS INDICATOR</th>
<th>LOGIC VALUE</th>
</tr>
</thead>
</table>

**NOTES:**

1) With this form, attach and submit factory calibration forms for flowmeters and transmitters that are available from factory.

2) Field test and calibrate instrumentation and associated control systems in accordance with the specifications and the manufacturer's instructions. Instrumentation shall meet specified accuracy or shall be repaired or replace at Contractor's expense.

3) Complete a separate calibration form for each instrument provided.

4) Simulate process variable in field by applying known pressure, temperature, pH, etc. as required to confirm calibration. This step must be witnessed by inspector.

5) Provide parameter value for each parameter changed from factory default.

**CERTIFIED BY:**

**SIGNATURE**

**COMPANY**

**DATE**

**WITNESSED BY:**

**SIGNATURE**

**COMPANY**

**DATE**

Frisch Engineering, Inc. ITC Frischengineering.com
DIVISION 16 ELECTRICAL

ELECTRICAL SYSTEM ANALYSIS

SECTION 16630

PART 1: GENERAL

1.01 SCOPE OF WORK

A. System Analysis to include Outingdale Raw Water Pump Station and existing Water Treatment Plant.
   1. Short Circuit Study.
   2. Protective Device Coordination Study.
   3. Arc Flash Study and labeling.
   4. Labor, materials, equipment, tools, safety gear, test equipment, incidentals, services, and transportation to complete the work and implement the conclusions.
   5. Analysis shall be prepared utilizing electrical systems analysis software with all calculation modules within the same program. Analysis software shall be SKM Power Tools, Easy Power, or approved equal.
   6. Study shall be prepared by or under the direct supervision of a California registered Electrical Engineer and bear that engineer's seal and signature.
   7. Work includes analysis of all electrical equipment in the facility, new and existing; i.e. buses, circuit breakers, main switchboards, motor control centers, conductors, fuses, etc. Collect field data, coordinate with Utility, and document new and existing conditions as required for a thorough system analysis.
   8. Work includes that specified in Electrical Specifications [Electrical General].

1.02 SUBMITTAL REQUIREMENTS

A. Provide submittals and drawings as specified in Electrical Specifications [Electrical General, Submittal Requirements].
B. Submittals shall be provided in multiple steps:

1. Included with first electrical equipment submittal but under separate cover. Purpose will be to confirm selected equipment meets requirements for interrupt capacity and is able to be coordinated.

2. Included with subsequent electrical equipment submittals but under separate cover. Comments and changes related to electrical equipment shall be incorporated.

3. Two weeks prior to equipment start-up. Final wire lengths, and other information related to actual field installation shall be incorporated. New or revised utility information as it exists. Order/furnish equipment labels upon approval of study.

C. Submit input data and reports generated by analysis software for review after approval of power distribution equipment but prior to procurement. Submittal shall include, but not limited to;

1. Load Flow drawing and analysis with voltage and current at each node.
2. Fault drawing and analysis with incident energy shown at each node.
3. Time-Current Curve and Coordination
4. Settings Table
5. Arc Flash and incident energy table
6. Arc Flash warning labels (printout)

D. Changes to electrical equipment required due to selective coordination requirements will need to be implemented prior to procurement of the power distribution equipment.

E. Submit system model in native software file format for use by the City when performing modifications in future years.

PART 2: PRODUCTS

2.01 GENERAL

A. Perform study(s) using the latest version of electrical analysis software created specifically for this purpose. Program name and version shall be clearly stated within report.

B. The coordination study shall begin at the utility company's connection and include all of the electrical protective devices down to and include the largest feeder circuit breaker and motor starter in the 480 Volt motor
control centers and power distribution panelboards. The study shall also include variable frequency drives, harmonic filters, power factor correction equipment, transformers, and all protective devices.

C. Obtain utility source information for proper modeling of source supply.

D. Perform and provide fault calculations for each power source, and every possible switched configuration.

E. Input electrical equipment individually into the program, not as groups. All electrical equipment shall be included.

F. Utilize equipment / component tag names and numbers where shown. Follow similar standards when naming equipment without defined tags.

G. Obtain manufacturer data from submittals provided by vendors and integrators on the project and from the Utility Company directly. The Owner and Engineer are not responsible for providing information.

H. Provide time-current curves (TCC) diagrams for all protective equipment and breakers. Provide trip settings for each circuit breaker on the TCC diagram.

I. Protective device settings shall be applied prior testing and start-up of electrical equipment.

2.02 SHORT CIRCUIT STUDY AND LOAD FLOW ANALYSIS

A. Use actual conductor impedances if known. If unknown, use typical conductor impedances based on IEEE Standards 141, latest edition.

B. Transformer design impedances and standard X/R ratios shall be used when test values are not available.

C. Short circuit study shall provide the following information:

1. Bus impedances.

2. Transformer impedances based on actual submittals or ANSI standards.

3. Cable length, impedance, size, type, and quantity.

4. Utility data:
   a. Transformer KVA, impedance, voltage.
   b. Primary voltage of Utility transformer.
c. Utility Company primary fault currents (Min, Max, normal values), three phase bolted, line to ground, X/R ratio (positive sequence) and X/R ratio (zero sequence).

D. Voltage and current at each node within the system.

E. Protective relay model and settings.

F. Calculate Short Circuit fault currents for three-phase bolted fault and line-to-ground fault at each node including the following.

1. Incoming Utility
2. High / Medium / Low voltage switchgear
3. Power transformer primary and secondary
4. Switchboard
5. Motor Control Centers (MCCs)
6. Panelboards
7. 480V, 3 phase motor and equipment loads 2 HP and larger

G. Compare ratings of transformers, cable, equipment, and protective devices to the calculated short circuit stresses. Note any areas or equipment that may be deficient.

H. Provide Short Circuit and Load Flow study report showing the following minimum information.

1. Assumptions
2. Input data to program
   a. Circuit diagrams (conductors, circuit disconnects, transformers, panelboards, main switchboards, generators, transfer switches, buses, etc.)
   b. Symmetrical and asymmetrical line-to-line and line-to-ground fault currents.
   c. Impedances
   d. X/R ratios
   e. Motor contributions
3. Equipment evaluations (protected and non-protected devices) showing ratings, manufacturer, status, equipment type, and calculated minimums.

4. Bus rating of equipment.

5. Electric Utility company data.

6. Results, conclusions, and recommendations.

2.03 PROTECTIVE DEVICE COORDINATION STUDY

A. Provide Protective Device Coordination drawings for each section of distribution system.

B. Provide coordination time-current curves (TCC) on conventional log-log curve sheets. Each time-current curve shall be labeled to identify its purpose. This identifier shall be used in the tabulated settings spreadsheet and on the associated one-line diagram.

C. Provide the following curves (minimum):
   1. 12 kv distribution system, relay, fuses, cable, etc.
   2. Transformer, circuit breakers, and motor loads

D. Partial one-line diagram of specific portion of distribution system associated with time-current curves in question. One-line diagram shall include the following:
   1. Coordination name identifier – usually the protected device.
   2. Voltages, amperages, impedance and node names.
   3. Circuit devices such as transformers, cables, breakers, fuses, etc. with their corresponding amperage, KVA, and HP ratings.

E. Show maximum fault current to which device is exposed as calculated in short circuit study.

F. Characteristics plotted on TCC diagrams shall include; but, not be limited to:
   1. Protective relays.
   2. Fuses including melting curve, tolerance, and damage bands.
   3. Circuit breaker trip with tolerance bands.
4. Transformer full-load and magnetizing current.
5. Transformer and cable damage curves.
6. Transformer withstand parameters ANSI.
7. Motor and equipment full load currents.
8. Ground fault protective device settings.

G. Provide the following recommended settings in spreadsheet format in the Protective Device Coordination study report:
   1. Relay settings including CT values.
   2. Circuit Breakers adjustments:
      a. Long trip amperage and delay.
      b. Short trip amperage and delay.
      c. Instantaneous trip amperage.
      d. Ground trip amperage and delay.

H. Settings for all configurable electronic motor starters and VFDs.
I. Provide settings for settable circuit breakers and MCPs. Provide settings according to actual equipment installed.
J. Identify each curve by description, manufacturer, function, amperage and model as necessary to distinguish it from others.

2.04 ARC FLASH HAZARD STUDY

A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E including annexes.

B. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Alternative methods shall be presented in the proposal.

C. The flash protection boundary and the incident energy shall be calculated at all significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway, and splitters) where work could be performed on energized parts.
D. Safe working distances shall be specified for calculated fault locations based upon the calculated arc flash boundary for incident energy of 1.2 cal/cm² or greater.

E. Provide Arc flash calculation on line and load side of main breaker if there are serviceable components in a main breaker compartment.

F. Provide a table with the following parameters in the Arc Flash Hazard study report:
   1. Arc fault magnitude
   2. Device clearing time and/or arc duration
   3. Arc flash boundary
   4. Incident energy
   5. Working distance

2.05 STUDY REPORTS

A. Reports shall contain:
   1. Description of studies performed and brief introduction.
   2. Report calculations and spreadsheets results.
   3. Selected equipment deficiencies.
   4. Short circuit and coordination studies results.
   5. Comments or suggestions to improve safety:
      a. Changes and additions to equipment rating and/or characteristics.
      b. Highlight any equipment or devices that are deficient.
   6. Protective device settings:
      a. Breaker Frame make and model
      b. Trip unit make and model number
      c. Long, Short, Instantaneous, and Ground settings
   7. Stamped, signed and dated by Electrical Engineer registered in the State of California who performed the analysis.
8. Reports are to be updated to reflect as-built conditions at the end of the project to reflect change orders and other changes that have taken place since submittal.

PART 3: EXECUTION

3.01 GENERAL

A. Perform settings to equipment as required to obtain conformance with the Short Circuit and Protective Device Coordination Studies.

B. Submit as-built Power System Analysis report and project in PDF and native software file format for future use by the OWNER. Furnish all files needed to re-create the report.

3.02 FIELD QUALITY CONTROL

A. Test all protective devices as specified in section 16600.

B. Submit with any related field changes with final copies of studies and documentation.

C. The individual performing the Arc Flash hazard study shall direct the installation of the arc-flash hazard labels:

1. Remove and replace any improperly applied labels.

2. Repair the equipment finish damaged by removal of any labels.

3.03 ADJUSTING

A. After review and acceptance of the recommend settings, the supplier's field service technician shall set all recommended settings according to values determined during coordination Study.

B. Install arc-flash hazard labels on all equipment covered by the study.

3.04 ARC FLASH WARNING LABELS

A. Labels shall comply with latest codes and standards as they frequently change and the latest information may not be reflected here.

B. Provide minimum 3.5in. x 5in. Polyester with polyvinyl polymer over-laminate, self-adhesive warning sticker for each work location analyzed. Labels shall be resistant to:
1. UV Rays
2. Chemicals and common cleaning solvents
3. Scuffing
4. Wide temperature changes

C. Each label shall have a header with the wording, “DANGER (red) or WARNING (orange) - ARC FLASH HAZARD”, and shall include the following machine printed information:
   1. Location designation
   2. Nominal voltage
   3. Flash protection boundary
   4. Incident energy
   5. Working Distance
   6. Minimum Arc Rating of Clothing and other PPE
   7. Engineering report/issue date and revision number

D. Labels shall be professionally manufactured, machine printed, and not be hand-made and/or hand marked.

E. After review and acceptance of the Arc Flash hazard submittal and/or report by the Engineer, install all arc-flash hazard labels:
   1. Install labels at all locations required by NFPA, ANSI, or IEEE standards.
   2. At a minimum install labels in the following locations:
      a. The front of each main or incoming service compartment. Provide label for line and load sides of main.
      b. The front of each low voltage switchgear section.
      c. The front of each medium voltage circuit breaker door.
      d. Each motor control center compartment displaying hazard below the circuit breaker when energized.
      e. Each panelboard covered by the study.
f. Each control panel, individual starter, VFD or other equipment covered by the scope of the study.

END OF SECTION
DIVISION 16 ELECTRICAL

CONTROL PANELS

SECTION 16905

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Provide and install site specific Control Panels per Drawings.

B. Provide complete wired and tested panel with all devices installed per the contract Drawings and as stated herein.

C. Provide all necessary hardware, conduit, wiring, fittings, and devices to connect the control panel to equipment provided under other Sections.

1.02 REFERENCES

A. Electrical Specifications [Electrical General]

B. Electrical Specifications [Low Voltage Wire & Data Cable]

C. Electrical Specifications [PLC & OI Hardware]

D. Electrical Specifications [Instrumentation]

1.03 SUBMITTAL REQUIREMENTS

A. Provide submittals and Drawings as specified in Electrical Specifications [Electrical General, Submittal Requirements].

B. Submit shop construction Drawings for the Control Panel. The following Drawings shall be provided as a minimum:

1. Scaled drawings of the Control panel elevation, baseplan. The dimensions and locations of the cutouts shall be dimensioned from the bottom left corner of the door(s).

2. Scaled drawings of the backpan including all mounted components and wireways.

3. Wiring diagrams for AC and DC power distribution, I/O for each card in the PLC and communications block diagrams.

C. Calculations for environmental controls. Environmental controls (including air conditioners, exhaust fans, heaters and circulation fans) shall maintain interior panels temperatures within ratings of all internal equipment given the intended installation location.
1. Design and install environmental control systems to meet requirements herein and prevent premature failure of panel internal components.

2. Environmental controls may be shown in the Drawings and shall be considered the minimum level required. Additional components or systems shall be provided to meet internal temperature requirements.

3. Environmental control systems shall prevent and control intrusion of dust and bugs through the use of filtration systems.

4. Environmental control systems shall maintain humidity below that of the external ambient air and without condensation within panel.

1.04 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Provide operating instructions as specified in Electrical Specifications [Electrical General].

PART 2: PRODUCTS

2.01 ENCLOSURE

A. The enclosure for the control panels shall be (at minimum) sized as shown in the Contract Drawings.

1. Arrangement: Where so indicated, the instruments mounted in the panels shall have the nominal size and general arrangement shown. Panel layouts and nameplates shall conform to the approved submittal.

2. Assembly: Mount all equipment on 12 ga. painted white backpan(s) that is bolted to rear (and sides) of the enclosure. Use drill and tap method for machine thread screws for all internal components on mounting panels. Provide extra mounting bolts through the rear of the structure if equipment weight exceeds backpanel mounting stud capacity.

3. Hardware: Provide door latch and accessories as detailed in the Contract Drawings or as required to meet NEMA area ratings.

    a. Provide one or two single point latches for panels up to 36" height.
b. Provide 3 point latching mechanisms for panels over 36” height consisting of rotating handle with latch, extension bars with plastic wheels at ends and guide slots at top and bottom of door, or as otherwise shown on drawings.

c. Hinges, pins, bolts and screws shall be of 316 stainless steel only.

4. When physical size requirements for individual components are different than that detailed on the Control Panel backpan drawing, the wiring diagrams and specifications herein shall supersede the elevation drawing and the Contractor shall furnish additional panel width as needed to fit the electrical equipment. Deviations with sufficient evidence for the change shall be submitted for approval. The Contractor is required to provide for all equipment including spares and spaces as shown in the wiring diagrams.

5. PLC Control Panel Enclosures shall be Saginaw Enviroline, Hoffman Concept, with all required handles, latches lock hasps, dead-fronts, mounting panels and other required hardware or equal.

6. Pump Control Panel Enclosures shall be custom Saginaw, Hoffman, with all required handles, latches lock hasps, dead-fronts, barriers, mounting panels and other required hardware or equal.

2.02 CONTROL PANEL CIRCUIT BREAKERS

A. Furnish circuit breakers and accessories as required per Drawings and application.

1. Copper busbar systems, up to 480VAC, 115A, 1, 2 or 3 phase as needed for application

2. Trip rating per Drawings or as needed for protected device. Trip curves as selected by System Integrator.

a. B curve magnetic trip point: 3 to 5 times the rated current, typically used for computers and electronic equipment with very low inrush loads (PLC wiring).

b. C curve magnetic trip point: 5 to 10 times the rated current, typically used for small transformers, pilot devices, etc.

c. D curve magnetic trip point: 10 to 20 times the rated current, typically used for transformers or loads with very high inductive loads.
3. Quantity of pins and feed in lugs as required.
4. Auxiliary contact, shunt trip as required in Drawings.
5. DIN rail mounted, 18mm width per pole, finger safe pressure plate terminals.

B. Motor applications:
1. UL489 for branch circuit protection up to 40A, 1 to 3 pole.
2. 5 kAIC interrupting capacity @ 480 VAC
3. Alltech, Eaton FAZ, or equal.

C. Control circuit transformers and other Non-motor applications:
1. UL1077 supplementary protection up to 63 amps, 1 to 2 pole, AC or DC.
2. Used where a UL489 protective device is upstream powering the circuit (from a panelboard or other source).
3. Used within control circuits for power supplies, control power transformers, relays and PLC I/O points.
4. Used in place of fuses that are applied as supplementary protection.
5. Eaton FAZ, or equal.

2.03 FUSES AND FUSE HOLDER

A. Fuses shall not be used in branch or control circuits unless specifically shown in the Drawings. Circuit breakers shall be furnished and utilized where possible.

B. Fuses used in circuits 200 VAC and above shall be time-delay, 13/32" x 1-1/2", and have an interrupting rating of 10,000 AIC at 500 VAC. Fuses shall be Bussman type FNQ or approved equal. Fuse holders shall feature open fuse indication lights and shall be rated 30A at 600 VAC. Fuse holders shall be Bussman Optima Series OPM or equal.

C. Fuses used in 120 VAC shall be time-delay, 1/4" x 1-1/4", and have a rating of 250 VAC. Fuses shall be Bussman type MDA or approved equal. Fuse-holders shall be of the same manufacturer, series and color as the adjacent terminal blocks and have blown fuse neon indicators. Fuse holders shall be Entrelec ML 10/13.SFL, Allen Bradley 1492-H4 or equal.
D. Fuses used in signal and 24 VDC circuits shall be fast acting, 5mm x 20mm and have a rating of 250 VAC. Fuses shall be Bussman type GMA or approved equal Fuse-holders shall be of the same manufacturer, series and color as the adjacent terminal blocks and have blown fuse LED indicators. Fuse holders shall be Entrelec M 4/8.SFDT, Allen Bradley-1492-H5 or equal.

E. Fuses shall be sized in conformance with the NEC.

2.04 TERMINAL BLOCKS AND ACCESSORIES

A. General

1. Terminal blocks to be clamp type, 5 spacing, 300 volt, minimum rating of 20 amps, and mounted on DIN rail. DIN rail shall be same type as used for the relays. Install extra DIN rail on each type of terminal strip with 10% spare terminals for future additions.

   a. Provide larger terminal as necessary based on gauge of connected wiring. Those terminals with 10 gauge larger gauge wiring or more than one 12 gauge wire should be evaluated and changed.

2. Provide terminal blocks with "follower" plates that compress the wires and have wire guide tangs for ease of maintenance. Terminal blocks that compress the wires with direct screw compression are unacceptable. All power, control and instrument wires entering and leaving a compartment shall terminate on terminal blocks with wire numbers on terminals and on both ends of the wires.

3. Provide end clamps, separators, din rails, and jumpers to complete terminal block system. See example PLC I/O drawing for additional information. Engineer can provide on request if not available in plans.

4. Terminal Tags and Markers: Each terminal strip shall have a unique identifying alphanumeric code at one end (i.e.: TB1, TB2, etc.) or as shown in Drawings.

5. Plastic marking tabs shall be provided to label each terminal block. These marking tabs shall have a unique number/letter for each terminal which is identical to the "elementary" and "loop" diagram wire designation. Numbers on these marking strip shall be machine printed and 1/8" high letters minimum.

6. Terminal blocks shall be physically separated into groups by the level of signal and voltage served by PLC I/O card. Power and control wiring above 100 volts shall have a separate group of
terminal blocks from terminal blocks for wiring below 100 volts, intermixing of these two types of wiring on the same group of terminal blocks is not allowed.

7. Terminal blocks shall be gray in color unless otherwise shown on the Drawings.

8. Provide a ground terminal or connection point for each grounding conductor.

9. Provide a separate signal, common, and/or neutral terminal for every wire and PLC or remote device connection at minimum.

B. CP – Control Panel Terminal Blocks

<table>
<thead>
<tr>
<th>Description</th>
<th>Model number, Allen Bradley or equal</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose Terminal Block, 20A</td>
<td>1492-W3</td>
</tr>
<tr>
<td>Disconnecting Terminal Block, 20A</td>
<td>1492-JKD3</td>
</tr>
<tr>
<td>Grounding Terminal Block</td>
<td>1492-JG4</td>
</tr>
<tr>
<td>PLC AI Sensor Block, 4 Level with GND</td>
<td>1492-WTS3</td>
</tr>
<tr>
<td>PLC Digital Output Relays, 120VAC, 6A, SPDT</td>
<td>700-HLT1U1</td>
</tr>
</tbody>
</table>

Note 1: General purpose relays are defined in ELECTRICAL – GENERAL

Note 2: Accessories are not listed such as end caps, anchors, jumpers, bridges, marking strips, or other items necessary to make up a complete terminal block layout. Furnish all parts necessary per manufacturer's intended solution.

C. Power – Power terminal Blocks

1. Backpan mounted termination blocks shall be rated for 600V (min). The power termination blocks shall be rated to accept Copper or Aluminum cable and rated as shown on Contract one-line diagrams. Termination blocks shall be insulated with molded plastic covering and finger safe cover. Each termination block shall be provided with quantity and size of primary and secondary cable connections as required per installation. The power termination blocks shall be Erico UD, UDJ, BD, TD, or SB series or equal.

2. Unmounted termination blocks shall be constructed of aluminum and suitable for use with Aluminum and copper wire. Size and quantity of cable connections shall be as required for installation. Termination blocks shall be insulated with molded high-dielectric strength plastic covering and eliminate the need for tape insulation of electric connection. The termination block shall have removable
access plugs over the wire entry and hex screw ports. Provide NSI Polaris IPL or IPLD Series terminal blocks or equal.

D. Panel Ground

1. Each electrical enclosure shall have a copper ground bus. Screw type fasteners shall be provided on all ground busses for connection of grounding conductors. Ground bus shall be a Challenger GB series, ILSCO CAN series or equal.

2. A 12ga. copper ground wire shall be attached between the ground bar and the panel enclosure, and between the ground bar and the mounting panels. The ground connection to the enclosure and panel shall be made by sanding the paint finish off a small area, drilling a hole for a 0.25 inch bolt and mounting a 0.25-20 bolt to the panel to serve as grounding stud. The grounding stud shall be attached with a nut and flat washers on both sides of the enclosure/panel, and with an inside tooth star lock washer next to the panel surface. The star lock washer shall be on the inside surface of the enclosure, and the front surface of the mounting panel. The grounding wire shall be secured to the stud with a nut and inside tooth star lock washer. These grounding points shall be located within 12 inches of the bottom to the grounding bar. Each terminal strip rail shall be individually grounded by means of a #12 AWG wire to the ground bus.

3. Components within the panel shall be grounded according to the manufacturer's recommendations.

2.05 POWER SUPPLIES

A. Uninterruptible Power Supply (UPS)

1. The UPS shall be installed within the control panel and power all process related 120 VAC devices and DC power supplies.

2. The UPS capacity/size shall be as shown in the contract Drawings. The battery capacity shall be such that it may provide nameplate power for 10 minutes (min) from a fully charged battery(s).

3. The UPS shall provide surge protection and filtering: 0.3% IEEE surge let-through, zero clamping response time to meet UL 1449. The inverter shall provide true sine wave output.

4. When the Utility power voltage is outside of a preset range (approx. 100 < V < 130 VAC) then the UPS shall power the load from storage batteries and a solid state inverter.
5. The power supply shall be wired into the control panel power circuit per the contract Drawings.

6. The UPS operating ambient temperature range shall be 32 deg F to 122 deg F minimum.

7. The inverter shall be self resetting and continuously on-line regardless of the Utility power existence. Configure the UPS to restart automatically upon restart of utility power without operator intervention. The rectifier/charger shall recharge and maintain float charge on the batteries automatically.

8. The UPS shall be of a readily available commercial manufacturer. Provide American Power Conversion Smart UPS, Marathon Vault Series, or equal.

B. DC Power Supply (PS)

1. The DC power supply shall utilize a switching power stage, rectifier and voltage regulator. The power supply case shall be DIN rail mountable.

2. The power supply shall operate on 120V AC and provide DC output voltage and current as shown in the Contract Drawings.

3. The power supply shall be wired and fused per manufacturer instructions and Contract Drawings. Power supply output shall include self resetting overcurrent protection.

4. Power supplies below 101 Watts output power shall be Class 2 rated.

5. The power supply shall provide 2% voltage regulation for a change of 10% load to 100% full load.

6. The DC power supply shall be IDEC PS5R Series, Phoenix Contact Quint Power, or equal.

2.06 MISCELLANEOUS COMPONENTS

A. Wireway: Manufactured from light gray rigid PVC suitable for continuous use at temperatures up to 50 deg C. Wireway shall be 2” height, width as required with 0.5” slot spacing with removable covers. Provide Panduit type “F” or equal.

B. Intrusion Switch: The intrusion switch shall have a pin plunger that is depressed when the door is closed. The form C contacts shall be rated 2A at 120 VAC. Provide Hoffman A-LFSWD, Microswitch 1AC2 or equal.
C. LED Strip Light: The LED light shall be an “under cabinet” style with multiple LED lamps and acrylic diffuser. Lamp shall be switched on/off from integral switch or PIR motion sensor. Light housing shall be capable of magnet mount to top or side of enclosure or will include mounting tabs for mounting to brackets. Lamp shall be powered from 120VAC or from 24~48 VDC or shown in the contract Drawings. LED Strip Light shall be Stego 02540, or equal.

D. Circulation Fans: The control panel temperature shall be maintained 10 deg. F below lowest internal device’s temperature rating. The fans shall be 4” or 6” unless otherwise noted on Contract Drawings. The Contractor shall calculate the heat generation of all internal components and determine if the fans submitted will meet the cooling requirements of the internal components. Circulation fans shall include louver with filter and bug screen for outdoor installations.

E. Forced Air Heater: The control panel temperature shall be kept above 50 deg. F through the use of a resistive forced air heater when the panel is located outdoors. The heater shall contain a fan, heating elements, and thermostat within a single self contained unit. The wattage of the heater shall be as calculated by the supplier using the manufacturers sizing method to meet the temperature requirements. The heater shall be Hoffman D-AH series, or equal.

F. Thermostats: The air circulation fans shall be controlled by adjustable thermostat. The thermostat shall be mounted near the top of the panel and easily accessible by a technician. The thermostat shall be capable of control of a heater or cooling fan(s) by selecting the proper contact logic. The thermostat range shall be adjustable from 30 to 140 deg F. Thermostat shall be Hoffman A-TEMxx, or equal.

PART 3: EXECUTION

3.01 WORKMANSHIP

A. All work in this Section shall conform to the codes and standards specified in Electrical Specifications [Electrical General, Workmanship].

3.02 FABRICATION

A. Equipment Mounting:

1. Mount all equipment using manufacturers mounting tabs/holes or brackets where possible. Where not possible, construct custom brackets to panel mount or backpan mount components as shown in the Contract Drawings.
2. Equipment or laptop shelves shall be provided where shown on the Contract Drawings. Equipment shown on shelves shall not be placed on the bottom of the panel after field installation.

3. All nuts, bolts, screws, washers and hinges used in the panel shall be stainless steel. All components shall be mounted using bolts or screw fasteners only which are drilled and tapped into the backpan. Pop rivets shall not be allowed within panel except for enclosure support arms.

B. Environmental:

1. Control panel environmental accessories including fans, louvers, filters, bugscreens, air conditioners, etc. shall be provided as noted in the Drawings and as necessary for a complete environmental solution.

2. Panels environmental controls shall be designed during shop drawing submittal and fabricated to maintain temperatures 10 degrees F below lowest internal equipment maximum temperature rating.

3. Contractor shall provide [additional] fans, louvers, screens, sunshades, air conditioners, etc. as necessary to prevent equipment malfunction or premature failure. Provide associated wiring and thermostats as needed.

4. Environments:

   a. NEMA 4X rated panels shall be cooled/heated with closed loop type conditioning systems to include air conditioners, internal panel circulation fans and resistive heaters.

   b. NEMA 3R rated outdoor panels shall be cooled/heated with open loop type conditioning systems to include air conditioners, exhaust fans and louvers, internal panel circulation fans and resistive heaters. All exhaust fans and louvers shall include filters and bugscreens.

   c. NEMA 12 or 1 rated indoor panels shall be cooled/heated with open loop type conditioning systems to include air conditioners, exhaust fans and louvers, internal panel circulation fans and resistive heaters. All exhaust fans and louvers shall include filters and bugscreens.
C. Wiring:

1. Panel Wiring: All wiring shall be installed in wireways between terminal blocks, PLC, and devices. Reference Contract Drawings for control panel power distribution diagram and control panel elementary diagrams.

3.03 INSTALLATION

A. Wiring:

1. Install all equipment per Electrical Specifications [Electrical General].

2. All internal and field wiring shall be per Electrical Specifications [Low Voltage Wire].

3. Panel Wiring: All wiring shall be installed in wireways between terminal blocks and devices. Reference Contract Drawings for Control panel power distribution diagram and control panel elementary diagrams.

4. Field Wiring: Wireways shall be provided for field wiring. Reference Contract Drawings for control panel power distribution diagram and control panel elementary diagrams.

B. Cleaning:

1. The Contractor shall clean the inside of the control panel of any dust or debris remaining at the completion of installation and testing.

2. The Contractor shall exercise care when using a vacuum cleaner or compressed air such as not to damage any component within the panel.

3. Many electrical and computer components are open for ventilation. Falling debris can penetrate the openings and cause equipment failure. Equipment with debris inside shall be removed, cleaned and/or replaced.

3.04 FIELD ASSISTANCE

A. Provide testing as specified in Electrical Specifications [Factory and Field Testing].
3.05 WARRANTY

A. Provide warranty as specified in Electrical Specifications [Electrical General, Warranty].

3.06 FINAL ACCEPTANCE

A. Final Acceptance per Electrical Specifications [Electrical General].

END OF SECTION
PART 1: GENERAL

1.01 SCOPE OF WORK

A. Providing and installing Programmable Logic Controller (PLC) and Operator Interface Hardware and all supporting hardware, wiring and devices as specified in Electrical Specifications.

1.02 REFERENCES

A. Electrical Specifications [Electrical General]
B. Electrical Specifications [Low Voltage Wire and Data Cable]
C. Electrical Specifications [PLC and OI Application Programming]

1.03 SUBMITTAL REQUIREMENTS

A. Provide submittals per Electrical Specifications [Electrical General, Submittal Requirements].

B. Submit documentation showing the number and type of I/O modules required to meet the I/O requirements specified herein. Include complete manufacturer's part and model numbers.

1. PLC I/O points are determined by the P&ID Drawings. The Contractor shall count and total the PLC I/O points per PLC controller and per type of I/O required based on the P&ID diagrams. Provide 25% spare I/O points per I/O type per PLC.

C. Submit calculations showing that the power supply meets the specified requirements and the requirements of the devices powered. Confirm PLC power supply is sufficient for all possible operable conditions.

D. Submit shop drawings showing physical backpan layout of equipment in Control Panel.

E. Submit communications block diagram including PLC, OI, motor controls, power supplies, switches, routers, radios, and any other connected components.

F. Submit hardware Operations and Maintenance Manual per Electrical Specifications [Electrical General].
PART 2: PRODUCTS

2.01 GENERAL

A. Provide PLC modules from a single family of products, using the same software and interchangeable I/O cards, that can be configured for a range of applications from small, uncomplicated sites to large, complex sites with a variety of equipment.

B. Provide a PLC that will meet the following requirements:

1. Size and provide a CPU and power supply to accommodate the CPU, I/O cards, communication devices, etc. as specified herein.

2.02 PLC COMPONENTS

A. The following components (Allen Bradley, no equal) shall be provided to complete the PLC(s). Only major components are listed. Multiples of some components are required- see Drawings.

B. Compactlogix

1. Processor 1769-L36ER
2. EEPROM Memory Compact Flash 16MB min
3. Power Supply 1769-PA4 or -PA2 as required
4. Digital Input Module (DC) 1769-IQ16
5. Digital Output Module (Relay) 1769-OW16
6. Analog Input Module 1769-IF8
7. Analog Output Module 1769-OF4CI
8. End Cap 1769-ECR, 1769-ECL
9. Extension Cable 1769-CRRx

2.03 ISOLATION/INTERFACE RELAYS

A. Provide output isolation relays on all digital outputs that operate devices external to the control panel and on spare outputs or as otherwise shown in the Drawings. The relay coil connection shall be on one side of the relay base and form-C output contacts on the other.

B. Relays shall be 6A SPDT, coil voltage as required, indicating, plug in style as manufactured by Allen Bradley 700-HLT1U1 or equal. Provide jumper bars for common buss connections, Allen Bradley 700-TBJ20G, or equal.

2.04 ETHERNET SWITCH

A. The managed Ethernet switch shall have 16 ports with automatic uplink detection. Ports shall be manageable, auto-sensing 10/100 Base-Tx with RJ-45, 8 pin female connectors, meeting IEEE 802.3 standards. Each port
shall feature crossover VLAN, Broadcast filtering, MAC address filtering and manual IP address routing capabilities. Configuration shall be performed through software provided with the switch. Case shall be ventilated steel with provisions for wall or DIN rail mounting. Switch shall be suitable for power from 10 - 30 VDC. Switch shall be Stratix 5700 series 1783-BMS20CA, or equal.

2.05 OPERATOR INTERFACE (OI)

A. Provide an operator terminal Panelview Plus 7 Performance (2711P-T10C22D9P) system as manufactured by Allen-Bradley (AB), no equal to meet the following requirements:

1. Provide operator terminal with keypad/ touch screen terminal with Ethernet Communication Port connected to PLC Ethernet port.

2. Provide operator terminal with color liquid crystal display with replaceable backlight and 128 touch cells (minimum) on the display.

3. Provide operator terminal with 240K application memory.

4. Provide the operator terminal capable of operating the following environmental conditions:

   a. Operating Temperature: 32 to 131 degrees F
   b. Storage Temperature: -4 to 140 degrees F
   c. Humidity Rating: 5 to 95%, non-condensing
   d. Rating: NEMA 12, 13, 4X (indoor only)
   e. Power: 85 to 264 VAC, 47 to 63 Hz.

PART 3: EXECUTION

3.01 WORKMANSHIP

A. All work in this Section shall conform to the codes and standards specified in Electrical Specifications [Electrical General, Workmanship].

3.02 INSTALLATION

A. Fabrication

1. Mount, wire and Ground PLC and OI per manufacturer’s recommendations.

2. Organize equipment on control panel backpan per Backpan Layout detail in Contract Drawings.

3. Locate and install PLC(s) and OI(s) per Contract Drawings.
B. Wiring
1. Terminate status, control and analog wiring on terminal blocks.
2. Label and wire PLC to terminal blocks per Electrical Specifications [Wire, Fuses & Terminal Block] and Example I/O Wiring Diagram in the Drawings.
3. All spare I/O points shall be wired to terminal blocks.
4. Install communication cables to connect the PLC to external devices.
5. Bundle and tie down wires in a neat and orderly manner.
6. Terminate drain wire of shielded cables at backpan terminal block only.

3.03 FIELD ASSISTANCE
A. Provide testing as specified in Electrical Specifications [Factory and Field Testing].

3.04 WARRANTY
A. Provide warranty per Electrical Specifications [Electrical General, Warranty].
B. Perform the following services during the warranty period:
   1. Repair or replace damaged modules returned for service within 24 hours.
   2. Determine and report the cause of failure of modules returned for service.
   3. Resolve design or implementation problems discovered.

3.05 FINAL ACCEPTANCE
A. Final Acceptance per Electrical Specifications [Electrical General].

END OF SECTION
PART 1: GENERAL

1.01 SCOPE OF WORK
A. The work described herein is by Application Programmer. This specification provided for Contractor reference only.

1.02 REFERENCES
A. Electrical Specifications [Electrical General]
B. Project Drawings

1.03 QUALIFICATIONS
A. Services furnished under this specification shall be performed by qualified programmers meeting requirements specified in Electrical Specifications [Electrical General, Qualifications].

1.04 SECTION INCLUDES
A. Control descriptions for Programmable Logic Controller(s) (PLCs) and Operator Interface(s) (OIs).
B. Applications Programming for Programmable Logic Controller (PLC) and Operator Interface (OI) and SCADA is by Application Programmer. The programming description in 2.02 and 2.03 of this specification is provided for Contractor reference.
C. Related work as specified in Electrical Specifications [Electrical General].

1.05 SUBMITTAL REQUIREMENTS
A. Provide submittals per Electrical Specifications [Electrical General, Submittal Requirements].
B. Submit software operations manual including the following as a minimum.
   1. Program Code
      a. Program code demonstrating function in compliance with descriptions herein.
2. Setpoint listing with description

3. Program description
   a. Provide written description of program operation. Description shall cover all aspects of normal operation and alarm shutdowns. Describe all alarms and their effect on operation. Describe alarms that require manual reset.

4. Register cross reference listing
   a. The listing shall be in table format and include all program constants and variable registers with their functions.
   b. The listing shall show (block and rung number) where the register is used within the program code.

5. Configuration and Set-up
   a. The configuration of the processor and hardware selections shall be summarized.
   b. The configuration of the communication ports shall be shown.

6. Data Tables
   a. Print data tables with initial register values shown.

7. Special files
   a. Include any special files that are particular to the manufacturer. All files pertinent to programming or configuration shall be submitted.

C. Submit software documentation demonstrating understanding of control software requirements and compliance with Portability and Maintainability requirements specified in this Section.

1. Submit OI graphic layout and PLC program listing with cross-references for approval 4 weeks prior to factory test.

2. Provide two (2) sets of SCADA and OI graphic screens and PLC applications programs on flash drives, in native file format with each software submittal and at the end of the project for as-programmed final documentation for O & M manuals. Each drive shall have a typed label clearly stating the contents, date, filenames, and submittal (i.e., initial or as-programmed final).

3. A hard copy listings of SCADA and OI graphic screens and PLC applications programs (with comments) shall be printed with standard laser print 8½" x 11" paper and supplied with the initial
submittal and for as-programmed final documentation for O&M manuals. Copy and binding method shall not cut off any parts of program logic and comments. Print shall be sized so that the complete program logic run fits on one sheet, rungs extending to multiple sheets will not be accepted and will be returned without review.

1.06 PROGRAMMING METHODS

A. Design and code programs per the following:

1. Utilize ladder logic programming language as available in the PLC manufacturer's configuration software. Other software languages such as function block, flow charts, and structured text shall not be used unless approved through RFI/submittal process.

2. Clearly comment each line of program logic code. Include module headers detailing the purpose of the module, programmer name, date of last revision, revision history, and description of sequence of events.

3. Comment for each block of code explaining purpose of program block.

4. Code shall use the P&ID device names as the prefix to the names or tagnames throughout the program logic. Reference tag formation below. If PLC does not use tagnames as data reference, then provide tagname in symbol name or in comment areas at minimum.

5. Data arrays may be used in tagname aliases for communication data transfers.

6. Provide program file for each type of program logic. The following are types that should be used, as applicable and at minimum.

   a. Analog input scaling
   b. Analog output scaling
   c. Analog alarms
   d. Digital alarms
   e. PLC clock, midnight and today/yesterday control
   f. Flow totalizations
   g. Equipment runtimes
   h. Equipment starts
   i. Communications
   j. Each individual piece of controlled equipment (digital control)
   k. Each individual piece of controlled equipment (analog control)
   l. Each individual process system (digital control)
m. Each individual process system (analog control)
n. Miscellaneous systems

B. All custom software, including diagnostic, configuration and applications programming software shall become the sole property of the Owner for their use on this and future Owner projects.

C. No software or documentation shall be labeled proprietary.

D. Provide complete hardware and original manufacturer software manuals describing how to use the configuration software.

E. Provide two (2) disks copies and two (2) hard copies of all as-installed programs at the end of the project.

F. Furnish and maintain 256MB (min) USB RAM stick on site and within control panel so that latest program files are always available and up-to-date. Upon conclusion of each downloaded program change, the USB RAM stick shall be updated.

PART 2: PRODUCTS

2.01 APPLICATIONS PROGRAM CODE

A. The Applications Programmer will provide, install and test (with Contractor assistance) application programming. The descriptions provided herein are not final and may have modifications made to them during construction that may change the nature of operation.

B. The descriptions are provided to give the Contractor an insight as to the level of testing effort that will be required in the later stages of the project. Minor modifications should be expected and will not constitute a change in project testing assistance scope unless those modifications cause significant additional testing time or materials by Contractor. Significant time shall be defined as 4 hours and only time or materials related to program modifications since bid may be accounted.

C. The PLC program, OI and SCADA screens shall be modeled after a similar station. Modify I/O layouts as needed and adjust programming as needed to meet requirements herein.

D. The program code shall be written without any "hard-coded" constants that would effectively require a program change to modify the value. All function blocks shall contain variable registers only.
2.02 CONTROL STRATEGIES

A. General Requirements:

1. The following requirements (General and Specific) are intended to be used as a guideline for application programming of the PLC. They are the major functions and are not intended to be completely comprehensive of all requirements of the station operation and do not attempt to cover all necessary program routines for an operational system. Additional features, functions and registers will be required for an operational system.

2. The following general program functions shall be provided:

   a. Enable/disable toggle bits and variable time delays for all alarms.
   b. Analog input noise filtering -- software or firmware.
   c. SCADA Auto-Off-Manual controls for all equipment controlled by the PLC. These control buttons shall also be accessible via the OI(s).
   d. All equipment to have a Remote Reset feature available from SCADA and OI(s). Remote Reset signal to be held on until cleared by Reset Feedback signal.
   e. Normal operations shall continue with loss of SCADA connection. The PLC code shall act on I/O connections, PLC to PLC communications, and non-SCADA communications only to control the system. Only in the event of SCADA override, shall the system not act on PLC I/O connections and non-SCADA communications. None of the program code to control the system shall reside in the SCADA system.
   f. Time of day clock synchronization with SCADA system. PLC shall have registers defined for SCADA system clock write. The PLC shall have code written to recognize that the register(s) have been written to, stop the real time clock, set the clock, and restart it, with the value in the register(s). Date and time of day shall be set.
   g. Resettable and non-resettable operation hour meters for all equipment and resettable starts counters for all equipment.
h. Scaling to engineering values of all variables. Minimum of 3 significant digits required.

1) Level in 1/10th Feet or Inches
2) Pressure in 1/10th PSI.
3) Flow in GPM.
4) Flow totalization
   a) Total non-resettable flow displayed in MGD with 9999999.999 presentation layout.
   b) Total resettable flow displayed in MGD with 9999999.999 presentation layout.
   c) Total yesterday flow displayed in KGAL with 99999.9 presentation layout.
   d) All registers shall roll over to zero automatically.
5) Speed in percent %.
6) Motor current in 1/10 amps.
   a) Convert current input to power (in KW) where shown on drawings. Assume voltage to be 480 and power factor to be 0.85.

i. Data register types:

1) Any register that requires precision past the decimal shall be floating point type.
2) Integer registers may be used where decimal precision is not required.
3) Boolean registers shall be used for all statuses and on/off controls.

j. All set point registers, enable/disable toggle bits and settable variable time delays shall be adjustable from the OI direct to program data table.

k. Provide communications messaging as required to share data information and interlocks between PLCs. Message structure shall be fail safe as to keep overflows or other improper operation from occurring.

l. A power fail shall reset all routines.

m. Pumps and equipment shall have backspin delays and power fail sequential re-start delay routines.
n. All powered equipment and devices shall have an assigned essential / non-essential status for purposes of generator load shedding.

o. Programming code shall have automatic error checking and proper initialization to prevent illegal operations such as negative values being placed in timer presets or mathematical out of range functions which could cause a processor fault.

p. PLC shall be programmed so that, in the event of a power interruption, the equipment controlled shall resume normal operation upon power restoration without requiring a manual reset unless otherwise shown.

q. Set points

1) Minimum required set points for Lead / Lag pumping scenario.

   a) Lead Pump start level
   b) Lag Pump start level
   c) Lead Pump stop level
   d) Lag Pump stop level
   e) Pump Start delay time
   f) Pump Stop delay time
   g) Backspin delay time
   h) Sequential Start delay time
   i) Pump rotation selection (0=auto rotate, 1=P1 Lead, 2=P2 Lead)

2) Additional minimum required set points for Lead / Lag pumping scenario when variable speed control is used.

   a) Minimum Lead Pump speed to start Lag Pump
   b) Minimum Lag Pump speed to stop Lag Pump
   c) Maximum Pump Speed
   d) Minimum Pump Speed

3. Analog Scaling:

   a. All analog values shall be adjusted (if necessary) prior to scaling for required offsets due to hardware / firmware conditions.
b. All analog input values shall be scaled into real world engineering units and presented in REAL (floating point) format for use by SCADA and the OI(s).

c. All analog output values shall be scaled from real world engineering units into INT (decimal) format to control current or voltage output from an analog output device.

4. Alarms General:

a. Common alarms: Provide all applicable alarms per device based on available P&ID inputs and outputs.

1) Motor power or amperage alarms shall be disabled when the motor is not running.

2) If a device is called to start or move and the associated run status does not confirm start or move after a time delay then post a device “Run fail” alarm. (*YNRFA).

3) All equipment (as marked on P&ID drawings) shall have a non-running alarm. (*YNRNA)

4) Not in Auto alarm: All devices (valves, gates, pumps) with auto switch monitoring shall have associated “Not in auto” alarms. (*HNAFA).

5) Moisture / Temperature alarms: All submersible pumps shall have “Moisture” and “Over temperature” alarms. (*SMFA and *SOTFA)

6) Seal Water Fail alarm: All sludge type pumps shall have “Seal water fail” alarms. (*SWFA).

7) Pressure alarm: All sludge type pumps shall have “Inlet and Outlet pressure” alarms. (*IPFA and *OPFA).

8) Temperature alarm: All sludge type pumps shall have a pump body “Over Temp” alarm. (*OTFA).

9) Differential pressure alarm: All filters shall have “Differential pressure” alarms. (*DPFA).

10) Low oil alarm: All lubricated mechanical devices (gearboxes etc.) shall have a “Low oil” alarm. (*LOFA)
11) Vibration alarm: All moving mechanical devices (gearboxes, aerators, pumps etc.) shall have a “Vibration” alarm. (*VFA).

12) Over torque alarm: All geared mechanical devices (clarifiers etc.) shall have an “Over torque” alarm. (*OTQFA)

13) VFD Fault: All VFDs shall have a common fault alarm as a minimum. Further breakdown of alarms shall be provided based on data available from the VFD. All VFDs shall have a manual reset available from the OI(s) and SCADA. (*UAFA).

14) Flow, level, pressure, analytical and other analog alarms: All analog values will have at a minimum an associated alarm structure as defined in section 2.03.A.4.b.5 below.

15) All digital alarm values will have at a minimum an associated alarm structure as defined in section 2.03.A.4.c.3 below.

b. Analog Alarms:

1) If an analog value is above/below the associated set point, and the associated time delay has exceeded the time delay set point, then the alarm shall be generated / annunciated.

2) Transducer out of range alarms. If the scaled value of the analog input exceeds 21 mA or falls below 3.5 mA, an out of range alarm shall be triggered for that input.

3) The alarm shall automatically reset unless a latch is required to keep the process from resuming and recreating the alarm. A latching alarm requires either a reset set point for hysteresis or a manual reset.

4) The low flow alarms (and pressure alarms if applicable) shall only be enabled when the associated pump or system is running.

a) Provide low flow alarm for pump operation where flow is expected above setpoint continuously when running. Alarm shall shutdown system and fail pump. If other pumps are available, they shall be called in its place.
5) Example analog alarm display structure (Units per alarm type). ENABLE / DISABLE shall be a toggle switch. DELAY to be editable timer base value for associated alarm delay timer. SET POINT column to contain current analog value in Transducer Fail Alarm row. Other alarm rows to contain editable alarm set point value with REAL (floating point) data type. LATCH to be either reset set point value for reset of alarm or manual reset toggle (blank if alarm is not latching).

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
<th>En / Dis</th>
<th>Delay</th>
<th>Set Point</th>
<th>Latch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transducer Fail Alarm</td>
<td>ALARM</td>
<td>Enable</td>
<td>10 sec.</td>
<td>28.4 GPM</td>
<td>Reset</td>
</tr>
<tr>
<td>High Alarm</td>
<td>OK</td>
<td>Enable</td>
<td>5 Sec.</td>
<td>xxx.x GPM</td>
<td>OK</td>
</tr>
<tr>
<td>High Warning</td>
<td>ALARM</td>
<td>Enable</td>
<td>5 Sec.</td>
<td>xxx.x GPM</td>
<td></td>
</tr>
<tr>
<td>Low Warning</td>
<td>OK</td>
<td>Enable</td>
<td>5 Sec.</td>
<td>xxx.x GPM xxx.x</td>
<td>GPM</td>
</tr>
<tr>
<td>Low Alarm</td>
<td>OK</td>
<td>Disable</td>
<td>5 Sec.</td>
<td>xxx.x GPM xxx.x</td>
<td>GPM</td>
</tr>
</tbody>
</table>

c. Digital Alarms:

1) If the digital alarm state is TRUE and the associated time delay timer has exceeded the time delay set point, then the alarm shall be generated / annunciated.

2) The alarm shall automatically reset unless it is designated as “latch”. A latching alarm requires a manual reset.

3) Example digital alarm Structure. ENABLE / DISABLE to be a toggle switch. DELAY to be editable timer base value for associated alarm delay timer. LATCH to be a manual reset toggle (blank if alarm is not latching).

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
<th>En / Dis</th>
<th>Delay</th>
<th>Latch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic Digital Alarm 1</td>
<td>OK</td>
<td>Disable</td>
<td>10 sec.</td>
<td></td>
</tr>
<tr>
<td>Generic Digital Alarm 2</td>
<td>ALARM</td>
<td>Enable</td>
<td>10 sec.</td>
<td>Reset</td>
</tr>
</tbody>
</table>

d. Communications Alarm:
1) The SCADA and connected PLC(s) shall monitor for communications between controllers and they shall post an alarm if any PLC fails to respond to message queries.

5. Totalization:

a. Flow totalization (Example):

1) If an analog flow input value (Fxxxx) is positive, then increment the flow totalizers (FxxxxNRTOT, FxxxxRTOT and FxxxxTTOT) for each 1000 gallons of accumulated flow.

2) If internal flow reset status (FxxxxRST) is set, then set resettable flow totalizer (FxxxxRTOT) to zero and reset FxxxxRST.

3) Similar for all flowmeters / totalizers.

b. Hour Meters (Example):

1) If Generic Pump #1 running (PxxxxYNR) is set, then start hour timers PxxxxHRS, PxxxxRHRS and PxxxxTHRS.

2) If internal run time hours reset status (PxxxxRHRSRST) is set, then set resettable run time hours (PxxxxRHRS) to zero and reset PxxxxRHRSRST.

3) Similar for all device run time hours.

c. Starts Counters (Example):

1) If Generic Pump #1 running input (PxxxxYNR) is set or Generic Pump #1 start command (PxxxxXCS) is set (if running input is not available), then increment starts counters PxxxxS, PxxxxRS and PxxxxTS.

2) If internal starts reset status (PxxxxSRST) is set, then set resettable starts counter (PxxxxRS) to zero and reset PxxxxSRST.

3) Similar for all device starts.

d. Intrusion Alarms (Example):
1) Provide intrusion alarms for panels and buildings with intrusion switches.

2) Alarm shall be generated after an adjustable time delay to SCADA.

3) If an OI or SCADA is present, then provide a way for an operator to reset and disable the intrusion alarm for a setpoint period of time.

4) After that time elapses, then the alarm shall be reactivated automatically.

5) If no SCADA or OI, then the alarm shall reset automatically once the condition is returned to normal state.

B. SPECIFIC REQUIREMENTS

1. To be further defined by Applications Programmer and submitted for review. Include all operations to provide a fully functioning system.

2. Must comply with general requirements.
   a. Provide time delays and time delay setpoints for all functions.

3. Consists of programming function for the following:
   a. This Raw Water Pump Station will be a slave to the existing Water Treatment Plant system via radio communications under normal conditions.
   b. Raw Water Pump Station – Intake Pumps
      1) Interlock Intake Pump operation with alarms – high pressure, high level, high vibration, low flow, and 480 VAC power fail.
      2) This Intake Pump system will maintain a water level setpoint in the storage tank.
         a) Start lead pump on start level setpoint and stop pumps on stop level setpoint.
b) Rotate intake pumps and provide ability to fix lead intake pump. Only 1 intake pump is required to operate at a given time.

c) Utilize PID control routine to maintain setpoint level control in the Raw Water Storage by modulating the speed of the VFDs.

c. Raw Water Pump Station – Booster Pumps

1) Interlock booster pump operation with alarms – high pressure, high level, high vibration, low level, low flow, and 480 VAC power fail.

2) Pump call shall be from the existing plant Allen Bradley PLC control panel via radio communications.

   a) Modify Plant PLC to communicate with the new RW pump station PLC.

   b) If communications fail alarm, stop raw water pump station within setpoint seconds.

3) This booster pump system will maintain a flow setpoint required by the existing Water Treatment Plant.

   a) Rotate booster pumps and provide ability to fix a lead booster pump. Only 1 booster pump is required to operate at a given time.

   b) Enable booster pump to operate and obtain a flow setpoint when the storage tank is between high and low setpoints.

   c) Utilize PID control routine to maintain setpoint flow control to the plant by modulating the speed of the VFDs.

2.03 OPERATOR INTERFACE (OI) and SCADA

A. Operator Interface

1. Full manual and automatic control interface to be provided on each OI. Group controls logically to provide intuitive navigation through display screens for operators.
2. Include all setpoints and controls on each OI to allow full station operation independent of SCADA.

B. SCADA

1. Provide SCADA display screens similar to existing screens for other associated facilities. Submit all new displays for review.

2. Include sufficient displays to incorporate all controls, statuses, alarms, setpoints and trends required for station operation.

3. Provide status and alarm indication of communications from SCADA to all PLC(s).

PART 3: EXECUTION

3.01 WORKMANSHIP – N/A

3.02 SOFTWARE DEVELOPMENT

A. The programming, setup and configuration of the PLC & OI shall be done by the Applications Programmer.

B. The PLC & OI shall be ready to be placed in operation at the time of Operational Testing.

C. Do not enable or set any passwords on the PLC software or hardware for this project.

D. Additional Programmer Labor Hours

1. The Contractor shall include in his bid price an additional 32 hours of PLC/OI program configuration changes to be designated by the Engineer or Owner during testing and start-up.

3.03 MEDIUM

A. Provide PLC & OI applications programs on USB Flash Drive media with each submittal. Clearly label drive with station name and contents. Flash drive shall contain the following:

1. Application program, configuration and data tables.

2. OI software with graphics and all support files.

3. These disks and all copyrights shall become the property of the Owner, for its use on this and future projects.
B. In addition, one USB Flash drive of the application PLC & OI programs shall remain on site in the control panel. All programs and files shall be updated each time the Applications Programmer modifies the PLC program.

C. Provide two (2) copies of as-installed applications programs printed with standard laser print 8 1/2" x 11" paper at end of project. Insert new print-outs into the Operations and Maintenance manuals. Provide number of copies as specified in 16010 Operations and Maintenance Instructions.

3.04 FIELD ASSISTANCE

A. Provide testing as specified in Electrical Specifications [Factory and Field Testing].

3.05 WARRANTY

A. Troubleshoot and correct all program abnormalities, glitches and bugs uncovered during the warranty period. Provide phone and/or on-site support as required to correct problem(s).

B. Software support which shall be provided by the Applications Programmer:

1. Free technical PLC / OI software and hardware configuration phone support for a period of one year. PLC / OI phone support shall be provided directly from the person(s) that configured the PLC / OI. Phone support shall be available between 8 a.m. and 4 p.m. Pacific Standard Time Monday through Friday.

2. The Applications Programmer shall correct any PLC / OI software configuration error that is discovered within the warranty period, at no additional cost to Owner. Updated documentation for each "operation and maintenance" manual and new USB flash drives of updated software shall be provided for each correction.

END OF SECTION
DIVISION 16 ELECTRICAL

INSTRUMENTATION

SECTION 16940

PART 1: GENERAL

1.01 SCOPE OF WORK

A. The major components in the instrumentation scope of work are:

1. Furnish, configure, test, commission, and warrant instrumentation as shown in the P&IDs, plans, and/or listed in specification section.

2. Include necessary piping, valves, pressure reducers, mounting brackets or flanges, supports, and anchors to complete installation.

3. Provide sunshades for instrumentation for all instruments that are exposed to direct sunlight.

B. System Integrator selection of instrumentation shall be per manufacturer's recommendation for the application and per specifications. If a manufacturer's recommendation or installation instructions are inconsistent with the Contract installation details or specifications, then the Contractor shall submit an RFI describing the inconsistency. If the inconsistency is due to substitution from the first named equipment, then the responsibility of coordination and any additional cost shall be borne by the Contractor.

C. Projects that come into contact with drinking water: (NSF-61 certification)

1. Furnish NSF/ANSI 61 certified products that have undergone testing for any device, valve, instrument, or assembly that will come into contact with drinking water.

2. The certification determines what contaminants may migrate or leach from the product into drinking water and confirms if they are below the maximum levels allowed to be considered safe.

3. Flowmeters, pressure transmitters, and chemical analyzers are a few of the products that may fall into this category requirement.

D. Provide all devices, valves, tubing, fittings, wiring, terminal blocks, calibration consumables, initial calibration equipment, accessories, sunshades and enclosures as specified herein and as shown on Contract Drawings.
E. The Contractor shall furnish all tools, calibration equipment, calibration materials, specialized parts and incidentals necessary to integrate the instrument to the application.

F. Contractor shall furnish labor for installation, verification, start-up, calibration, testing and commissioning. Contractor shall prove proper function of instrument prior project completion.

1.02 REFERENCES
A. Electrical Specifications [Electrical General]
B. Electrical Specifications [Factory and Field Testing]

1.03 SUBMITTALS AND DRAWINGS
A. Submit shop documents and drawings for approval in accordance with this subsection and as specified in Electrical Specifications [Electrical General, Submittal Requirements].
B. Submit Operating Instructions (O&M Manuals) for each instrumentation device prior to equipment installation.

1.04 OPERATING AND MAINTENANCE INFORMATION
A. Provide operating instructions as specified in Electrical Specifications [Electrical General, Operating and Maintenance Instructions].

PART 2: PRODUCTS
2.01 QUALITY
A. Electrical Specifications [Electrical General, Quality].
B. All equipment shall be designed and constructed so that in the event of a power interruption, the equipment specified hereunder shall resume normal operation without requiring a manual reset.
C. Signal transmission from remote or field electric and electronic devices shall be 4-20 mA, sourced by a 24 VDC supply internal to the instrument or from a 24 VDC power supply located within the panel that is to receive the signal. Nonstandard transmission methods such as impulse duration, pulse rate, and voltage regulated will not be permitted except where specifically noted.
D. Transmitters or devices located in Class 1, Division 1 hazardous areas shall be rated for hazardous location installations per NEC and UL. Explosion proof enclosures and raceways or current/spark limiting devices
located inside or outside of the classified area shall be furnished to comply with code requirements.

E. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately converted to 4-20 mA signals for remote transmission.

2.02 INSTRUMENT IDENTIFICATION

A. All major instrumentation and equipment items or systems specified in this Division and/or on the P&IDs are identified by tag numbers. Tag field equipment with assigned instrumentation tag number and functional description.

1. Tags shall be 1/2" stainless steel DYMO impressed tape with 3/16" (minimum) height characters.

2. Metal tape embosser shall feature a built in hole punching device and scissor cutoff tool.

B. Attach tags to equipment with a 4" long, 20-gage stainless steel wire leash for small devices, or two stainless steel screws for larger instruments; however, such permanent attachment shall not be on an ordinarily replaceable part or in an area that will be subject to unintended overuse fatigue. Make the tag plainly visible.

2.03 LEVEL COMPONENTS

A. Ultrasonic Level Transmitter:

1. The ultrasonic level transmitter shall utilize non-contacting ultrasonic signal reflection technology to provide level monitoring for up to 50 ft range.

2. The transmitter shall feature advanced echo processing algorithms that can be configured to ignore selected echos.

3. The transducer level element (LE) shall have the following features:
   a. Corrosion resistant plastic body, completely submergence rated.
   b. Rated for Class 1, Div. 1 hazardous atmospheres.
   c. Operating temperature of -40 to 200 deg F.
   d. Beam angle (degrees) as required for the application and to avoid obstructions.
   e. Beam range as required for the application.
4. The level indicating transmitter shall have the following features:
   a. NEMA 4X / IP65 enclosure.
   b. Ground isolated 4-20 mA output, max load of 750 ohm.
   c. Two 5 amp at 120V AC, SPDT relays.
   d. Integral 4 button keypad for configuring parameters.
   e. Integral 1.5" x 4" (min) backlit LCD display.
   f. Operating temperature range from -40 to 140 deg. F.

5. The calibration of the level transmitter and cable length shall be as shown in the instrument schedule.

6. Provide one hand held or integral programming interface with each transmitter provided.

7. The ultrasonic level transmitter shall be Pulsar Ultra 5, or equal. The sensor range shall be 0-20 feet meeting all required applications. Provide cable length as required per site plan. Provide dB6 sensor, standard transducer face and mounting hardware.

2.04 PRESSURE COMPONENTS

A. Gauge, Absolute, or Differential Pressure Transmitter:

1. The pressure indicating transmitter shall be a loop powered, two wire, 4-20 mA signal transmitting device with signal derived from the applied sensor pressure. Transmitter shall be capable of driving 0 to 500 ohm loads with 24 VDC supply.

2. The transmitter shall have the following features:
   a. Programmable 4-digit Liquid Crystal Display (LCD) process indicator.
   b. HART programming with programming selections for square root extraction, output calibration, and adjustable dampening 0.0 to 36.0 seconds, minimum.
   c. Integral microprocessor based circuitry with RFI filtering and shielding.
   d. The transmitter shall have accuracy of +/- 0.1% of span over a range of minimum 10 to 1 turndown. Elevated zero setting capable of 0-30% upper calibration limit.
e. Operating temperature range shall be -40 to 185°F (minimum). Process wetted materials shall be compatible with fluid being measured with minimum hastalloy or ceramic diaphragm and 316 stainless steel wetted parts.

f. Process connection shall be as follows:

1) Low solids content - 1/2" MNPT with calibration valve.

2) High solids content - 1-1/2" or 2" flange with flushing ring and valve.

3) And as required per installation detail.

g. The transmitter shall be scaled as shown in the instrument schedule.

3. Provide mounting bracket per mounting requirements shown in Contract drawings.

4. The gauge pressure transmitter shall be Endress and Hauser Cerabar M PMC 71, Rosemount Smart 3051, or equal.

B. Calibration Valve:

1. Calibration valve for use with gauge transmitters shall have the following features:

   a. Stainless steel body with integral blocking valve and calibration valve and port.

   b. Calibration port shall be 1/4" FNPT with 1/4" MNPT x 1/2" FNPT adapter.

   c. Valve shall have a non-rotating stem tip and a fully backseated bonnet.

   d. Process and transmitter connections shall be 1/2" MNPT. Include 1/2” stainless steel close nipple as required.

2. Calibration valve shall be Hex HB59, Anderson Greenwood, or equal.

C. Pressure Guage:

1. The pressure gauge shall be 1% accurate with C-type bourdon tube. The bourdon tube, socket and connection tube of the gauge shall be 316 stainless steel. The case and bezel ring shall be
constructed of type 304 stainless steel. The dial shall be 3-1/2” in diameter with a black pointer and a white gauge face with black print. The gauge shall be filled with liquid glycerin. A bottom mount process connection shall include a snubber as a separate component. The process connection shall be 1/2” stainless steel. The pressure gauge shall be Ametek gauge model 1535, Ashcroft 1009, or equal.

2.05 FLOW COMPONENTS

A. Magnetic Flow Meter:

1. The magnetic flow meter shall consist of a flow tube FE and a converter FIT, complete with interconnecting cables.

2. The magnetic flow meter shall be of the low frequency electromagnetic induction type and shall produce a DC pulse signal directly proportional and linear to the flow rate, with the duration not less than 100 milliseconds. Complete zero stability shall be an inherent characteristic of the metering system. Meters requiring field zero adjustment will not be acceptable. The meter accuracy shall not be affected by changes in fluid pressure, temperature, viscosity, or conductivity.

3. Accuracy

a. The maximum error of the complete metering system including flow element and flow indicating transmitter shall be 0.30% of actual flowrate (in specified units) and readout over the range of full scale velocity settings from 1 to 30 feet per second. Variations in temperature, voltage, and frequency within the ranges listed herein shall not affect the overall measuring accuracy.

b. The flow meter shall not require more than three diameters of straight pipe length from the center of the meter to upstream or downstream obstructions to obtain specified accuracies.

c. Lack of straight pipe or obstructions to straight length pipe requirements shall not cause overall flowmeter inaccuracies to exceed more 0.5% of actual flowrate over the range of full scale settings from 1 to 30 feet per second.

4. Flow Element (FE)

a. The flow element shall be based on a pipe spool with ANSI class 150 flange connections or be flangeless construction
as required by mechanical drawings. Class 300 flanges shall be provided where shown or when the pressure and temperature of the process fluid exceeds the rating of a 150 lb flange. The flow element size shall be as shown in the mechanical drawings and listed in the Instrumentation Schedule. Flange type and bolt pattern shall be coordinated with the mechanical Contractor prior to submittal.

b. The flow element shall have Hastalloy C4 or 316 stainless steel coil and grounding electrodes.

c. Stainless steel grounding rings shall be provided at both ends of the flow element for all flowmeter applications. Grounding rings shall be manufactured from stainless steel, 2 mm thickness with grounding tab for electrical wire connection, and fit within the flange bolt circle. Grounding ring shall be self centering within pipe.

d. The flow element internal liner material shall be hard rubber, unless recommended otherwise by the manufacturer for the application and approved.

e. Nema rating as defined in the Instrumentation Schedule.

5. Flow Indicating Transmitter (FIT)

a. The electronic flow indicating transmitter shall be mounted remotely from flow tube as shown on Contract drawings.

b. The electronic transmitter shall be provided in a NEMA rated enclosure per the Instrumentation Schedule.

c. The transmitter shall be interchangeable with all sizes of flow elements and shall be field replaceable (without replacing flow element) in the event of transmitter failure.

d. The transmitter shall be microprocessor controlled, utilizing digital signal processing with automatic zero correction to provide a linear 4-20 mA signal proportional to flow rate.

e. The transmitter shall incorporate a high impedance amplifier of 100,000 Megohms or greater, eliminating the need for electrode cleaning systems.

f. The transmitter shall contain a self test mode to allow the operator to manually simulate the output 4-20 mA signal to any value between 0% and 100% to check out any driven devices in the loop.
g. Rate indicator and totalizer: An alphanumeric LCD backlit display shall be provided to continuously display the flowrate and totalizer with units and all programming functions.

h. All programming configuration of the Flowmeter shall be completed through the transmitter’s pushbutton interface. A communication device shall not be necessary to configure the flow transmitter.

i. PC based software shall be available and included for configuration and troubleshooting. Connection to flowmeter shall be via computer USB port and include interface cables as required.

j. Verimaster software kit and infrared adapter provided to the District upon completion of the project

k. The transmitter shall be designed for operation from a power source of 120 volts AC, with a power consumption of less than 20 watts. The flow element shall be powered from the transmitter.

l. The transmitter shall operate continuously without fault in an ambient temperature range from 14 to 140 °F. The flowmeter shall be suitable for operation in direct sunlight without the use of a sunshade. If a sunshade becomes required after installation for any operational reason, one shall be furnished and installed free of charge.

m. The following configurable parameters shall be provided at a minimum:

1) Field adjustable flow signal dampening.

2) Low flow cutoff (forces zero flow signal) between 0.0-5.0% of full scale rate.

3) Empty pipe detection (forces zero flow signal) if the pipe is not full.

4) Selection for forward/reverse/both flow directions.

6. Flow Indicating Transmitter (FIT) I/O Interface

a. Flow Signal: 4-20 mA signal proportional to the flow. The signal shall be field configurable for the flow calibration specified and others within the flow tube accuracy range. The flow signal shall be capable of measurement for forward
and reverse flows combined by offsetting zero to mid scale (12 mA).

b. Flow Totalization Pulse: The Flowmeter shall feature a pulse output that is scaled to 1000 gallons per pulse unless otherwise shown.

1) Provide solid state interfacing relay within control panel (as required) between flow meter voltage output and PLC discrete voltage input. Provide any necessary interfacing devices to make flow meter pulse duration and output rate compatible with PLC discrete pulse input rate.

c. Meter Positive Zero Return: This contact input shall force the flow reading and output flow signal to zero flow.

7. If the flow indicating transmitter (FIT) is shown in the Contract drawings to be mounted remotely from the flow element (FE), the manufacturer shall provide all cabling between flow element and flow indicating transmitter.

8. All mounting hardware and/or devices necessary to complete the installation shall be provided by the manufacturer at no additional cost to the Owner.

9. The meter shall be hydraulically calibrated at a facility located in the United States and the calibration shall be traceable to the National Bureau of Standards. A certified copy of the calibration test results shall be submitted to the Owner prior to shipment of the meter.

10. The magnetic flowmeter shall be ABB WaterMaster model FEV121, no equal.

2.06 EVENT, STATE OR POSITION DEVICES

A. Position Switch:

1. Door switch – door intrusion switch shall have a wide gap magnetic sensor with S.P.D.T. contacts mounted in an extruded aluminum housing with integral 3 foot stainless steel armored cable for wiring to a junction box. Switch contacts shall have 0.25A at 30VAC/VDC minimum capability. When attaching to a ferrous metal surface, space sensor components away from metal by minimum ¼” using plastic spacer in order to maintain magnetic gap. Intrusion door switches shall be Sentrol 2507-A or equal.
2.01 INSTRUMENTATION SCHEDULE

A. The Instrumentation Schedule spreadsheet (located at the end of this section) is intended to be a summary of instrumentation equipment required for this project. Not all instrumentation details are shown on the schedule. Some requirements may be shown in the Instrumentation Schedule such as enclosure rating and instrument span that are not described in the specifications. Both are required for a complete specification.

B. If an instrument is shown in the P&IDs or on the site plan, then the device shall be provided whether or not it is shown on the Instrumentation Schedule.

PART 3: EXECUTION

3.01 WORKMANSHIP

A. Instrumentation work shall conform to workmanship standards specified in Electrical Specifications [Electrical General, Workmanship].

B. The Contractor shall employ personnel who are skilled and experienced in the installation and connection of equipment defined in this section. Contractor qualifications are specified in Electrical Specifications [Electrical General].

C. Verify that all equipment and materials fit properly.

D. All instrumentation configuration, programming and calibration shall be completed prior to the start of field tests.

E. Equipment without approved submittals shall not be installed.

F. All equipment shall be properly stored indoors while awaiting installation. Protect installed equipment from construction debris or mishaps. The Contractor will replace any equipment that is not in new condition at the time of installation and/or start-up.

G. Perform work to remedy non-compliant installations after inspection.

3.02 INSTALLATION

A. Install and supply all products necessary to provide an operational instrumentation system. This shall include the following:

1. Contract Drawings are intended to show the basic functional requirements of the instrumentation system. Insufficient detail does
not relieve the Contractor from the responsibility to provide a complete and functioning system. If additional detail or clarification is required, the Contractor shall request such information prior to installation.

2. Provide relays, signal converters, isolators, boosters, power conditioners, circuit cards, and other miscellaneous devices as required for the compatible and functional interface.

3. Provide analog loop isolators where required to eliminate "ground loops."

4. The instrumentation and accessory equipment shall be installed in accordance with the manufacturer's instructions and located as shown on the Drawings or as approved. When manufacturer's installation literature specifies a particular location or orientation in a process line due to measurement accuracy considerations, the installation shall be in conformance with the manufacturer's instructions.

B. Instrument installation methods.

1. Install instruments at the location shown on the Plans or approved. Instruments enclosures shall be NEMA rated for the installed location.

2. Install level and plumb.

3. All instruments shall be provided with floor stands or wall brackets as shown in installation details or as required for functional installation.

4. Mounting stands shall be custom manufactured of aluminum channel with base plate unless otherwise noted in installation detail.

5. Mounting channels (unistrut), and spacers shall be galvanized steel above ground outdoors and stainless steel below ground (wetwell), unless otherwise noted in installation details.

6. All screws, bolts and anchors shall be stainless steel.

C. Wiring and raceway installation methods:

1. Terminal blocks shall be provided at all instrument cable junctions and all wires shall be identified at such junctions.

2. Instrumentation wiring shall be run without splices between instruments, terminal boxes, or panels.
D. Wiring, grounding, and shielding: The following practices shall be observed unless modified by manufacturer's standards.

1. Each electronic equipment chassis shall be grounded to power ground.

2. Shielded twisted pair, shielded triad, or manufacturer supplied cables only shall be used for analog signals and communications signals.

3. Drain wire of shielded cables used for analog inputs to the PLC shall be connected at the PLC unit only. Shield shall be isolated from ground at all other termination points including transmitters.

4. Drain wire of shielded cables used for analog outputs from the PLC shall be connected at signal receiving device only. Shield shall be isolated from ground at all other termination points.

5. If electrical interference noise is imposed on DC status and alarm signals, then they shall be re-routed or wire changed to shielded twisted pair cables.

6. Each shield drain wire which is not connected to ground shall be cut off covered with a heat shrink insulating boot at cable jacket end. Shields shall be connected together at each transition from one cable to another for an effectively continuous shield circuit.

3.03 SUPPLIER SERVICES

A. The Contractor shall be responsible for each supplier of equipment to provide the following minimum services for each type of instrument supplied. Each supplier shall provide a qualified instrumentation field technician to perform services listed herein. Contractor shall supply all calibration materials necessary to commission unit and shall not use any consumable materials that are intended to be furnished for the first period of use.

1. Advise and instruct Contractor on proper installation requirements.

2. Inspect, calibrate, test, and place equipment in operation. Calibrate instruments to values as shown in the instrument index or as noted herein. If instrument spans are required to change (within instrument range) during startup for process reasons, the Contractor shall change them as directed by the Engineer.

3. Programmable devices shall be programmed and tested prior to startup. Programming shall be adjusted or changed as directed by the Engineer at any time prior to final acceptance.
4. Perform testing in the presence of Engineer.

5. Visit the project site as often as required and spend as much time as necessary to ensure accurate and operational instrumentation.

6. Provide training as specified in FIELD ASSISTANCE.

B. The Contractor shall coordinate with each supplier of instrumentation to confirm that primary elements are provided in a timely manner, meeting critical path scheduling. The Contractor shall coordinate process connection size, equipment size, and material type when applicable and oversee the installation, calibration, and acceptance testing.

3.04 FIELD ASSISTANCE

A. The instrument supplier shall provide a minimum of one (1) hour of field training to instruct Owner's personnel in the use, operation, calibration, programming, and maintenance on each type of "field" instrument.

3.05 SPARE PARTS

A. Provide spare parts as described in each products section herein and specified in Electrical Specifications [Electrical General, Spare Parts].

B. Contractor shall supply all calibration materials necessary to commission unit and shall not use any consumable materials that are intended to be handed over to the Owner as defined in the instrument specifications.

3.06 WARRANTY

A. Provide warranty as specified in Electrical Specifications [Electrical General, Warranty].

3.07 FINAL ACCEPTANCE

A. Final Acceptance per Electrical Specifications [Electrical General].

END OF SECTION
Mr. Wilson:

In accordance with your request, this letter summarizes the results of our geotechnical investigation for the proposed Outingdale Water Treatment Plant (WTP) river intake improvements located along the South Fork of the Cosumnes River in El Dorado County, California. The approximate site location is depicted on the Vicinity Map, Figure 1.

Geocon previously performed a geotechnical investigation at this site for the proposed access stairway structure in August of 2017 (referenced above). The El Dorado Irrigation District (EID) has since modified the layout of the proposed stairway and is also proposing additional improvements as discussed in this report. We have included boring logs and laboratory test results from our previous study as part of this report and have utilized this information as applicable. This report supersedes our previous report.

SITE AND PROJECT DESCRIPTION

The existing Outingdale river intake is located on the southern bank of the Cosumnes River at the bottom of a steep hill [inclined at approximately 1.5H:1V (horizontal to vertical) slope] that abuts a series of residential homes in Somerset, El Dorado County, California. The site currently includes a trail and hand-dug stairs that provide worker access to the river intake. The existing access stairs consist of wooden railings and steps formed by soil retained by pieces of dimensional lumber held in place by rebar (Photo 1). The stairway follows a trail that meanders approximately 130 feet from the top landing and descends approximately 30 feet to the intake station near the river.

EID plans to construct a new stairway structure that will provide more convenient and safer worker access to the river intake station. The new stairway will include a straight-line steel stair structure with concrete landings at the top and bottom of the staircase and two steel landings spanning in between. The stair structure at each landing will likely be supported by shallow concrete footings or cast-in-drilled-hole (CIDH) concrete piers with bonded rock anchors, if needed. In addition to the new steel stairs, EID plans to construct a new electrical building uphill and adjacent to the existing intake station and install a new 1,400-gallon water tank. Currently, there are two possible locations for the water tank but we have assumed it will be located directly adjacent to the new electrical building. The new electrical building and water tank will likely be supported on metal decks supported on either: (1) spread footings bearing on competent material or intact rock, or (2) CIDH concrete piers embedded in rock with bonded rock anchors, if needed.
The new steel stair structure will descend approximately 30 feet to 35 feet vertically down the 1.5H:1V slope to the proposed electrical building and the existing pump house, respectively. The approximate locations of the proposed improvements are shown on the Site Plan, Figure 2.

PURPOSE AND SCOPE

The purpose of our geotechnical services was to evaluate existing site conditions and provide geotechnical recommendations for design and construction of the proposed improvements. To prepare this letter, we performed the following scope of services:

- Reviewed published documents, geologic maps and other geological literature pertaining to the site and surrounding area to aid in evaluating geologic conditions at the site.
- Reviewed available design plans for site improvements and reviewed our previous geotechnical report.
- Performed a site reconnaissance to review project limits and existing conditions.
- Observed soil and rock conditions at the proposed improvements locations.
- Advanced 10 hand-auger borings (HA1 through HA10) at and near the proposed improvements locations using a 3-inch outside diameter hand auger to refusal depths ranging from approximately 1½ to 5½ feet.
- Performed 5 dynamic cone penetration (DCP) soundings (DCP1 through DCP5) using a hand-operated Wildcat DCP to refusal depths of approximately 6 to 10 feet.
- Obtained representative samples from the hand-auger borings.
- Upon completion, backfilled the hand-auger borings with the excavated material.
- Logged the borings in accordance with the Unified Soil Classification System (USCS).
- Performed laboratory tests on selected soil samples to evaluate pertinent geotechnical parameters.
- Obtained rock samples using hand sampling equipment for classification purposes.
- Prepared this letter summarizing our findings, conclusions, and recommendations for design of the proposed stairway.

Approximate locations of our borings relative to the proposed improvements are shown on the Site Plan, Figure 2.

SOIL AND GEOLOGIC CONDITIONS

Soil and Geologic Conditions

To supplement our field observations, we reviewed the *Geologic Map of California, Sacramento Quadrangle* prepared by the California Department of Conservation, 1981. The geology of the site is mapped as Mesozoic granitic rock.

During our subsurface investigations on August 16, 2017 and April 11, 2019, we encountered colluvium underlain by completely to slightly weathered granitic rock. Colluvium is defined as eroded materials (soil) that are not subject to concentrated flows of water but are generally the result of gravitational forces combined with frost heaving in mountainous areas.
The colluvium at the site consists of loose to medium dense silty sand (SM) with some gravel to cobble size material of 6-inch maximum dimension. The completely weathered granitic rock observed consists of medium dense to dense well-graded sand (SW) with increasing size and quantity of granitic rock fragments with depth.

Based on our observations, exposed rock on the northwest side of the proposed improvements (right side of proposed stairs looking up slope) consist of large boulders of moderately to slightly weathered granitic rock, as shown on Photo 2. The rock is mostly covered in moss-like vegetation, displays slight fracturing, and does not appear to indicate overt signs of instability. Beneath the surface and below the colluvium, the granitic rock profile appears to be highly variable in depth depending on location. We used a Schmidt Hammer to evaluate approximate compressive strengths of the rock as discussed in this report.

Soil and geologic conditions described in the previous paragraphs, are generalized. The borings logs (Figures 4 through 19) detail soil type, color, moisture, consistency, and classification of the soils encountered at specific locations. A generalized geologic cross-section of the site is presented as Figure 3.

**Laboratory Test Results**

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for their in-place moisture content, plasticity characteristics, grain size distribution, moisture-density relationship, and soil corrosion potential. Corrosion potential laboratory test results are summarized in Table 1. Other laboratory test results are presented on Figures 20 through 23.

**TABLE 1**

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Sample Depth (feet)</th>
<th>pH</th>
<th>Minimum Resistivity (ohm-cm)</th>
<th>Chloride (ppm/%)</th>
<th>Sulfate (ppm/%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA1-HA4 Bulk</td>
<td>0-5</td>
<td>6.6</td>
<td>1,180</td>
<td>7.5 / 0.00075%</td>
<td>0.2 / 0.00002%</td>
</tr>
</tbody>
</table>

Notes: ppm = parts per million  ND = below detection limits of 0.05

Caltrans considers a site corrosive to foundation elements if one or more of the following conditions exist for the representative soil samples at the site:

- The pH is equal to or less than 5.5.
- The resistivity is equal to or less than 1,100 ohm-cm.
- Chloride concentration is equal to or greater than 500 parts per million (ppm).
- Sulfate concentration is equal to or greater than 1,500 ppm.

According to the 2016 California Building Code (CBC) Section 1904.1 which refers to the durability requirements of American Concrete Institute (ACI) 318 (Chapter 4), Type II cement may be used where soluble sulfate levels in soil are below 2,000 ppm.
CONCLUSIONS AND RECOMMENDATIONS

General

Based on the current design configuration, the proposed improvements and the top and bottom stair landings may be supported on reinforced concrete footings or CIDH concrete piers bearing on competent material or intact granitic rock. This will require footing depths ranging from approximately 2½ to 8 feet, depending on location. If no significant loading occurs at the top landing, the footing depth may be reduced. Based on our observations, use of a Schmidt Hammer, and published strength values\(^1\) for typical rock types, the granitic rock likely has compressive strengths on the order of 7,000 to 15,000 pounds per square inch (psi) for moderately weathered to slightly weathered rock, respectively. In our opinion, this rock type is suitable for support of the stairway landings and supports, provided they are constructed in accordance with the recommendations presented in this letter.

Excavation Characteristics

Table 2 summarizes anticipated excavation characteristics in each geologic unit mapped at the site.

<table>
<thead>
<tr>
<th>Material</th>
<th>Excavation Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colluvium</td>
<td>Colluvium generally consists of loose to medium dense silty sand (SM) with some gravel to cobble size material up to 6-inch maximum dimension. We anticipate moderate excavation effort with conventional grading equipment for this material. We anticipate excavations in this material will generate material predominantly 6 inches and smaller.</td>
</tr>
<tr>
<td>Completely Weathered Granitic Rock</td>
<td>Completely weathered granitic rock generally consists of well-graded sand (SW), with increasing size and quantity of granitic clasts with depth. We anticipate moderate excavation effort in this material with conventional grading equipment.</td>
</tr>
<tr>
<td>Moderately to Slightly Weathered Granitic Rock</td>
<td>Granitic rock boulders and outcrops were observed to be moderately to slightly weathered and slightly fractured. Weathering will likely decrease with depth. We anticipate excavations in this material can be accomplished with use of a pneumatic hammer and drilling can be accomplished with use of hand-operated pneumatic rock drill (e.g., Jack Leg Drill).</td>
</tr>
</tbody>
</table>

Foundation Recommendations

The stairs and the metal decks can be supported on either (1) concrete spread footings embedded 2½ to 8 feet to bypass the colluvium and bear on competent material or intact rock depending on location and as determined by our field representative or, (2) CIDH concrete piers embedded in intact moderately to slightly weathered granitic rock augmented with bonded rock anchors, if needed. Competent material may consist of completely weathered granitic rock beneath the colluvium as determined by our field representative. Rock anchors or doweling may be used to provide lateral resistance since the colluvium will not provide reliable passive resistance, particularly on the downhill side of the footings/drilled piers. If used, rock anchors should be installed only in competent rock as determined by our representative.

---

Design of the footings bearing on competent material or rock may be based on an allowable bearing capacity of 1,500 pounds per square foot (psf) and 5,000 psf, respectively, for dead plus live loads with a one-third increase for transient loads, including wind, impact, and seismic. The allowable coefficient of friction to resist sliding is 0.45 for concrete against rock. Required footing depths will range from approximately 2½ to 8 feet, depending on location.

Preliminary design of bonded rock anchor uplift capacity may be based on an ultimate bond stress of 50 psi. The top 6 inches of embedment into competent rock should be neglected for design. If multiple anchors are required, they should be spaced at least 15 anchor diameters apart. Drilled holes for anchors should provide a minimum ½-inch annular space between the anchor and the rock; for example, a 1¾-inch grouted anchor would require a 2¾-inch hole.

Lateral shear resistance of individual bonded rock anchors may be assumed to be 40% of the tensile (yield) strength of the steel. A minimum embedment of 18 inches into undisturbed, competent rock is required to develop this lateral shear resistance.

Bonded anchor capacity is a function of construction method, depth of anchor, diameter and length of the bonded section. We recommend performing two types of load tests on the bonded anchors to verify capacity. Load testing should be performed in accordance with the guidelines of the Federal Highway Administration (FHWA 1999) or approved equivalent procedures. Performance (verification) tests should be performed on a limited number of anchors to confirm the design, installation methods, and ultimate capacity (usually tested to failure). Proof tests should be performed on the remaining anchors during production to verify adequate capacity (usually tested to 133% to 150% of design load). Geocon can assist in developing the required testing program which will be dependent on the total number, locations, and design loads of the anchors.

**Construction Considerations**

Constructing foundations for the project will likely require excavating overlying soil and excavating/drilling into granitic rock. We anticipate excavation in the granite can be achieved using pneumatic hammers. Drilling can be accomplished using a hand-operated pneumatic rock drill (Jack Leg Drill). Fractures and joints, where present, may cause some over-break in rock excavation. If rock dowels are used, they will be fixed in drilled holes either mechanically (using mechanically expanding rock bolts) or fixed with epoxy or grout. The project structural engineer should select the dowel type(s).

**Plan Review**

We should review the plans and specifications prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required.

**Testing and Observation Services**

The recommendations provided in this report are based on the assumption that we will continue as Geotechnical Engineer of Record throughout the construction phase. It is important to maintain continuity of geotechnical interpretation and confirm that field conditions encountered are similar to those anticipated during design. If we are not retained for these services, we cannot assume any responsibility for other’s interpretation of our recommendations or the future performance of the project.
LIMITATIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the subsurface conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, we should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials or environmental contamination was not part of our scope of services.

This report is issued with the understanding that it is the responsibility of the owner or their representative to ensure that the information and recommendations contained herein are brought to the attention of the design team for the project and incorporated into the plans and specifications, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The recommendations contained in this report are preliminary until verified during construction by representatives of our firm. Changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. Additionally, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated partially or wholly by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices used in the area at this time. No warranty is provided, either express or implied.

Please contact us if you have any questions regarding this letter or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Jeremy J. Zorne, PE, GE
Senior Geotechnical Engineer

Victor M. Guardado, EIT
Senior Staff Engineer

John Pfeiffer, PG, CEG
Senior Engineering Geologist

Attachments: Figure 1, Vicinity Map
Figure 2, Site Plan
Figure 3, Cross Section A-A'
Figure 4, Key to Logs
Figure 5 through 14, Hand-Auger Boring Logs (HA1 through HA10)
Figure 15 through 19, Dynamic Cone Penetration (DCP1 through DCP5) Test Results
Figure 20, Summary of Laboratory Results
Figure 21, Atterberg Limits
Figure 22, Grain Size Distribution
Figure 23, Moisture-Density Relationship
Photos 1 and 2
This figure depicts generalized subsurface conditions inferred from our explorations and is intended for use as an aid for design. Actual subsurface conditions, including groundwater depths/elevations, may vary. Please refer to the project Boring Logs for detailed subsurface conditions encountered at each boring location.
### Unified Soil Classification

<table>
<thead>
<tr>
<th>Major Divisions</th>
<th>Typical Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravels</td>
<td>Clean Gravels with Little or No Fines (GW)</td>
</tr>
<tr>
<td></td>
<td>Poorly Graded Gravels with or Without Sands, Little or No Fines (GP)</td>
</tr>
<tr>
<td></td>
<td>Silty Gravels, Silty Gravels with Sand (GM)</td>
</tr>
<tr>
<td></td>
<td>Clayey Gravels, Clayey Gravels with Sand (GC)</td>
</tr>
<tr>
<td>Sands</td>
<td>Clean Sands with Little or No Fines (SW)</td>
</tr>
<tr>
<td></td>
<td>Poorly Graded Sands with or Without Gravel, Little or No Fines (SP)</td>
</tr>
<tr>
<td></td>
<td>Silty Sands with or Without Gravel (SM)</td>
</tr>
<tr>
<td></td>
<td>Clayey Sands with or Without Gravel (SC)</td>
</tr>
<tr>
<td>Silts and Clays</td>
<td>Organic Silts and Very Fine Sands, Rock Flour, Silts with Sands and Gravels (ML)</td>
</tr>
<tr>
<td></td>
<td>Organic Silts of Low to Medium Plasticity, Clays with Sands and Gravels (CL)</td>
</tr>
<tr>
<td></td>
<td>Organic Silts or Clays of Low Plasticity (OL)</td>
</tr>
<tr>
<td></td>
<td>Organic Silts, Incipient or Tarnaceous Fine Sands or Silts, Eutetic Silts (MH)</td>
</tr>
<tr>
<td></td>
<td>Organic Clays of High Plasticity, Fat Clays (CH)</td>
</tr>
<tr>
<td></td>
<td>Organic Clays of High Plasticity, Fat Clays (OH)</td>
</tr>
<tr>
<td>Highly Organic Soils</td>
<td>Peat and Other Highly Organic Soils (PT)</td>
</tr>
</tbody>
</table>

### Laboratory Test Key

- **CP** – Compression Curve (ASTM D1557)
- **CR** – Corrosion Analysis (ASTM C42, 643, 417)
- **DS** – Direct Shear (ASTM D3080)
- **EI** – Expansion Index (ASTM D429)
- **GSA** – Grain Size Analysis (ASTM D42)
- **MC** – Moisture Content (ASTM D2166)
- **PI** – Plasticity Index (ASTM D4318)

### Bedding Spacing Descriptions

<table>
<thead>
<tr>
<th>Thickness/Spacing</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 10 feet</td>
<td>Massive</td>
</tr>
<tr>
<td>5 to 10 feet</td>
<td>Very Thicked Bedded</td>
</tr>
<tr>
<td>3 to 5 inches</td>
<td>Thcheadly Bedded</td>
</tr>
<tr>
<td>1 1/2 inch to 3 inches</td>
<td>Moderately Bedded</td>
</tr>
<tr>
<td>1 inch to 1 1/2 inch</td>
<td>Thinly Bedded</td>
</tr>
<tr>
<td>Less than 1 inch</td>
<td>Very Thinly Bedded</td>
</tr>
<tr>
<td>Laminate</td>
<td></td>
</tr>
</tbody>
</table>

### Structure Descriptions

**Criteria**
- Alternating layers of varying material or color with layers at least 1 inch thick
- Alternating layers of varying material or color with layers less than 1 inch thick
- Breaks along definite planes of fracture with little resistance to fracturing
- Fracture planes appear polished or glossy, sometimes stratified
- Cohesive soil that can be broken down into smaller angular lumps which resist further breakup
- Inclusion of small pockets of different soil, such as small lenses of sand scattered through a mass of clay
- Same color and material throughout

### Cenmentation/Induration Descriptions

**Field Test**
- Crumbles or Breaks with Handing or Little Finger Pressure
- Crumbles or Breaks with Considerable Finger Pressure
- Will Not Crumble or Break with Finger Pressure

**Description**
- Weakly Cementsed-Indurated
- Moderately Cementsed-Indurated
- Strongly Cementsed-Indurated

### Igneous/Metamorphic Rock Strength Descriptions

**Field Test**
- Material Crumbles under Blow from Geology Hammer
- Hand Sample with Sharp End from Geology Hammer
- Hand Sample from Geology Hammer
- Hand Sample from Geology Hammer

**Description**
- Extremely Weak
- Moderately Weak
- Moderately Strong
- Strong

### Igneous/Metamorphic Rock Weathering Descriptions

**Degree of Decomposition**
- Completely Weathered
- Highly Weathered
- Moderately Weathered
- Slightly Weathered
- Fresh

**Field Recognition**
- Discolored, Changed to Soil, Fabric Mainly Preserved
- Discolored, Highly Fractured, Fabric Altered around Fractures
- Discolored, Fractures, Intact Rock Not Slightly Weathered than Fresh Rock
- May Be Discolored, Some Fractures, Intact Rock Not Noticeably Weathered than Fresh Rock
- No Discoloration, or Loss of Strength

**Engineering Properties**
- Excavated by Hand or Shovel (Skeletal)
- Excavated with Difficulty Without Explosives
- Excavated with Difficulty Without Explosives
- Excavated with Difficulty Without Explosives
- Excavated with Difficulty Without Explosives

### Moisture Descriptions

**Field Test**
- Approx. Degree of Saturation, % |

**Description**
- No Moisture, Dry to the Touch
- Slightly Moist
- Moist
- Wet
- Satuated

### Quality Descriptions

**Approx. Estimated Percent**

<table>
<thead>
<tr>
<th>Description</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trace</td>
<td>5 - 10</td>
</tr>
<tr>
<td>Few</td>
<td>11 - 20</td>
</tr>
<tr>
<td>Little</td>
<td>21 - 25</td>
</tr>
<tr>
<td>Sone</td>
<td>26 - 50</td>
</tr>
<tr>
<td>Mostly</td>
<td>51 - 100</td>
</tr>
</tbody>
</table>

### Bedding Spacing Descriptions

**Criteria**
- Thickness/Spacing |

**Description**
- Massive
- Very Thicked Bedded
- Thcheadly Bedded
- Moderately Bedded
- Thinly Bedded
- Very Thinly Bedded
- Laminate

### Laboratory Test Key

- **CP** – Compression Curve (ASTM 301)
- **CR** – Corrosion Analysis (ASTM C42, 643, 417)
- **DS** – Direct Shear (ASTM D3080)
- **EI** – Expansion Index (ASTM D429)
- **GSA** – Grain Size Analysis (ASTM D42)
- **MC** – Moisture Content (ASTM D2166)
- **PI** – Plasticity Index (ASTM D4318)
<table>
<thead>
<tr>
<th>Depth in Feet</th>
<th>Sample Interval &amp; Recovery</th>
<th>Lithology</th>
<th>Groundwater</th>
<th>Soil Class (USCS)</th>
<th>Elevation (MSL)</th>
<th>Date Completed</th>
<th>Practical Refusal</th>
<th>Additional Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1 HA1-bulk</td>
<td>SM</td>
<td>COLUVIUM</td>
<td></td>
<td>-1683'</td>
<td>8/16/17</td>
<td>5.5 Feet</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1 HA1-bulk</td>
<td>SM</td>
<td>COLUVIUM</td>
<td></td>
<td></td>
<td>5.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Material Description**

- Loose to medium dense, damp, brown Silty SAND, few roots
  - gravel of 6-inch maximum dimension
- becomes micaceous
- weakly cemented material
- difficult to excavate

**Practical Refusal at 5.5 Feet**

No groundwater encountered

Backfilled with excavated material
BORING HA2

LITHOLOGY: COLLUVIUM

- Medium dense, damp, brown, Silty SAND, few roots
- weakly cemented material

PRACTICAL REFUSAL AT 2.5 FEET
NO GROUNDWATER ENCOUNTERED
BACKFILLED WITH EXCAVATED MATERIAL

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>SAMPLE INTERVAL &amp; RECOVERY</th>
<th>LITHOLOGY</th>
<th>GROUNDWATER</th>
<th>SOIL CLASS (USCS)</th>
<th>ELEV. (MSL.)</th>
<th>DATE COMPLETED</th>
<th>ENG./GEO.</th>
<th>DRILLER</th>
<th>EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(HA3-hulk)</td>
<td>SM</td>
<td>COLUVIUM</td>
<td>SM</td>
<td>-166'</td>
<td>8/16/17</td>
<td>Victor Guardado</td>
<td>Geocon</td>
<td>HAND-AUGER</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

- Medium dense, damp, brown, Silty SAND, few roots
- weakly cemented material
- trace granitic fragments

**PRACTICAL REFUSAL AT 2.5 FEET**

NO GROUNDWATER ENCOUNTERED
BACKFILLED WITH EXCAVATED MATERIAL

---

**NOTE:** The log of subsurface conditions shown herein applies only at the specific boring or trench location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.
**BORING HA4**

**LITHOLOGY**
- COLLUVIUM

**SOIL CLASS (USCS)**
- SM

**MATERIAL DESCRIPTION**
- Medium dense, brown, damp, micaceous, Silty SAND, few roots
- weakly cemented material
- trace granitic fragments

**PRACTICAL REFUSAL AT 3.7 FEET**
- NO GROUNDWATER ENCOUNTERED
- BACKFILLED WITH EXCAVATED MATERIAL

**DATE COMPLETED** 8/16/17

**ENG./GEO.** Victor Guardado

**DRILLER** Geocon

**EQUIPMENT** HAND-AUGER

**HAMMER TYPE** N/A

**DEPTH IN FEET**
- 0
- 1
- 2
- 3

**SAMPLE INTERVAL & RECOVERY**
- HA4-bulk

**SOIL ELEV. (MSL.)** ~1657'

**PENCETRATION RESISTANCE (BLOWS/FT.)** N/A

**DRO DENSITY (P.C.F.)** N/A

**MOISTURE CONTENT (%)** N/A

**ADDITIONAL TESTS**
- N/A

Figure 8, Log of Boring, page 1 of 1

IN PROGRESS  S1231-05-01 OUTINGDALE WATER STAIRS.GPJ  05/10/19

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>SAMPLE INTERVAL &amp; RECOVERY</th>
<th>LITHOLOGY</th>
<th>GROUNDWATER</th>
<th>SOIL ELEV. (MSL)</th>
<th>DATE COMPLETED</th>
<th>PENETRATION RESISTANCE (BORES/FT)</th>
<th>DRY DENSITY (P.C.F.)</th>
<th>MOISTURE CONTENT (%)</th>
<th>ADDITIONAL TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>SM</td>
<td>COLLUVIUM</td>
<td>-1681'</td>
<td>4/11/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>SW</td>
<td>GRANITIC ROCK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>HA5-2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>3</td>
<td>HA5-3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**
- **COLLUVIUM**
  - Loose, moist, dark brown, Silty SAND, trace oxidized granitic rock fragments, fine to medium sand, micaceous
- **GRANITIC ROCK**
  - Completely weathered, excavates as: medium dense, damp, dark yellow brown, Well-Graded SAND, medium to coarse sand, with granitic rock fragments, micaceous
  - dense, tan with gray, slightly oxidized
  - very dense, black, white, tan, and gray
  - less oxidized

**PRACTICAL REFUSAL AT 3.5 FEET**
- NO GROUNDWATER ENCOUNTERED
- BACKFILLED WITH EXCAVATED SOIL

---

**NOTE:** THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>SAMPLE INTERVAL &amp; RECOVERY</th>
<th>LITHOLOGY</th>
<th>SOIL CLAY (USCS)</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>SM</td>
<td></td>
<td>COLLUVIUM: Loose, moist, dark brown, Silty SAND, trace oxidized granitic rock fragments, fine to medium sand, micaceous</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>SW</td>
<td></td>
<td>GRANITIC ROCK: Completely weathered, excavates as: dense, damp, tan with black and white, Well-Graded SAND, medium to coarse sand, with granitic rock fragments, oxidized - very dense</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>PRACTICAL REFUSAL AT 2.5 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH EXCAVATED SOIL</td>
</tr>
</tbody>
</table>

Figure 10, Log of Boring, page 1 of 1

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>SAMPLE INTERVAL &amp; RECOVERY</th>
<th>LITHOLOGY</th>
<th>GROUNDWATER</th>
<th>SOIL CLASS (USCS)</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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</tr>
<tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- auger grinding</td>
</tr>
<tr>
<td>3</td>
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<td></td>
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<td>PRACTICAL REFUSAL AT 3.0 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH EXCAVATED SOIL</td>
</tr>
</tbody>
</table>

Figure 11, Log of Boring, page 1 of 1

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
<table>
<thead>
<tr>
<th>Depth in Feet</th>
<th>Sample Interval &amp; Recovery</th>
<th>Lithology</th>
<th>Groundwater</th>
<th>Soil Class (USCS)</th>
<th>Date Completed</th>
<th>Notes</th>
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<tbody>
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<td></td>
<td>4/11/19</td>
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<td>HAI-1.5</td>
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</tr>
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<td></td>
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<td>- with dark yellowish brown</td>
</tr>
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<td>4, 5</td>
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<td></td>
<td>BORING TERMINATED AT 5 FEET NO GROUNDWATER ENCOUNTERED BACKFILLED WITH EXCAVATED SOIL</td>
</tr>
</tbody>
</table>

**Project No.** S1231-05-01A  **Project Name** EID Outingdale Improvements

**Figure 12, Log of Boring, page 1 of 1**

**Sample Symbols**
- □ ... Sampling Unsuccessful
- □ ... Standard Penetration Test
- □ ... Drive Sample (Undisturbed)
- □ ... Disturbed or Bag Sample
- □ ... Chunk Sample
- □ ... Water Table or Seepage

**Note:** The log of subsurface conditions shown herein applies only at the specific boring or trench location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.
**Figure 13, Log of Boring, page 1 of 1**

<table>
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<tr>
<th>DEPTH IN FEET</th>
<th>SAMPLE INTERVAL &amp; RECOVERY</th>
<th>LITHOLOGY</th>
<th>GROUNDWATER</th>
<th>SOIL CLASS (USCS)</th>
<th>ENGIN. GEO.</th>
<th>DRILLER</th>
<th>EQUIPMENT</th>
<th>DATE COMPLETED</th>
<th>PENETRATION RESISTANCE (BLOWS/FT.)</th>
<th>DRY DENSITY (P.C.F.)</th>
<th>MOISTURE CONTENT (%)</th>
<th>ADDITIONAL TESTS</th>
</tr>
</thead>
<tbody>
<tr>
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<td>SM</td>
<td></td>
<td></td>
<td>Victor Guardado</td>
<td>Geocon</td>
<td>Hand-Auger</td>
<td>4/11/19</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**MATERIAL DESCRIPTION**

**COLLUVIUM**

Loose, moist, brown, Silty SAND, trace oxidized granitic rock fragments, fine to medium sand, micaceous

- auger grinding

**PRACTICAL REFUSAL AT 1.5 FEET**

NO GROUNDWATER ENCOUNTERED
BACKFILLED WITH EXCAVATED SOIL

---

**NOTE:** The log of subsurface conditions shown herein applies only at the specific boring or trench location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.
<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>SAMPLE INTERVAL &amp; RECOVERY</th>
<th>LITHOLOGY</th>
<th>SOIL CLASS (USCS)</th>
<th>GROUNDWATER</th>
<th>DATE COMPLETED</th>
<th>PENETRATION RESISTANCE (BLOWS/FT.)</th>
<th>DRY DENSITY (P.C.F.)</th>
<th>MOISTURE CONTENT (%)</th>
<th>ADDITIONAL TESTS</th>
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</thead>
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</tr>
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</table>

**Boring HA10**

**ELEV. (MSL)**: -1653

**ENG./GEO.**: Victor Guardado

**DRILLER**: Geocon

**EQUIPMENT**: HAND-AUGER

**HAMMER TYPE**: N/A

**MATERIAL DESCRIPTION**

**COLLUVIUM**

Loose, moist, brown, Silty SAND, trace oxidized granitic rock fragments, fine to medium sand, micaceous

PRACTICAL REFUSAL AT 5 FEET

NO GROUNDWATER ENCOUNTERED

BACKFILLED WITH EXCAVATED SOIL

---

Figure 14, Log of Boring, page 1 of 1

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREIN APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
### WILDCAT DYNAMIC CONE LOG

*Geocon Consultants, Inc.*

**PROJECT NUMBER:** S1231-05-01  
**DATE STARTED:** 08-16-2017  
**DATE COMPLETED:** 08-16-2017

---

**HOLE #:** DCP-1  
**CREW:** VG, ES  
**PROJECT:** Outingdale Raw Water Stairs  
**ADDRESS:** River Mist Lane  
**LOCATION:** Somerset, California

**SURFACE ELEVATION:** N/A  
**WATER ON COMPLETION:** N/A  
**HAMMER WEIGHT:** 35 lbs.  
**CONE AREA:** 10 sq. cm

---

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>BLOWS PER 10 cm</th>
<th>RESISTANCE Kg/cm²</th>
<th>GRAPH OF CONE RESISTANCE</th>
<th>N’</th>
<th>TESTED CONSISTENCY</th>
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<tbody>
<tr>
<td>0</td>
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<td>31.1</td>
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<td>MEDIUM STIFF</td>
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<tr>
<td>1 ft</td>
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<td>66.6</td>
<td>19</td>
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<tr>
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<td>25</td>
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<td>3 ft</td>
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<td>44.4</td>
<td>12</td>
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<td>STIFF</td>
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<td>9</td>
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<td>10</td>
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<td>STIFF</td>
</tr>
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<td>115.8</td>
<td>17</td>
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<td>STIFF</td>
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</tbody>
</table>

---

*Figure 15*
**HOLE #:** DCP-2  
**CREW:** VG, ES  
**PROJECT:** Outingdale Raw Water Stairs  
**ADDRESS:** River Mist Lane  
**LOCATION:** Somerset, California  

**DATE STARTED:** 08-16-2017  
**DATE COMPLETED:** 08-16-2017  
**SURFACE ELEVATION:** N/A  
**WATER ON COMPLETION:** N/A  
**HAMMER WEIGHT:** 35 lbs.  
**CONE AREA:** 10 sq. cm

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<th>BLOWS PER 10 cm</th>
<th>RESISTANCE Kg/cm²</th>
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<td>8.9</td>
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<td>2</td>
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</tr>
<tr>
<td>-</td>
<td>4 m</td>
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</tbody>
</table>

Figure 16
# WILDCAT DYNAMIC CONE LOG

Geocon Consultants, Inc.

**PROJECT NUMBER:** S1231-05-01A  
**DATE STARTED:** 04-11-2019  
**DATE COMPLETED:** 04-11-2019

**HOLE #:** DCP-3  
**CREW:** VG, TMH  
**PROJECT:** EID Outingdale Improvements  
**ADDRESS:** River Mist Lane  
**LOCATION:** Somerset, California

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<th>DEPTH</th>
<th>BLOWS PER 10 cm</th>
<th>RESISTANCE Kg/cm²</th>
<th>GRAPH OF CONE RESISTANCE</th>
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<th>TESTED CONSISTENCY</th>
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Figure 17
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</tr>
<tr>
<td>6 ft</td>
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<tr>
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</tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
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<td></td>
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</tr>
<tr>
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</tr>
<tr>
<td>13 ft</td>
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</table>

Figure 18
# WILDCAT DYNAMIC CONE LOG

Geocon Consultants, Inc.

**PROJECT NUMBER:** S1231-05-01A  
**DATE STARTED:** 04-11-2019  
**DATE COMPLETED:** 04-11-2019  
**HOLE #:** DCP-5  
**CREW:** VG, TMH  
**PROJECT:** EID Outingdale Improvements  
**ADDRESS:** River Mist Lane  
**LOCATION:** Somerset, California  
**SURFACE ELEVATION:** ~1656’  
**WATER ON COMPLETION:** N/A  
**HAMMER WEIGHT:** 35 lbs.  
**CONE AREA:** 10 sq. cm

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<th>BLOWS PER 10 cm</th>
<th>RESISTANCE Kg/cm²</th>
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<th>N'</th>
<th>TESTED CONSISTENCY</th>
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</thead>
<tbody>
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**Figure 19**
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<th>Plasticity Index</th>
<th>Expansion Index</th>
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<th>Water Content (%)</th>
<th>Dry Density (pcf)</th>
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# Atterberg Limits (ASTM D4318)

**Sample No.**

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**Geocon Consultants**
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742
Telephone: 9168529118

**Project:** EID Outingdale Improvements
**Location:** El Dorado County, California
**Number:** S1231-05-01A
**Figure:** 21
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742
Telephone: 916-852-9118

Project: EID Outingdale Improvements
Location: El Dorado County, California
Number: S1231-05-01A
Figure: 22
Source of Material
HA1-HA4 Bulk
Description of Material
Silty SAND (SM)
Test Method
D1557A

TEST RESULTS
Maximum Dry Density
119.5 PCF
Optimum Water Content
10.7 %

ATTERBERG LIMITS
LL  PL  PI

Curves of 100% Saturation for Specific Gravity Equal to:
2.80
2.70
2.60
PHOTOS NO. 1 & 2

Photo No. 1  Existing stairway looking south from HA4 location

Photo No. 2  Granite outcrops looking west from HA2 location

GEOCON Consultants, Inc.
3180 Gold Valley Dr. – Suite 800 – Rancho Cordova, CA 95742
Phone 916.852.9118 – Fax 916.852.9132

EID Outingdale Improvements
El Dorado County, California

GEOCON Project No. S1231-05-01A  September 2019