BRIDGEPORT PUBLIC UTILITY DISTRICT ARSENIC REMOVAL PROJECT

CONSTRUCTION CONTRACT

Contract Documents

&

Construction Specifications

March 24, 2017



Prepared by:

R.O. ANDERSON ENGINEERING, INC. 1603 Esmeralda Avenue P.O. Box 2229 Minden, Nevada 89423

for:

BRIDGEPORT PUBLIC UTILITY DISTRICT P.O. Box 473 Bridgeport, CA 93517

ADVERTISEMENT FOR BIDS BRIDGEPORT PUBLIC UTILITY DISTRICT ARSENIC REMOVAL PROJECT - CONSTRUCTION

Bridgeport Public Utility District (BPUD), as Owner, invites and will receive sealed bids, labeled, addressed, and delivered to:

Bridgeport Public Utility District BPUD ARSENIC REMOVAL PROJECT Mailing Address: P.O. Box 473 or Physical Address: 233 Twin Lakes Road Bridgeport, CA 93517

Bids must be received prior to <u>1:00 p.m. on Thursday, April 20, 2017</u>. Bids will be subsequently opened and read aloud publicly in the BPUD main office at 233 Twin Lakes Road.

The Project generally includes a 1,400 SF building with slab-on-grade foundation, wood frame construction, standing seam metal roof, and associated MEP; installation of prefabricated arsenic treatment units provided by Owner and appurtenances; and SCADA integration. The Project also includes underground utility installation: water – 180' of 8" ductile iron pipe, 215' of 8" PVC pipe, and 9 gate valves; sewer – 230' 8" SDR 35; storm drain – 160' 10" SDR 35, and 40' 21" RCP culvert; electrical; and a propane gas line with a regulator and valves. Other site work that is also included is a 6'-high chain link fence and wrought iron fence with gate; paving; concrete flatwork; and landscaping. Some of the work is located within the Twin Lakes Road right-of-way and will require traffic control. The Engineer's Estimate of Probable Construction Costs is \$645,000.

A non-mandatory pre-bid conference will be held at 11:00 a.m. Tuesday, April 11, 2017 at the BPUD main office with a site tour of the project area to follow. The Contract Documents will be available on March 27, 2017, and may be examined at the following locations:

- ISSUING OFFICE:
 - R.O. Anderson Engineering, Inc. 1603 Esmeralda Ave, Minden, Nevada 89423 (775) 782-2322
- http://www.roanderson.com/bid-documents/
- Various plan rooms

Upon request, hard copies may be purchased from the issuing office for the non-refundable fee of \$100.

Questions regarding this project shall be directed to Sue McReavy, P.E. Contractors may register their intent to submit a bid by sending an email to smcreavy@roanderson.com - SUBJECT LINE: BPUD Arsenic Removal Project. Registration as a prospective Bidder of record is necessary to receive notifications via email.

All bidders shall be licensed and qualified by the State of California (CA) Contractors State License Board to do the type of work contemplated for this project <u>prior</u> to the time of opening of said bids, shall be skilled and regularly engaged in the general class or type of work, and be further qualified to bid pursuant to the Labor Code § 1725.5 – CA Legislative Information.

WAGE RATES: As required by Labor Code § 1771, bidders are hereby notified that no less than the general prevailing wage rates, including rates for overtime and holiday work, in the locality in which the work is to be performed, for each craft or type of workman needed to execute the work contemplated under the Contract as determined by the CA Department of Industrial Relations, shall be paid to all workmen employed on said work by the Contractor or by a subcontractor performing any part of said work.

BRIDGEPORT PUBLIC UTILITY DISTRICT ARSENIC REMOVAL PROJECT - CONSTRUCTION

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INSTRUCTIONS TO BIDDERS

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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INSTRUCTIONS TO BIDDERS

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ARTICLE 1 – DEFINED TERMS

- <u>1.01</u> Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
 - A. *Issuing Office* The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered. <u>R.O. Anderson Engineering, Inc., 1603 Esmeralda</u> <u>Avenue, Minden, Nevada, 89423.</u>

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, non-refundable cost, if any, stated in the advertisement or invitation to bid may be obtained from the Issuing Office. The deposit will be refunded to each document holder of record who returns a complete set of Bidding Documents in good condition within 30 days after opening of Bids.
- <u>2.02</u> Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- <u>3.01</u> To demonstrate Bidder's qualifications to perform the Work, within 7 days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below, with the completed Bid Form.
 - A. Evidence of Bidder's authority to do business in the state where the Project is located.
 - B. Bidder's state contractor license number, if applicable.
 - C. Bidder qualification form, AGC document No. 220
- <u>3.02</u> Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

- <u>4.01</u> Subsurface and Physical Conditions
 - A. The Supplementary Conditions identify:

- 1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site.
- 2. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in

<u>4.02</u> Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others. Owner and Engineer do not assume responsibility for the accuracy or completeness thereof unless it is otherwise expressly provided in the Supplementary Conditions.

4.03 Hazardous Environmental Condition

- A. The Supplementary Conditions identify any reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site.
- B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
- 4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 4.06 of the General Conditions.

- 4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.
- 4.06 A. Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.
 - B. Paragraph 6.13.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.
- <u>4.07</u> It is the responsibility of each Bidder before submitting a Bid to:
 - A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents;
 - B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
 - C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;
 - D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Paragraph 4.06 of the Supplementary Conditions as containing reliable "technical data";
 - E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs;
 - F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work

at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

- G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
- H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID CONFERENCE

5.01 <u>A pre-Bid conference will be held at 11:00 a.m. local time on Tuesday, April 11th, 2017 at Bridgeport P.U.D. office, 233 Twin Lakes Road, Bridgeport, California, with site tour to follow.</u> Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 – SITE AND OTHER AREAS

<u>6.01</u> The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days

prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

<u>7.02</u> Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 – BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 10% percent of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.
- 8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security
- 8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven14 days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

<u>9.01</u> The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

<u>10.01</u> Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

- 12.01 Each Bidder must submit a completed List of Subcontractors, and List of Suppliers, on the forms furnished, with the completed Bid Form. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.
- <u>12.03</u> Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 – PREPARATION OF BID

- 13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.
- 13.02 All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item, alternative, and unit price item listed therein. In the case of optional alternatives the words "No Bid," "No Change," or "Not Applicable" may be entered.
- 13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vicepresident or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.

- <u>13.04</u> A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.
- $\underline{13.05}$ A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- <u>13.06</u> A Bid by an individual shall show the Bidder's name and official address.
- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.08 All names shall be printed in ink below the signatures.
- <u>13.09</u> The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- <u>13.10</u> Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located., or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

<u>14.01</u> Unit Price

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
- B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

<u>14.02</u> Allowances

A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 11.02.B of the General Conditions.

<u>14.03</u> Completion Time Comparisons

A. Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Article 9 above.

ARTICLE 15 – SUBMITTAL OF BID

- <u>15.01</u> With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the following documents:
 - A. Completed Unit Price Bid Schedule
 - B. List of Proposed Subcontractors.
 - C. List of Proposed Suppliers
 - D. List of Project References
 - E. Evidence of authority to do business in California
 - F. Bidder qualification form, AGC document No. 220
- 15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to the Issuing Office.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

- <u>16.01</u> A Bid may be modified or withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.
- <u>16.02</u> If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

<u>17.01</u> Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.
- <u>19.02</u> More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- <u>19.03</u> In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- <u>19.04</u> In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.
- <u>19.05</u> Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.
- <u>19.06</u> If the Contract is to be awarded, Owner will award the Contract to the <u>lowest</u>, <u>responsive</u>, <u>responsible</u> Bidder whose Bid, <u>when evaluated by the Owner</u>, <u>indicates that the award</u> is in the best interests of the Project.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 22 – SALES TAX

22.01 Owner is exempt from California state sales taxes on materials and equipment to be incorporated in the Work (Exemption No._(to be furnished prior to notice of award)). Said taxes shall not be included in the Bid. Refer to Paragraph 6.10 of the Supplementary Conditions for additional information.

ARTICLE 23 – APPEAL BY BIDDERS

- 23.01 Any Bidder may appeal a pending bid award prior to award by Owner. The appellant must:
 - A. Submit a written protest to the Engineer within 5 workdays after the bid opening.
 - B. Describe, in the written protest, the issues to be addressed on appeal.
 - C. Post, with the written protest, a bond with a surety meeting the requirements of Supplementary Condition SC 5.02 authorized to do business in this state or submit other security in a form approved by Owner who will hold the bond or security until a determination is made on the appeal.
 - D. Post the bond or other security in the amount of 25% of the total dollar value of the appellant's bid, up to a maximum bond or other security amount of \$250,000.00.
 - E. Not seek any type of judicial intervention until Owner has rendered its final decision on the protest.

- 23.02 Owner will stay award actions until after Engineer has responded in writing to the protest. If the appellant is not satisfied with the response, the appellant may then protest to the Bridgeport Public Utility District Board of Directors, who will render a final decision for the Owner. No bid protests will be heard by the Board of Directors unless Bidder has followed the appeal process.
- 23.03 If an appeal is granted, the full amount of the posted bond or security will be returned to the appellant. If the appeal is denied or not upheld, a claim may be made against the bond for expenses suffered by Owner because of the unsuccessful appeal.
- 23.04 Owner is not liable for any costs, expenses, attorney's fees, loss of income, or other damages sustained by the appellant in a bid process.

BID FORM

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by









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AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE A Practice Division of the NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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CONSTRUCTION SPECIFICATIONS INSTITUTE

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BID FORM

Project Title:	Bridgeport Public Utility District Arsenic Removal Project – Construction Contract
Project Address/Location:	Twin Lakes Road, Bridgeport, California
Owner:	Bridgeport P.U.D. Renn Nolan, Office Manager P.O. Box 473, Bridgeport, California 93517 P 760-932-7251 F 760-932-9992
Engineer:	 R.O. Anderson Engineering, Inc. Sue McReavy, P.E. 1603 Esmeralda Avenue Minden, NV 89423 P 775-782-2322 F 775-782-7084 E smcreavy@roanderson.com
Engineer's Project Number:	0883-029

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Bridgeport P.U.D. Renn Nolan, Office Manager P.O. Box 473, Bridgeport, CA 93517 P 760-932-7251 F 760-932-9992

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

- 3.01 In submitting this Bid, Bidder represents that:
 - A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date

- B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in SC-4.02 as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in SC-4.06 as containing reliable "technical data."

- E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

ARTICLE 4 – BIDDER'S CERTIFICATION

- 4.01 Bidder certifies that:
 - A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
 - B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
 - C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
 - D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

- 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial noncompetitive levels, or (c) to deprive Owner of the benefits of free and open competition;
- 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
- 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

See Attached Unit Price Bid Schedule

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are submitted with and made a condition of this Bid:
 - A. Required Bid security in the form of _____;
 - B. List of Proposed Subcontractors;
 - C. List of Proposed Suppliers;
 - D. List of Project References;
 - E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;
 - F. Contractor's License No.: _____
 - G. Required Bidder Qualification Statement with Supporting Data; and
 - H. Bid Schedule

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01	This Bid is submitted by:	
	If Bidder is:	
	An Individual	
	Name (typed or printed):	
	By:	
	(Individual's signature)	
	Doing business as:	
	<u>A Partnership</u>	
	Partnership Name:	
	By:(Signature of general partner attach evidence of authority to sign)	
	Name (typed or printed):	
	<u>A Corporation</u>	
	Corporation Name:	(SEAL)
	State of Incorporation:	
	Type (General Business, Professional, Service, Limited Liability):	
	By:	
	Name (typed or printed):	
	Title:(CORPORATE SEAL)	
	Attest	
	Date of Qualification to do business in California is/	

A Joint Venture

Name of Joint Venture:	
First Joint Venturer Name:	(SEAL)
By:	y to sign)
Name (typed or printed):	
Title:	
Second Joint Venturer Name:((SEAL)
By:	ority to sign)
Name (typed or printed):	
Title:	
(Each joint venturer must sign. The manner of signing for each individual, g and corporation that is a party to the joint venture should be in the manner is above.)	oartnership, ndicated
Bidder's Business Address	
Phone No Fax No	
E-mail	
SUBMITTED on, 20	
State Contractor License No Class	

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNE Bri Re P.C	R (<i>Name and Address</i>): dgeport P.U.D. nn Nolan, Office Manager D. Box 473 degeport CA 02517		
BID	lagepoit, CA 95517		
Bid I	Due Date:		
Desc	ription (Project Name and Include Location):	Arsenic Twin La	e Removal Project - Construction akes Road, Bridgeport, California
BOND			
Bo	nd Number:		
Da	te (Not earlier than Bid due date):		
Per	nal sum		\$
	(Words)		(Figures)
Surety a	and Bidder, intending to be legally bound here ad to be duly executed by an authorized office	by, subject	et to the terms set forth below, do each cause this
Surety a Bid Bor BIDDE	and Bidder, intending to be legally bound here nd to be duly executed by an authorized office R (Seal	eby, subjec er, agent, o SURE	et to the terms set forth below, do each cause this or representative. TY (Seal)
Bid Bor BIDDE Bidder' By:	and Bidder, intending to be legally bound here and to be duly executed by an authorized office R (Seal s Name and Corporate Seal	by, subject r, agent, o SURE Surety' By:	et to the terms set forth below, do each cause this or representative. TY (Seal) s Name and Corporate Seal
Surety a Bid Bon BIDDE Bidder' By:	and Bidder, intending to be legally bound here nd to be duly executed by an authorized office R (Seal s Name and Corporate Seal Signature	by, subject r, agent, o SURE Surety' By:	et to the terms set forth below, do each cause this or representative. TY (Seal) s Name and Corporate Seal Signature (Attach Power of Attorney)
Bid Bor BIDDE Bidder' By:	and Bidder, intending to be legally bound here and to be duly executed by an authorized office R (Seal s Name and Corporate Seal Signature Print Name	eby, subjec r, agent, o SURE Surety' By:	et to the terms set forth below, do each cause this or representative. TY (Seal) s Name and Corporate Seal Signature (Attach Power of Attorney) Print Name
Bid Bor BIDDE Bidder' By:	and Bidder, intending to be legally bound here nd to be duly executed by an authorized office R (Seal s Name and Corporate Seal Signature Print Name Title	eby, subjec r, agent, o SURE Surety' By:	et to the terms set forth below, do each cause this or representative. TY (Seal) s Name and Corporate Seal Signature (Attach Power of Attorney) Print Name Title
Surety a Bid Bon BIDDE Bidder' By:	and Bidder, intending to be legally bound here and to be duly executed by an authorized office R (Seal s Name and Corporate Seal Signature Print Name Title	Attest:	et to the terms set forth below, do each cause this or representative. TY (Seal) s Name and Corporate Seal Signature (Attach Power of Attorney) Print Name Title
Surety a Bid Bon BIDDE Bidder' By:	and Bidder, intending to be legally bound here and to be duly executed by an authorized office R (Seal s Name and Corporate Seal Signature Print Name Title Signature	Attest:	et to the terms set forth below, do each cause this or representative. TY (Seal) s Name and Corporate Seal Signature (Attach Power of Attorney) Print Name Title Signature

parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

- 3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

EJCDC C-430 Bid Bond (Penal Sum Form)
Prepared by the Engineers Joint Contract Documents Committee.
Page 2 of 2

Unit Price Bid Schedule

SITE IMPROVEMENTS

SITE IMPROVEMENTS							
ITEM	DESCRIPTION	QUANTITY		QUANTITY UNIT COST			
1	Bonds, Insurance, Mob., Demob., Temporary BMP, Traffic Control	1	Lump Sum	/EA			
2	Demolition	1	Lump Sum	/LS			
3	Site Grading & Landscaping	1	Lump Sum	/LS			
4	4" AC on 6" Aggregate Base	3437	Square Feet	/SF			
5	Aggregate Base Shoulder	235	Square Feet	/SF			
6	Concrete Flatwork (propane tank pad, rolling gate pad, SD cap)	115	Square Feet	/SF			
7	Chain Link Fence	300	Linear Feet	/LF			
8	Wrought Iron Fence & Man Gate	31	Linear Feet	/LF			
9	Rolling Gate w/Operator	1	Lump Sum	/LS			
10	On-Site Conduit Wire & Trenching	150	Linear Feet	/LF			
11	Remove Ex. 200 Amp Service & Pole and Replace With New 225 Amp Service (SCE Contract)	1	Lump Sum	/LS			
12	3/4" Meter, Meter Box & Lateral	1	Each	/EA			
13	2" Meter Box & Lateral	1	Each	/EA			
14	8" C900 Class 150 PVC Pipe, On-site	64	Linear Feet	/LF			
15	8" Gate Valve	1	Each	/EA			
16	8" Ductile Iron Pipe, On-Site	176	Linear Feet	/LF			
17	8" SDR 35 Sewer Line, On-Site (Below Ground)	115	Linear Feet	/LF			
18	10" PVC SDR 35 Storm Drain Line, On-Site	160	Linear Feet	/LF			
19	24x24 Drop Inlet	1	Each	/EA			
20	Propane Gas Line, On-Site	60	Linear Feet	/LF			
21	Propane Regulator and Valves	1	Lump Sum	/LS			
Sub Total							

Unit Price Bid Schedule

OFF-SITE IMPROVEMENTS							
ITEM	DESCRIPTION	QUANTITY		UNIT COST	TOTAL		
1	Bonds, Insurance, Mob., Demob., Temporary BMP, Traffic Control	1	Lump Sum	/EA			
2	8" C900 PVC Pipe, Off-Site	150	Linear Feet	/LF			
3	8" Gate Valve, Off-Site	8	Each	/EA			
4	8" Pipe Concrete Encasement	3	Each	/EA			
5	Water Main Cut and Tie, Twin Lakes Road	6	Each	/EA			
6	8" Ductile Iron Pipe, Off-Site	176	Linear Feet	/LF			
7	8" SDR 35 Sewer Line, Off-Site	115	Linear Feet	/LF			
8	2" Water Service Line	1	Lump Sum	/LS			
9	Air Release Valve & Lateral	2	Each	/EA			
10	21" RCP CL IV Storm Drain & Flared Ends	40	Linear Feet	/LF			
11	Grouted 6" to 8" Rip Rap	108	Square Feet	/SF			
12	Pavement Patch and Driveway Within Twin Lakes Road	700	Square Feet	/SF			
	Sub Total						

APPURTENANCES TO WATER TREATMENT

ITEM	DESCRIPTION	Q	UANTITY	UNIT COST	TOTAL
1	Bonds, Insurance, Mob., Demob., Temporary BMP, Traffic Control	1	Lump Sum	/EA	
2	Water Treatment System Installation	1	Lump Sum	/LS	
3	Piping Inside Building	1	Lump Sum	/LS	
4	Pre Filters	1	Lump Sum	/LS	
5	Flow Meters, Pump to Waste Valve, Check Valve and other Valves	1	Lump Sum	/LS	
6	Chemical Feed: Hypochlorite	1	Lump Sum	/LS	
7	Drainage Piping	1	Lump Sum	/LS	
8	Ventilation Systems	1	Lump Sum	/LS	
9	Emergency Shower/Eyewash	1	Lump Sum	/LS	
10	SCADA: Computer Upgrades, I/O Mods, Programming & Graphics	1	Lump Sum	/LS	
11	Building Electrical & Conduits	1	Lump Sum	/LS	
				Sub Total	
	ING				

Boilbiito						
ITEM	DESCRIPTION	QUANTITY		QUANTITY UNIT COST		TOTAL
1	Bonds, Insurance, Mob., Demob., Temporary BMP, Traffic Control	1	Lump Sum	/	ΈA	
2	Building, Building Pad, Slab, Doors, Heat, Bathroom: 76' X 18'	1368	Square Feet	/:	SF	
Sub Total						

Unit Price Bid Schedule

Total of Base Bid

Total of Base Bid in words:

Contractor:

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA



CONSTRUCTION CONTRACTOR'S QUALIFICATION STATEMENT FOR ENGINEERED CONSTRUCTION

This qualification statement was developed by AGC of America in cooperation with the Engineers Joint Contract Documents Committee (EJCDC) which recommend its use as a suggested generic prequalification statement or a contract-specific qualification statement. In the latter case, the owner or engineer may wish to make appropriate supplemental inquires.

The Engineers Joint Contract Documents Committee consists of representatives of the following organizations:

National Society of Professional Engineers American Consulting Engineers Council American Society of Civil Engineers Construction Specifications Institute

The contents of this statement are CONFIDENTIAL.

Submitted by:		
Name of Organization	 	
Name of Individual	 	
Title	 	
Address	 	
Telephone		

Submitted	I to:	2
Name		
Address		
Telephon	8	
Project N	ame and Description (if applicable)	
110,000 14		
		1
Contractor	's General Business Information	
Cheo	sk lf:	
	orporation 🗆 Partnershin 🗖 Joint Venture 🗖 Sole Preprietershin	
L 0		
IT CO		
a.	Date and State of Incorporation	
b.	List of Executive Officers	
	Name	Title

AGC DOCUMENT NO. 220 • CONSTRUCTION CONTRACTOR'S QUALIFICATION STATEMENT FOR ENGINEERED CONSTRUCTION, © 1990, The Associated General Contractors of America.

If Partnership:

a.	Date and State of Organization
b.	Names of Current General Partners
c.	Type of Partnership
	General Publicly Traded
	Limited Other (describe):
lf Jo	bint Venture:
a.	Date and State of Organization
b.	Name, Address and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk *)
If So	ble Proprietorship:
a.	Date and State of Organization
b.	Name and Address of Owner or Owners

AGC DOCUMENT NO. 220 • CONSTRUCTION CONTRACTOR'S QUALIFICATION STATEMENT FOR ENGINEERED CONSTRUCTION, © 1990, The Associated General Contractors of America.

- 1. On Schedule A, attached, list major engineered construction projects completed by this organization in the past five (5) years. (If joint venture list each participant's projects separately).
- 2. On Schedule B, attached, list current projects under construction by this organization. (If joint venture, list each participant's projects separately).
- 3. Name of surety company and name, address, and phone number of agent.

Is your organization a member of a controlled group of corporations as defined in I.R.C. Sec. 1563?
 □ Yes □ No

If yes, show names and addresses of affiliated companies.

- 5. Furnish on Schedule C, attached, details of the construction experience of the principal individuals of your organization directly involved in construction operations.
- 6. Has your organization ever failed to complete any construction contract awarded to it?
 Yes No

If yes, describe circumstances on attachment.

If yes, describe circumstances on attachment.

8. In the last five years, has your organization ever failed to substantially complete a project in a timely manner?

If yes, describe circumstances on attachment.

9. Indicate general types of work performed with your own work force.

10.	If required, can you	^r organization	provide a bid bond	for this project?	Yes	🗆 No	
-----	----------------------	---------------------------	--------------------	-------------------	-----	------	--

- 11. What is your approximate total bonding capacity?
 - □ \$500,000 to \$2,000,000
 - □ \$2,000,000 to \$5,000,000
 - □ \$5,000,000 to \$10,000,000
 - □ \$10,000,000 or more

AGC DOCUMENT NO. 220 • CONSTRUCTION CONTRACTOR'S QUALIFICATION STATEMENT FOR ENGINEERED CONSTRUCTION, © 1990, The Associated General Contractors of America.
12.	Describe the perma	nent safety program you maintain within your organization. Use attachment if necessary.
	· · · · · · · · · · · · · · · · · · ·	
13.	Furnish the following	g information with respect to an accredited banking institution familiar with your organization.
	Name of Bank	
	Address	
	Account Manager	
	Telephone	

I hereby certify that the information submitted herewith, including any attachment is true to the best of my knowledge and belief.

By:	 	
Title:	 	
Dated:		

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Reference/Contact	Price Include Address and Phone	
	Contract	
ļ	Date Completed	
	Design Engineer	
	Owner	
Name, Location and	Description of Project	

SCHEDULE B

Reference/Contact	Include Address and Phone	
Date of Scheduled	Completion	
Amount	Completed	8
	Contract Price	
	Design Engineer	
	Owner	
Name, Location and	Description of Project	

LIST OF PROPOSED SUBCONTRACTORS

(to be submitted with bids)

The name and address of each subcontractor who will be paid at least **5 percent** of the prime contractor's total bid shall be listed below. To be deemed a responsive bid, this form must be submitted even if no subcontractors are required to be listed. In that case, the bidder should state "None" (or similar language stating that no subcontractors need to be listed) in the space below. (Refer to Supplementary Condition 6.09.H.)

<u>Name</u>	<u>Contact Information</u> <u>Address & Phone #</u>	<u>Portion of Work</u>

LIST OF PROPOSED SUPPLIERS

(to be submitted with bids)

The name and address of each proposed supplier shall be listed below. To be deemed a responsive bid this form must be submitted.

Contact Information (Address & Phone #)	Equipment, <u>Model # & Bid Price</u>	
	Contact Information (Address & Phone #)	

LIST OF PROPOSED SUBCONTRACTORS

(to be submitted after bid opening)

Within 5 days after the opening of the bids, the general contractors who submitted the three lowest bids must provide a list of each subcontractor who will provide labor or a portion of the work or improvement to the contractor for which the subcontractor will be paid an amount exceeding 1 percent of the prime contractors bid or \$50,000, whichever is greater, and the number of the license issued to the subcontractor. If the general contractor fails to submit such a list within the required time, his bid shall be deemed not responsive. To be deemed a responsive bid, this form must be submitted even if no subcontractors are required to be listed. In that case, the Bidder should state "None" (or similar language stating that no subcontractors need to be listed) in the space below. (Refer to Supplementary Condition SC-6.09 H.)

<u>Name</u>	Contact Information (<u>Address & Phone #)</u>	Portion of Work (<u>Description & \$ Value</u>)	

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by









AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE A Practice Division of the NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between	Bridgeport Public Utility District	("Owner") and
		("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

> The project includes providing and installing a new Arsenic Removal Water Treatment plant. The work entails construction of a new building, site work, complete installation of the Owner provided Arsenic Removal System, complete installation of all associated piping, electrical, controls, SCADA integration, and other pertinent equipment and infrastructure as indicated on the plans for a fully functional water treatment plant.

ARTICLE 2 – THE PROJECT

2.01The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Arsenic Removal Project

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by R.O. Anderson Engineering, Inc. (Engineer), which is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

- 4.01 Time of the Essence
 - A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Dates for Substantial Completion and Final Payment

A. The Work will be substantially completed on or before March 15, 2018 and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before May 15, 2018.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$1,250 for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$1,250 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, below:
 - A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the actual quantity of that item as shown on the Unit Price Bid Schedule attached as part of the Bid Form.

The Bid prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities. As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

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6.02 Progress Payments; Retainage

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the <u>last</u> day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.
 - 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.
 - a. <u>90</u> percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, <u>Owner may on recommendation of Engineer</u>, <u>determine that</u> there will be no additional retainage; and
 - b. <u>90</u> percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to <u>95</u> percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less <u>200</u> percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

6.04 *<u>Reimbursements</u>*

A. Contractor shall submit receipts to Owner for direct reimbursement for fees paid for obtaining permits required by the Project as listed in Supplementary Condition SC 6.08.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of <u>6</u> percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
 - B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
 - D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph SC-4.06 of the Supplementary Conditions as containing reliable "technical data."
 - E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.
 - F. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
 - G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
 - H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
 - I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement (pages $\underline{1}$ to $\underline{8}$, inclusive).
 - 2. Performance bond (pages $\underline{1}$ to $\underline{3}$, inclusive).
 - 3. Payment bond (pages $\underline{1}$ to $\underline{3}$, inclusive).
 - 4. General Conditions (pages <u>1</u> to <u>67</u>, inclusive).
 - 5. Supplementary Conditions (pages $\underline{1}$ to $\underline{24}$, inclusive).
 - 6. Specifications as listed in the table of contents of the Project Manual.
 - 7. Drawings consisting of <u>30</u> sheets with each sheet bearing the following general title: <u>Arsenic Treatment</u>.
 - 8. Addenda (numbers ______ to _____, inclusive). Bidder to FILL IN
 - 9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages _____ to ____, plus attachments). Bidder to FILL IN
 - b. Documentation submitted by Contractor prior to Notice of Award (pages ______ to _____, inclusive).
 - 10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages _____ to, _____ inclusive).
 - b. Work Change Directives.
 - c. Change Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.
- 10.04 *Severability*
 - A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution:
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

- 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
- 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 Other Provisions

A. If applicable, in the event that there is any litigation relative to the interpretation or enforcement of this agreement or any of the contract documents, the prevailing party shall be entitled to a reasonable attorney's fee, together with costs of suit.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on Effective Date of the Agreement).	(which is the
OWNER:	CONTRACTOR
Bridgeport Public Utility District	
Ву:	By:
Title:	Title: (If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
	License No.:
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	Agent for service of process:

Page 8 of 8

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name, and Address of Principal Place of Business):

OWNER (*Name and Address*): Bridgeport Public Utility District Renn Nolan, Office Manager 233 Twin Lakes Road Bridgeport, California. 93517

CONTRACT Effective Date of Agreement: Amount: Description (*Name and Location*):

Arsenic Removal Project - Construction 118 Twin Lakes Road, Bridgeport, California

BOND

Bond Number: Date (*Not earlier than Effective Date of Agreement*): Amount: Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

		(Seal)			(Seal)
Contractor's Name and Corporate Seal		_ ` ´	Surety's Name and Corporate Seal		`
By:			By:		
	Signature			Signature (Attach Power of Attorney)	
	Print Name			Print Name	
	Title			Title	
Attest:			Attest:		
	Signature			Signature	
	Title			Title	

Note: Provide execution by additional parties, such as joint venturers, if necessary.

EJCDC C-610 Performance Bond			
Prepared by the Engineers Joint Contract Documents Committee.			
Page 1 of 3			

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

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

- 2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
 - 2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
 - 2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
 - 2.3 Owner has agreed to pay the Balance of the Contract Price to:
 - 1. Surety in accordance with the terms of the Contract; or
 - 2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

- 3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
- 3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
- 3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
- 3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 - 1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
 - 2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

EJCDC C-610 Performance Bond
Prepared by the Engineers Joint Contract Documents Committee.
Page 2 of 3

- 5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
- 5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
- 5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

11. Definitions.

- 11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
- 11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
- 11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
- 11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other party*): Engineer

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name, and Address of Principal Place of Business):

OWNER (*Name and Address*): Bridgeport Public Utility District Renn Nolan, Office Manager 233 Twin Lakes Road Bridgeport, California. 93517

CONTRACT Effective Date of Agreement: Amount: Description (Name and Location):

Arsenic Removal Project - Construction 118 Twin Lakes Road, Bridgeport, California

BOND

Bond Number: Date (*Not earlier than Effective Date of Agreement*): Amount: Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

	()	Seal)			(Seal)
Contra	actor's Name and Corporate Seal		Suret	y's Name and Corporate Seal	_
By:			By:		
	Signature			Signature (Attach Power of Attorney)	
	Print Name			Print Name	
	Title			Title	
Attest:			Attest:		
	Signature			Signature	
	Title			Title	

Note: Provide execution by additional parties, such as joint venturers, if necessary.

	EJCDC C-615 Payment Bond	
Prepar	ed by the Engineers Joint Contract Documents Con	nmittee.
-	Page 1 of 3	

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

- 2. With respect to Owner, this obligation shall be null and void if Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

- 4. Surety shall have no obligation to Claimants under this Bond until:
 - 4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2 Claimants who do not have a direct contract with Contractor:
 - 1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 - 2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 - 3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

- 6.1 Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
- 6.2 Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

EJCDC C-615 Payment Bond	
Prepared by the Engineers Joint Contract Documents Committee.	
Page 2 of 3	

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

- 15. Definitions
 - 15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
 - 15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
 - 15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other*): Engineer

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by









AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE A Practice Division of the NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms. (See Supplementary Conditions)
 - 1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 - 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 - 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 - 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 - 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 - 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 - 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 - 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 - 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 - 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 - 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 - 12. Contract Documents—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop

EJCDC C-700 Standard General Conditions of the Construction Contract Copyright © 2007 National Society of Professional Engineers for EJCDC. All rights reserved. Page 1 of 64 Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

- 13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
- 14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
- 15. Contractor—The individual or entity with whom Owner has entered into the Agreement.
- 16. Cost of the Work—See Paragraph 11.01 for definition.
- 17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
- 18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
- 19. Engineer—The individual or entity named as such in the Agreement.
- 20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
- 21. General Requirements—Sections of Division 1 of the Specifications.
- 22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
- 23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
- 24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
- 25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
- 26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

- 27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
- 28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
- 29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
- 30. PCBs—Polychlorinated biphenyls.
- 31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
- 32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
- 33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
- 34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
- 35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
- 36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
- 37. *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.
- 38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
- 39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

- 40. *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.
- 41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
- 42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
- 43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
- 44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof. <u>(See Supplementary Conditions)</u>
- 45. Successful Bidder—The Bidder submitting a responsive Bid to whom Owner makes an award.
- 46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
- 47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
- 48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
- 49. Unit Price Work—Work to be paid for on the basis of unit prices. (See Supplementary Conditions)
- 50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. Work Change Directive—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times. <u>(See Supplementary Conditions)</u>

1.02 Terminology

- A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. Intent of Certain Terms or Adjectives:
 - 1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. Day:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. Defective:

- 1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

- c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).
- E. Furnish, Install, Perform, Provide:
 - 1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 - 3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

- 2.01 Delivery of Bonds and Evidence of Insurance
 - A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
 - B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.
- 2.02 *Copies of Documents*
 - A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction. (See Supplementary Conditions)
- 2.03 Commencement of Contract Times; Notice to Proceed
 - A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A

Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

- 2.04 *Starting the Work*
 - A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.
- 2.05 Before Starting Construction
 - A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.
- 2.06 Preconstruction Conference; Designation of Authorized Representatives
 - A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
 - B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete
and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

- 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
- 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
- 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

- 3.01 Intent
 - A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
 - B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
 - C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.
 (See Supplementary Conditions)
- 3.02 *Reference Standards*
 - A. Standards, Specifications, Codes, Laws, and Regulations
 - 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set

forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

- A. Reporting Discrepancies:
 - 1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
 - 2. Contractor's Review of Contract Documents During Performance of Work: 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 (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
 - 3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.
- B. Resolving Discrepancies:
 - 1. Except as may be otherwise specifically stated in the Contract Documents, 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:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any 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).

- 3.04 Amending and Supplementing Contract Documents
 - A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
 - B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (See Supplementary Conditions)
 - 1. A Field Order;
 - 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
 - 3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 - 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.
- 3.06 *Electronic Data*
 - A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
 - B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 Availability of Lands

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

- 4.02 Subsurface and Physical Conditions
 - A. Reports and Drawings: The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
 - B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of

construction to be employed by Contractor, and safety precautions and programs incident thereto; or

- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

(See Supplementary Conditions)

4.03 Differing Subsurface or Physical Conditions

- A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:
 - 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
 - 2. is of such a nature as to require a change in the Contract Documents; or
 - 3. differs materially from that shown or indicated in the Contract Documents; or
 - 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.
- C. Possible Price and Times Adjustments:
 - 1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

- b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
- 2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
- 3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

(See Supplementary Conditions)

4.04 Underground Facilities

- A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
 - 1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
 - 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

- d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
- B. Not Shown or Indicated:
 - 1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
 - 2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

(See Supplementary Conditions)

4.05 Reference Points

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.
- 4.06 Hazardous Environmental Condition at Site
 - A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such

condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed

by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.
- 5.02 *Licensed Sureties and Insurers*
 - A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

- 5.03 Certificates of Insurance
 - A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
 - B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
 - C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
 - D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
 - E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 Contractor's Insurance

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
 - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 - 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

- 3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
- 4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide); (See Supplementary Conditions)
- 5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
- 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter. (See Supplementary Conditions)

- 5.05 *Owner's Liability Insurance*
 - A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- 5.06 Property Insurance
 - A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall <u>(See Supplementary Conditions)</u>:
 - 1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 - 2. be written on a Builder's Risk "all-risk" policy form that shall at least include 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, earthquake, collapse, <u>explosion, underground exposure</u>, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

- 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
- 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
- 5. allow for partial utilization of the Work by Owner;
- 6. include testing and startup; and
- 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.
- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 Waiver of Rights

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.
- 5.08 Receipt and Application of Insurance Proceeds
 - A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached,

the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 Acceptance of Bonds and Insurance; Option to Replace

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 Partial Utilization, Acknowledgment of Property Insurer

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

- 6.01 Supervision and Superintendence
 - A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. (See Supplemental Conditions)
- 6.02 *Labor; Working Hours*
 - A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
 - B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer. (See Supplementary Conditions)

6.03 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

(See Supplementary Conditions)

- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents. (See Supplementary Conditions)

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 Substitutes and "Or-Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. "*Or-Equal*" *Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
 - 2. Substitute Items:
 - a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
 - b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute

items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.
- 6.06 *Concerning Subcontractors, Suppliers, and Others*
 - A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
 - B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

(See Supplementary Conditions)

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the

Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

- 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
- 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 Permits

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

(See Supplementary Conditions)

6.09 Laws and Regulations

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

- 6.10 *Taxes*
 - A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
- 6.11 Use of Site and Other Areas
 - A. Limitation on Use of Site and Other Areas:
 - 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
 - 2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
 - 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
 - B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner. (See Supplementary Conditions)

(See Supplementary Conditions)

6.13 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other 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.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion) (See Supplementary Conditions).

(See Supplementary Conditions)

- 6.14 *Safety Representative*
 - A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- 6.15 Hazard Communication Programs
 - A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 Emergencies

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.
- 6.17 Shop Drawings and Samples
 - A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require. (See Supplementary Conditions)

- 1. Shop Drawings:
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

(See Supplementary Conditions)

- 2. Samples:
 - a. Submit number of Samples specified in the Specifications. <u>(See Supplementary</u> <u>Conditions)</u>
 - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. Submittal Procedures:
 - 1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
 - 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation. (See Supplementary Conditions)

D. Engineer's Review:

- 1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine 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 a functioning whole as indicated by the Contract Documents.
- 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) 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.
- 3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1. (See Supplementary Conditions)
- E. Resubmittal Procedures:
 - 1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.
- 6.19 Contractor's General Warranty and Guarantee
 - A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members,

partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 - 6. any inspection, test, or approval by others; or
 - 7. any correction of defective Work by Owner.

6.20 Indemnification

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable. (See Supplementary Conditions)
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any

individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 Delegation of Professional Design Services

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals prepared by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 Related Work at Site

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 Coordination

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 Legal Relationships

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

- 8.01 Communications to Contractor
 - A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.
- 8.02 Replacement of Engineer
 - A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.
- 8.03 Furnish Data
 - A. Owner shall promptly furnish the data required of Owner under the Contract Documents.
- 8.04 *Pay When Due*
 - A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.
- 8.05 Lands and Easements; Reports and Tests
 - A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site. (See Supplementary Conditions)
- 8.06 Insurance
 - A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 Change Orders

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.
- 8.08 Inspections, Tests, and Approvals
 - A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.
- 8.09 Limitations on Owner's Responsibilities
 - A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- 8.10 Undisclosed Hazardous Environmental Condition
 - A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.
- 8.11 Evidence of Financial Arrangements
 - A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.
- 8.12 Compliance with Safety Program
 - A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

- 9.01 Owner's Representative
 - A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.
- 9.02 Visits to Site
 - A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions. (See Supplementary Conditions)

9.04 Authorized Variations in Work

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed. <u>(See Supplementary Conditions)</u>

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.
- 9.07 Determinations for Unit Price Work
 - A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.
- 9.08 Decisions on Requirements of Contract Documents and Acceptability of Work
 - A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
 - B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
 - C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
 - D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.
- 9.09 Limitations on Engineer's Authority and Responsibilities
 - A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not

exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.
- 9.10 Compliance with Safety Program
 - A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

- 10.01 Authorized Changes in the Work
 - A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided). (See Supplementary Conditions)
 - B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 Notification to Surety

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 Claims

- A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
 - 1. deny the Claim in whole or in part;
 - 2. approve the Claim; or
 - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05. (See SC 11.02)

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

- 11.01 Cost of the Work
 - A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
- 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
- 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
- 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
- 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
- 5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.
- B. Costs Excluded: The term Cost of the Work shall not include any of the following items:
 - 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
 - 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data. (See SC 11.02)

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. Cash Allowances:
 - 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. Contingency Allowance:
 - 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted. (See SC 11.02)

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item. (See Supplementary Conditions)
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

(See Supplementary Conditions)

- 2. there is no corresponding adjustment with respect to any other item of Work; and
- 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

- 12.01 Change of Contract Price
 - A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
 - B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

- 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or <u>(See Supplementary Conditions)</u>
- 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:
 - 1. a mutually acceptable fixed fee; or
 - 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive. (See SC 11.02)

12.02 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12. (See Supplementary Conditions)
- 12.03 Delays
 - A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God. (See SC 11.02)
 - B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
 - C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
 - D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
 - E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

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

- 13.01 Notice of Defects
 - A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.

(See Supplementary Conditions)

- C. If 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, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 Uncovering Work

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. (See Supplementary Conditions)
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 Owner May Stop the Work

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 Correction Period

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.
- 13.08 Acceptance of Defective Work
 - A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments:

- 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner 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 or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
- 2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
- 3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.
- B. Review of Applications:
 - 1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
 - 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;

- b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
- c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
- 3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
- 4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
- 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.
- C. Payment Becomes Due:
 - 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.
- D. *Reduction in Payment:*
 - 1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
 - 2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
 - 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor. (See Supplementary Conditions)
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 Partial Utilization

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially

EJCDC C-700 Standard General Conditions of the Construction Contract Copyright © 2007 National Society of Professional Engineers for EJCDC. All rights reserved. Page 57 of 64 complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

- 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
- 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
- 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 Final Payment

A. Application for Payment:

- 1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
- 2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and

- d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.
- B. Engineer's Review of Application and Acceptance:
 - 1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. Payment Becomes Due:
 - 1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 Final Completion Delayed

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

- A. The making and acceptance of final payment will constitute:
 - 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 - 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled. <u>(See Supplementary Conditions)</u>

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

- 15.01 Owner May Suspend Work
 - A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.
- 15.02 Owner May Terminate for Cause
 - A. The occurrence of any one or more of the following events will justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 - 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 - 3. Contractor's repeated disregard of the authority of Engineer; or
 - 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
 - B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
 - exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

- 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
- 3. complete the Work as Owner may deem expedient. (See Supplementary Conditions)
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.
- 15.03 Owner May Terminate For Convenience
 - A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other

dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

- 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 Contractor May Stop Work or Terminate

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph. (See Supplementary Conditions)

ARTICLE 16 – DISPUTE RESOLUTION

- 16.01 *Methods and Procedures*
 - A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
 - B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
 - C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

- 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
- 2. agrees with the other party to submit the Claim to another dispute resolution process; or
- 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

(See Supplementary Conditions)

ARTICLE 17 – MISCELLANEOUS

17.01 Giving Notice

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.
- 17.02 Computation of Times
 - A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

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

17.05 Controlling Law

- A. This Contract is to be governed by the law of the state in which the Project is located.
- 17.06 Headings
 - A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS TO THE GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2007 Edition). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC 1.01 Defined Terms

Make modifications to paragraph 1.01.A, as shown in the General Conditions, to read:

A. Wherever used in these General Conditions, the Bidding Requirements or in other Contract Documents the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. Said terms are generally capitalized or written in italics, but not always. When used in a context consistent with the definition of a listed-defined term, the term shall have a meaning as defined below whether capitalized or italicized or otherwise. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

SC 1.01.A.44 Substantial Completion

Make modifications to paragraph 1.01.A.44, as shown in the General Conditions, to read:

The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be safely and conveniently utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof. SC 1.01.A.49 Unit Price Work

Add the following sentence immediately after paragraph 1.01.A.49:

Unit prices shown in Bid Schedule refer to the cost to provide for a specific bid item and not a combination of items. LS is defined as a lump sum unit and includes work associated with that one bid item as a unit.

SC 1.01.A.51 Work Change Directive

Make modifications to paragraph 1.01.A.51, as shown in the General Conditions, to read:

A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and which may be recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

ARTICLE 2 – PRELIMINARY MATTERS

SC 2.02 Copies of Documents

Make modifications to the first sentence of paragraph 2.02, as shown in the General Conditions, to read:

Owner shall furnish to Contractor up to five printed or hard copies of the Drawings and Project Manual.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.01 Intent

Add the following new paragraph immediately after paragraph 3.01.C:

D. Cross-referencing of specification sections under the sub-paragraph heading "Related Sections include but are not necessarily limited to:" and elsewhere within each specification section is provided for the convenience of the Contractor. The Contractor shall not rely on the provided cross referencing and shall be responsible to coordinate the entire Work under the Contract Documents and provide a complete Project whether or not the cross referencing is provided in each section, or whether or not the cross referencing is complete

SC-3.03 Reporting and Resolving Discrepancies

Add the following new paragraph immediately after paragraph 3.03.B.1:

2. In case of discrepancy, calculated dimensions will govern over scaled dimensions, Drawings will govern over Standard Specifications, and Construction Specifications will govern over both Drawings and Standard Specifications. The Contractor shall take no advantage of any apparent error or omission in the Drawings or Construction Specifications, and the Engineer will be permitted to make such corrections and interpretations as may be deemed necessary to fulfill the intent of the Contract Documents.

SC-3.04 *Reporting and Resolving Discrepancies*

Modify paragraph 3.04.B to read as follows:

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work, not resulting in a change in Contract Price or Contract time, may be authorized, by one or more of the following ways:

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

SC-4.01 Availability of Lands

Add the following paragraphs after paragraph C.

- D. The Contractor shall take all necessary precautions for the protection of corporate or private property, such as walls and foundations of buildings, vaults, underground structures of public utilities, underground drainage facilities, overhead structures of public utilities, trees, shrubbery, crops and fences contiguous to the work, of which the contract does not provide for removal. The Contractor shall protect and carefully preserve all official survey monuments, property marks, section markers and Geological Survey Monuments, or other similar monuments, until the Owner, or an authorized surveyor or agent has witnessed or otherwise referenced their location or relocation. The Contractor shall notify the Engineer of the presence of any such survey or property monuments as soon as they are discovered.
- E. The Contractor shall be responsible for the damage or destruction of property of any character resulting from neglect, misconduct, or omission in its manner or method of execution or non-execution of the work, or caused by defective work or the use of unsatisfactory materials, and such responsibility shall not be released until the work shall have been completed and accepted and the requirements of the Specifications complied with.

F. Whenever public or private property is so damaged or destroyed, the Contractor shall at its own expense, restore such property to a condition equal to that existing before such damage or injury was done by repairing, rebuilding or replacing it as may be directed, or the Contractor shall otherwise make good such damage or destruction in an acceptable manner. If the Contractor fails to do so, the Engineer may, after giving the Contractor notice in writing, proceed to repair, rebuild or otherwise restore such property as may be deemed necessary, and the cost thereof shall be deducted from any compensation due, or which may become due, the Contractor under its contract.

SC-4.02 Subsurface and Physical Conditions

Add the following new paragraph(s) immediately after paragraph 4.02.B:

- C. In the preparation of Drawings and Specifications, Engineer or Engineer's Consultants relied upon the following Drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the Site;
 - 1. Report dated November, 2010, prepared by Black Eagle Consulting, Inc., entitled: "Geotechnical Investigation: Bridgeport Public Utilities District, Water System Arsenic Removal Works, Mono County, California", consisting of 19 pages. The "technical data" contained in such report upon which Contractor may rely is all recommendations.
- D. These reports and Drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer and Engineer's Consultants in the preparation of Drawings and Specifications.
- E. Copies of reports and Drawings itemized in SC-4.02.C that are not included with Bidding Documents may be examined during regular business hours at the office of the Engineer, R.O. Anderson Engineering, Inc., 1603 Esmeralda Avenue, Minden, Nevada, 89423.
- SC-4.03 Differing Subsurface or Physical Conditions

Add the following paragraphs after paragraphs SC-4.03.C.3:

- D. Possible Delays Due to Historic Preservation
 - 1. If during due course of the work, historic or archeological sites or findings are discovered and must be preserved, the Contractor may submit a claim for delays, changes in the Contract Times, or

adjustments in the Contract Price in accordance with Section 4.04.B.2 of the General Conditions, excepting underground facilities shall be intended to mean historic or archeological findings. The Contractor shall otherwise maintain consistency with this section in the discovery of conditions not shown or indicated.

SC-4.04 Underground Facilities

Add the following paragraphs after paragraph 4.04.B:

- C. Notification and Protection
 - 1. Contractor shall verify all utility locations prior to the start of construction. This shall include, but not necessarily be limited to: irrigation and drainage ditches, culverts, water lines, sewer lines, telephone cables, cable television, gas lines and electric lines. Prior to the start of construction the Contractor shall notify Underground Services Alert (USA DIGS) at 1-800-227-2600 (two full working days notice required). The failure of any utility to subscribe to USA DIGS shall not relieve the Contractor from the responsibility of protection of that utility on the site.
 - 2. A list of the major public utilities servicing the work area follows. The list indicates the name and telephone number of the responsible authority of the various utilities which should be notified if conflicts or emergencies arise during the progress of the work.

Southern California Edison 760-873-2902 Robert Castaneda – planner

Verizon Engineering 760-872-0855 Myles Mcmullen

Bridgeport P.U.D. 760-932-7251 Renn Nolan, Office Manager

- D. At points where the Contractor's operations are adjacent to public and private utilities, Contractor shall not commence work until Contractor has made all arrangements necessary for the protection of utilities.
- E. Contractor shall coordinate and cooperate with the owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable

manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

- SC-4.06 Hazardous Environmental Condition at Site
 - A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

ARTICLE 5 – BONDS AND INSURANCE

SC-5.02 *Licensed Sureties and Insurers*

Add the following new paragraphs immediately after paragraph 5.02.A:

- B. All Sureties and Insurance Companies shall be authorized to do business in the State of California and shall have a Dunn and Bradstreet rating of "A" or better. In the event that the Insurer fails to maintain a rating of "A" or better, the Contractor shall immediately retain a Surety which does meet the above requirements.
- SC-5.04 *Contractor's Insurance*

Modify the following portion of sub-paragraph in 5.04.B.4:

4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

Modify the following portion of sub-paragraphs in 5.04.B.6.b:

b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

Add the following new paragraphs immediately after paragraph 5.04.B:

C. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under paragraphs 5.04.A.1 and A.2 of the General Conditions:

a.	State:	Statutory
b.	Applicable Federal (e.g., Longshoreman's):	Statutory
c.	Employer's Liability:	Statutory

2. Contractor's General Liability under paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

a.	General Aggregate	\$2,000,000
b.	Products Completed Operations Aggregate	\$2,000,000
c.	Personal and Advertising Injury	\$1,000,000
d.	Each Occurrence (Bodily Injury and Property Damage)	\$1,000,000
e.	Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable. In addition to the above, Property Damage liability insurance will include coverage for OWNER supplied equipment, having a value of \$450,000, once delivered to the project site for installation by the Contractor.	
f.	Excess or Umbrella Liability	
	1) General Aggregate	\$2,000,000
	2) Each Occurrence	\$1,000,000

3. Automobile Liability under paragraph 5.04.A.6 of the General Conditions:

a. Combined Single Limit of \$1,000,000

4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

a.	Bodily Injury:	
	Each person	\$1,000,000
	Each Accident	\$1,000,000
b.	Property Damage:	
	Each Accident:	\$1,000,000
	Annual Aggregate	\$2,000,000

5. Workers Compensation Coverage - Contractor shall purchase and maintain for the period of the Contract full Workers Compensation Coverage for all persons whom it employs or may employ in performing or furnishing any of the Work under the Contract. This insurance shall be in strict accordance with requirements of the most current and applicable State Industrial Insurance laws, including any amended laws taking affect during the term of the Contract. Before beginning Work under the Contract, Contractor shall furnish Owner a certificate of compliance.

If Contractor does not maintain coverage throughout the entire term of the contract, Contractor agrees that Owner may, at any time the coverage is not maintained by Contractor, order the Contractor to stop work, suspend the contract, or terminate the contract. For each six month period this contract is in effect, Contractor agrees, prior to the expiration of the six month period, to provide another written request to its insurer for the provision of a certificate and notice of lapse in or nonpayment of coverage. If Contractor does not make the request or does not provide the certificate before the expiration of the six month period, contractor agrees that Owner may order the Contractor to stop work, suspend the contract, or terminate the contract.

6. The Comprehensive General Liability Insurance will include as Additional Named Insured the Bridgeport Public Utility District, R.O. Anderson Engineering, Inc., and each of their officers, agents and employees.

SC-5.06 Property Insurance

Modify paragraph 5.06.A to read thus:

A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. Contractor shall be responsible for any deductible or self-insured retention. This insurance shall:

Modify paragraph 5.06.A.7 to read thus:

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee.

SC-5.10 Partial Utilization, Acknowledgment of Property Insurer

Add the following paragraphs immediately after 5.10.A:

- B. All insurance required by the Contract Documents, or by law or regulation, shall remain in full force and effect on all phases of the Work, whether or not the Work is occupied or utilized by the Owner, until all Work included in the Agreement has been completed and final payment has been made.
- C. Nothing contained in the insurance requirements shall be construed as limiting the extent of Contractor's responsibility for payment of damages resulting from Contractor's, sub-contractor's or supplier's operations under the Contract. Contractor agrees that Contractor alone shall be completely responsible for procuring and maintaining full insurance coverage as provided herein, or as may be otherwise required by the Contract Documents.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITY

SC-6.01 Supervision and Superintendence

Modify paragraph 6.01.B to read thus:

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The Superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on the Contractor.

SC-6.02 Labor; Working Hours

Delete paragraph 6.02.B in its entirety and replace it with the following:

B. In the absence of any Federal, state or local laws, regulations or covenants, the Contractor may conduct its operations and perform the Work at the Contractor's

sole discretions, except that the cost of any overtime pay or other expense incurred by the Owner for Resident Project Representative, Owner's Representative and construction observation services, occasioned by conducting Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day, shall be reimbursed to the Owner by the Contractor.

Add the following paragraph immediately after 6.02.B:

- 1. Contractor shall provide 1 or more telephone numbers, one of which will be answered by a responsible agent of the contractor 24-hours a day 7 days a week to report violation of the above requirements.
 - C. All work shall be performed between the hours of 7:00 am and 7:00 pm with no work on Saturday, Sunday or California Legal holidays without the Owners Written Consent. Consent will only be given in bona fide emergencies or for good cause. Contractor shall provide 1 or more telephone numbers, one of which will be answered by a responsible agent of the contractor 24-hours a day 7 days a week to report violation of the above requirements.

SC-6.03 Services, Materials, and Equipment

Add the following paragraph immediately after 6.03.A:

B. Where the Work requires equipment to be furnished, due to the lack of standardization of equipment as produced by the various manufacturers, it may become necessary to make minor modifications in the structures, buildings, piping, mechanical work, electrical work, accessories, controls, or other work, to accommodate the particular equipment offered. Contractor's bid price for any equipment offered shall include the cost of making any necessary changes subject to the approval of Engineer.

Add the following paragraph immediately after 6.03.C:

D. All items of standard equipment shall be the latest model at the time of bid, unless otherwise specified.

SC-6.08 Permits

Add the following paragraph after paragraph 6.08.A:

B. Contractor shall be responsible for obtaining any and all other permits and licenses necessary for completion of the Work except those in C, including

preparation of a traffic control plan as needed for completion of the Work. The Contractor shall be responsible for compliance with the terms and special conditions of all permits whether shown on the Drawings or not.

C. Owner shall provide the Mono County Building Permit, Mono County Encroachment Permit, Mono County Special Use Permit, California State Water Resources Control Board Division of Drinking Water Water System Amendment Permit, Southern California Edison Contract for changing the electrical service, and California Regional Water Quality Control Board Lahontan Region dewatering permit.

SC-6.09 *Laws and Regulations*

Add the following new paragraphs immediately after paragraph 6.09 C:

- D. The higher of "Mono County Prevailing Wage Rates for Public Works", as determined by the Department of Industrial Relations or "Davis-Bacon Wages" for each class of mechanics and workmen apply. The rates that are actually in effect on the date set by each method of wage determination are the rates that shall apply throughout the course of the Work
 - 1. Contractor shall note that the hourly and daily rate of wages to be paid each class of mechanics and workmen must be posted on the project site in a place generally visible to the employees.
 - 2. Contractor shall note that if Contractor fails to pay prevailing wages, Contractor may forfeit penalties to Owner.
 - 3. The Owner will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wages set forth in the Contract Documents.
- E. Copies of the "Davis-Bacon Wage Requirements" and "wage rates" for nongovernmental entities that are subrecipients of funds from the Drinking Water State Revolving Fund (DWSRF) are included herein as an Exhibit. The Davis-Bacon act is incorporated in its entirety by this reference.
- F. A copy of the "American Iron and Steel (AIS)" guidance memorandum for projects utilizing State Revolving Fund funds is included herein as an Exhibit. The AIS clause is incorporated in its entirety by this reference.

SC-6.10 Taxes

Add a new paragraph immediately after Paragraph 6.10A:

B. Owner is exempt from payment of sales and compensating use taxes of the State of California and of cities and counties thereof on all materials to be

incorporated into the Work. Bidder shall not include sales tax. Contractor shall not include sales tax throughout the project on any change order requests.

- 1. Owner will furnish the required certificates of tax exemption to contractor for use in the purchase of supplies and materials to be incorporated into the Work.
- 2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

SC-6.11 *Use of Site and other areas*

Add the following paragraph after paragraph 6.11.A:

1. Use of storage and staging areas within Bridgeport, with the exception of the staging area at the SS Treatment Ponds as designated on the drawings, must be approved in advance by the Owner. Proposed areas should be in Commercial, Industrial or Agriculture zoning districts and preferably 500 feet or more from any residence.

SC-6.12 *Record Documents*

Modify paragraph 6.12.A. to read thus:

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner. Contractor shall include accurate locations of buried items constructed, as well as existing buried items found during construction, and imbedded items.

Add the following two paragraphs after paragraph 6.12.A:

B. The Contractor shall mark up one set of paper prints to show the As-built conditions. They shall include all the information shown on the contract set of Drawings and a record of all deviations, modifications, or changes from those Drawings, however minor, which were incorporated in the work, all additional

work not appearing on the contract Drawings and all changes which are made after final inspection of the Work. These As-built marked prints shall be kept current and available to Engineer for reference, on the job site at all times. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. No construction work shall be concealed until it has been inspected, approved, and recorded. The As-built marked prints will be jointly inspected for accuracy and completeness by the Engineer and a responsible representative of the Contractor prior to submission of the monthly Application For Payment. Failure to keep the As-built marked prints on a current basis shall be sufficient justification to suspend progress payments.

C. The As-built marked prints shall be delivered to the Engineer at the time of final inspection for its review and approval. All approval and acceptance of As-built Drawings shall be accomplished before final payment is made to the Contractor.

SC-6.13 Safety and Protection

Modify paragraph 6.13.F. to read thus:

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion) and during the Correction Period to the extent the Contractor or Contractor's Subcontractors are present on the Site to fulfill Correction Period obligations.

Add the following paragraphs after paragraph 6.13.F:

- G. No equipment of any kind shall be used or permitted within such proximity to the conductors of Southern California Edison's power lines as to be in violation of the safe working clearance prescribed by the National Electrical Safety Code.
- J. The Contractor shall at all times during construction provide for public access by permitting traffic to pass through or around the construction area as specified herein. The Contractor shall refer to the appropriate sections of Caltrans manuals for traffic control provisions. This document is incorporated herein by reference. Copies may be examined during regular business hours at the offices of R.O. Anderson Engineering, Inc., 1603 Esmeralda Ave., Minden, NV 89423.
 - 1. It is the intention of this section to set forth the basic provisions for traffic control in the work area and the Contractor shall note that nothing in these Supplementary Conditions shall be construed as

relieving the Contractor from its responsibility as provided in any permits.

- 2. In addition, the Contractor shall, within or adjacent to the limits of the work, supplement additional warning and directional signs if requested by the Engineer.
- 3. The Contractor, at its own expense, shall furnish and maintain all lights, signs, barricades or other devices necessary for the protection of public traffic.
- 4. In addition, the Contractor shall at all times during construction and non-construction hours be responsible for installation and maintenance of all traffic control devices necessary for the protection of public traffic, providing flaggers as necessary, scheduling and expediting the work to cause the least inconvenience to the public, and patrolling the work area as required to insure that all devices are in place, clean and properly displayed at all times.
- 5. Night flaggers shall wear reflectorized material and the flagger stations shall be illuminated so that the flaggers can be seen by the public traffic being controlled. Additionally, all traffic control devices shall be reflectorized.
- 6. The Contractor's vehicles shall be parked as far off the edge of the pavement as possible to insure the safe passage of public traffic.
- 7. All costs associated with accommodating public traffic, furnishing flaggers, installing, maintaining and removing signs, barricades and other facilities for the safety and direction of public traffic through and around the Project site shall be considered as included in the prices paid for the various contract items and no additional compensation will be allowed.
- H. The Contractor's methods of construction and safety requirements including but not limited to trench excavation and shoring where applicable, shall conform to the requirements of the Occupational Safety and Health Standards for the Construction Industry. The document entitled "State of California Occupational Safety and Health Standards for the Construction Industry" (29 CFR PART 1926) with Amendments including 29 CFR part 1910 General Industry Safety and Health Standards Applicable to Construction is not attached to the Contract Documents. Said requirements as identified and established above are incorporated herein by reference.

- I. No equipment of any kind shall be used or permitted within such proximity to the conductors of Southern California Edison's power lines as to be in violation of the safe working clearance prescribed by the National Electrical Safety Code.
- J. If blasting or use of explosives is necessary for performance of the Work, Contractor shall provide Engineer with a blasting plan in compliance with OSHA, State, County and local regulations, laws, ordinances, and requirements. Contractor shall exercise the utmost care not to endanger life or property. Contractor shall be responsible for all damage resulting from the use of explosives. Contractor shall notify each property owner and utility company having structures or facilities in proximity to the site of the work of its intentions to use explosives. Such notice shall be given sufficiently in advance to enable the utility companies to take such steps as they may deem necessary to protect their property from injury.

SC-6.17 Shop Drawings and Samples

Modify paragraph 6.17.A. to read thus:

A. Contractor shall submit required Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

Add the following paragraphs immediately after paragraph 6.17.A.1.b:

- c. Shop drawings submitted as herein provided by Contractor and reviewed by Engineer for conformance with the design concept shall be executed in conformity with the Contract Documents unless otherwise required by Owner.
- d. When Shop Drawings are submitted for the purpose of showing the installation in greater detail, their review shall not excuse Contractor from requirements shown on the drawings and Specifications.
- e. Three copies for Owner and Engineer to keep, plus as many copies as Contractor would like returned, of all shop and working Drawings shall be submitted to Engineer by or through Contractor, who shall be responsible for obtaining shop and working Drawings from its subcontractors and returning approved Drawings to them. All Drawings shall be clearly marked with the names of the Project, Contractor, and building, equipment or structure to which the drawing applies, and shall be suitably numbered. Each shipment of Drawings shall be accompanied by a letter of transmittal giving a list of the drawing numbers and the names mentioned above. After review, two
Drawings will be returned to the Contractor. If Contractor wishes extra copies to be returned, he shall submit additional copies.

- f. Only Drawings which have been checked and corrected by the fabricator should be submitted to Contractor by his subcontractors and vendors. Prior to submitting Drawings to Engineer, Contractor shall check thoroughly all such Drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All Drawings which are correct shall be marked with the date, checker's name, and indication of Contractor's approval, and then shall be submitted to Engineer; other Drawings shall be returned for correction.
- g. Should Contractor submit for approval equipment that requires modifications to the structures, piping, layout, etc., detailed on the Drawings, Contractor shall also submit for approval details of the proposed modifications. If such equipment and modifications are approved, Contractor, at no additional cost to Owner, shall do all work necessary to make such modifications.

Modify paragraph 6.17.A.2.a to read thus:

b. Submit number of required Samples specified in the Specifications.

Add the following paragraphs immediately after paragraph 6.17.A.2.b:

- c. Contractor shall submit samples of materials for such special tests as the Engineer deems necessary to demonstrate that they conform to the Specifications. Such samples shall be furnished, packed, and shipped by Contractor.
- d. All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the date cast, the name of the Project, and location for which the material is intend and the name of the contractor submitting the sample. To insure consideration of samples, Contractor shall notify Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. The letter of notification shall be sent separate from and should not be enclosed with the samples.
- e. Only Drawings which have been checked and corrected by the fabricator should be submitted to Contractor by his subcontractors and vendors. Prior to submitting Drawings to Engineer, Contractor shall check thoroughly all such Drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in

all respects. All Drawings which are correct shall be marked with the date, checker's name, and indication of Contractor's approval, and then shall be submitted to Engineer; other Drawings shall be returned for correction.

g. Should Contractor submit for approval equipment that requires modifications to the structures, piping, layout, etc., detailed on the Drawings, Contractor shall also submit for approval details of the proposed modifications. If such equipment and modifications are approved, Contractor, at no additional cost to Owner, shall do all work necessary to make such modifications.

Modify paragraph 6.17.C.3 to read thus:

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation otherwise Contractor will not be relieved of the responsibility of executing the Work in accordance with the Contract Documents, even though such Shop Drawings or Samples have been otherwise reviewed.

Add the following paragraphs immediately after paragraph 6.17.C.3:

- 4. Contractor shall submit all Shop Drawings and Samples sufficiently in advance of construction requirements to allow ample time for checking, correcting, re-submitting and re-checking and to avoid any delay in progress of the Work.
- 5. Shop Drawings and Sample submittals not conforming to requirements of this Paragraph 6.17C and Specification Section 01340 will be returned to Contractor without action for re-submittal and the resulting delay shall be entirely the responsibility of Contractor.

Add the following paragraphs immediately after paragraph 6.17.D.3:

- 4. Engineer's review of Shop Drawings and Samples, Standard Specifications and descriptive literature submitted by the Contractor will be only for general conformance with the design concept, except as otherwise provided, and shall not be construed as:
 - a. Permitting any departure from the Contract requirements;
 - b. Relieving Contractor of the responsibility for any error in details, dimensions or otherwise that may exist in such submittals; or
 - c. Constituting a blanket approval of dimensions, quantities or details of the material or equipment shown; or

d. Approving departures from additional details or instructions previously furnished by Engineer. Such check or review shall not relieve Contractor of the full responsibility of meeting all of the requirements of the Contract Documents.

SC-6.20 *Indemnification*

Delete the word "negligent" from the final sentence of paragraph 6.20.A.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

SC-8.05 Lands and Easements; Reports and Tests

Modify paragraph 8.05.A to read thus:

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-9.03 *Project Representative*

Modify paragraph 9.03.A to read thus:

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Paragraph 9.03B, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

Add the following paragraph immediately after paragraph 9.03.A:

B. Engineer's Resident Project Representative shall not authorize any deviation from the Contract Documents or substitutions of materials or equipment.

SC-9.05 *Rejecting Defective Work*

Add the following paragraph immediately after 9.05.A:

B. The acceptance at any time of materials or equipment by or on behalf of Owner shall not be a bar to future rejection if they are subsequently found to be defective, inferior in quality, or not equal to the material or equipment specified, or are not as represented to Engineer or Owner.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

SC-10.01 *Authorized Changes in the Work*

Add the following paragraph immediately after 10.01.A:

B. Change Proposal Request: When Owner requests Contractor to present a proposal to accomplish a change in the Work, the request shall be made in the form of a Change Proposal Request (CPR) prepared by Engineer. The CPR will describe the change and request Contractor to propose a cost and Contract Price and/or change to the Contract Time. Contractor will propose cost and/or time changes, if any, sign the CPR and return it to the Engineer. If requested by Owner or Engineer, Contractor shall provide an itemized breakdown of the cost of the change. Engineer will make recommendations to Owner concerning acceptance of the CPR. IF the CPR is approved by Owner, the CPR will be incorporated in a Change Order. Contractor is not authorized to proceed with a change contained in a CPR until the Change Order is properly signed and issued.

ARTICLE 11 – COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

SC-11.02 Allowances

Add the following paragraph immediately after paragraph 11.02.D:

- E. Owner Caused Delay Allowances
 - 1. The Contractor shall allow for and anticipate up to a 25-day delay caused by the Owner. Contract time shall be adjusted for any Owner caused delay of work that is on the critical path of the Project's schedule. However, no claim for a change in contract price for Owner caused delays that are less than or equal to the 25-days will be allowed.

SC-11.03 Unit Price Work

Modify paragraph 11.03.C to read thus:

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item. Work described in the Contract Documents, or reasonably inferred as required for a functionally complete installation, but not identified in the listing of unit price items shall be considered incidental to unit price work listed and the cost of incidental work included as a part of the unit price.

Delete paragraph 11.03.D.1 in its entirety and insert the following in its place:

1. If the total cost of a particular item of Unit Price Work amounts to 10% or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25% from the estimated quantity of such item indicated in the Agreement; and

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

SC 12.01 Change of Contract Price

Modify paragraph 12.01.B.2 to read thus:

- 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2), and shall include the cost of any secondary impacts that are foreseeable at the time of pricing the cost of extra Work; or
- SC 12.02 *Change of Contract Time* Add the following paragraph immediately after 12.02.B:
 - C. No extension of the Contract Time will be allowed for additional Work or for claimed delay unless the additional Work contemplated or claimed delay is shown to be on the critical path of the Project's schedule of construction or Contractor can show by Critical Path Method analysis how the additional Work or claimed delay adversely affects the critical path.

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

SC 13.03 Tests and Inspections

Add a new paragraph after paragraph 13.03.B.3:

4. Owner will provide materials testing at the discretion of Engineer, at no charge to Contractor. Testing shall include, but not be limited to, soil, aggregate base, asphalt and concrete. The number of tests performed will be at the discretion of Engineer. If any tests fail, Contractor shall remove and replace the defective work in accordance with the Contract Documents. Cost for retesting shall be paid by Contractor. Owner will provide materials testing on Mondays through Fridays during the standard hours of 8:00 a.m. to 5:00 p.m. Costs for materials testing outside of Mondays through Fridays during the hours of 8:00 a.m. to 5:00 p.m. shall be paid by Contractor. All outstanding charges for retesting and testing outside of standard hours shall be deducted from Contractor's final payment, including appropriate interest which may have accrued.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

SC 14.04 Substantial Completion

Add a new paragraph immediately after paragraph 14.04.B:

- C. If portions of the Work have been determined not to be at a point of Substantial Completion and require re-inspection or retesting by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner who will reimburse Engineer. Owner may offset said monies by deducting that actual amount from payments due to Contractor.
- SC 14.09 *Waiver of Claims*

Modify paragraph 14.09.A.2 to read thus:

2. a waiver of all Claims by Contractor against Owner and/or Engineer other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner and/or Engineer in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

SC 15.02 Owner May Terminate for Cause

Delete paragraph 15.02.B in its entirety and replace with the following paragraphs:

- B. If one or more of the events identified in Paragraph 15.02. A occur, Owner will provide written notice to Contractor and Surety to arrange a conference with Contractor and Surety to address Contractor's failure to perform the Work. Conference shall be held not later than 15 days, after receipt of notice.
 - 1. If the Owner, the Contractor, and the Surety do not agree to allow the Contractor to proceed to perform the Construction Contract, the Owner may, to the extent permitted by laws and regulations, declare a Contractor default and formally terminate the Contractor's right to complete the Contract. Contractor Default shall not be declared earlier than 20 days after then Contractor and Surety have received notice of conference to address Contractor's failure to perform the Work.
 - 2. If Contractor's services are terminated, Surety shall be obligated to take over and perform the Work. If Surety does not commence performance thereof within 15 consecutive calendar days after date of an additional written notice demanding Surety's performance of its obligations, then Owner, without process or action at law, may take over any portion of the Work and complete it as described below;
 - 3. If Owner completes the Work, Owner may exclude Contractor and Surety from the site and take possession of the Work and of all tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by Contractor and Surety (without liability to Contractor and Surety for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere;
 - 4. Neither Owner, Engineer, nor any of their respective consultants, agents, officers, directors or employees shall be in any way liable or accountable to Contractor and Surety for the method by which the completion of the said Work, or any portion thereof, may be accomplished or for the price paid therefor;
 - 5. Owner, notwithstanding the method used in completing the Contract, shall not forfeit the right to recover damages from Contractor or Surety for Contractor's failure to timely complete the entire Contract. Contractor shall not be entitled to any claim for damages on account of the method used by Owner in completing the Contract; and
 - 6. Maintenance of the Work shall continue to be Contractor's and Surety's responsibilities as provided for in the bond requirements of

the Contract Documents or any special guarantees provided for under the Contract Documents or any other obligations otherwise prescribed by law.

SC. 15.04 Contractor May Stop Work or Terminate

Delete the word "or" and replace it with "nor" in the last sentence of paragraph 15.04.B.

ARTICLE 16 – DISPUTE RESOLUTION

SC 16.01 *Methods and Procedures*

Add the following paragraphs after paragraph 16.01:

16.02 Mediation

A. Owner and Contractor agree that they shall submit any and all unsettled claims or counterclaims, disputes, or other matters in questions between them arising out of or relating to the Contract Documents or the breach thereof to mediation prior to either of them initiating against the other a demand for arbitration pursuant to paragraph SC-16.03, unless delay in initiating arbitration would irrevocably prejudice one of the parties. The 30 day time limit within which to file a demand for arbitration as provided in paragraphs SC-16.03.B and 16.03.C shall be suspended with respect to a dispute submitted to mediation within that time limit and shall remain suspended until ten days after the termination of the mediation. The mediator of any dispute submitted to mediation under this agreement shall not serve as arbitrator of such dispute unless otherwise agreed.

16.03 Arbitration

- A. All claims or counterclaims, disputes, or other matters in question between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.09) not resolved under the provisions of paragraph SC-16.02 will be decided by binding arbitration subject to the limitations of this paragraph SC-16.03. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.
- B. No demand for arbitration of any claim or counterclaim, dispute, or other matter that is required to be referred to Engineer initially for decision in accordance with paragraph 9.09 will be made until the earlier of: (i) the date

on which Engineer has rendered a written decision, or (ii) the 31st day after the parties have presented their final evidence to Engineer if a written decision has not been rendered by Engineer before that date. No demand for arbitration of any such claim or counterclaim, dispute, or other matter will be made later than 30 days after the date on which Engineer has rendered a written decision in respect thereof in accordance with paragraph 10.05; and the failure to demand arbitration within said 30 day period will result in Engineer's decision being final and binding upon Owner and Contractor. If Engineer renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned.

- C. Notice of the demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the 30 day period specified in paragraph SC-16.03.B, and in all other cases within a reasonable time after the claim or counterclaim, dispute, or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim or other dispute or matter in question would be barred by the applicable statute of limitations.
- D. Except as provided in paragraph SC-16.03.E, no arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
 - 1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and
 - 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings; and
 - 3. the written consent of the other individual or entity sought to be included and of Owner and Contractor has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.
- E. Notwithstanding paragraph SC-16.03.D, if a claim or counterclaim, dispute, or other matter in question between Owner and Contractor involves the work

of a subcontractor, either Owner or Contractor may join such subcontractor as a party to the arbitration between Owner and Contractor hereunder. Contractor shall include in all subcontracts required by paragraph 6.06.G a specific provision whereby the subcontractor consents to being joined in an arbitration between Owner and Contractor involving the work of such subcontractor. Nothing in this paragraph SC-16.03.E nor in the provisions of such subcontract consenting to joinder shall create any claim, right, or cause of action in favor of subcontractor and against Owner, Engineer, or Engineer's consultants that does not otherwise exist.

F. The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal.

ARTICLE 18 – STATE AND FEDERAL REQUIREMENTS

- 18.01 Funding
 - A. This Contract is expected to be funded through the California State Water Resources Control Board Division of Drinking Water (DDW) with funds provided by the California Drinking Water State Revolving Fund (DWSRF). Neither DDW, nor any of its departments, entities, or employees is a party to this Contract.
- 18.02 Contract Approval
 - A. Concurrence by DDW in the award of the Contract is required before the Contract is effective.
- 18.03 Conflict of Interest
 - A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.
- 18.04 Gratuities
 - A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or

otherwise) to any official, employee, or agent of Owner or DDW in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in Paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

18.11 *Restrictions on Lobbying*

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable State regulations, and Contractor shall also comply with all requirements of Title 40 CFR Part 34 "New Lobbying Requirements". This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to Owner. Necessary certification and disclosure forms shall be provided by Owner.

18.12 Environmental Requirements

In addition to complying with other environmental requirements and constraints described elsewhere in the Contract Documents, Contractor shall comply with the following environmental constraints:

- A. Wetlands- When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.
- B. Floodplains- When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey maps.

- C. Historic Preservation- Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Engineer, Owner, and the State Water Resources Control Board. Construction shall be temporarily halted pending the notification process and further direction issued by Engineer after consultation with the State Historic Preservation Officer (SHPO).
- D. Endangered Species- Contractor shall comply with the Endangered Species Act, which provides for protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Engineer, Owner, and the State Water Resources Control Board. Construction shall be temporarily halted pending notification process and further directions issued by Engineer after consultation with the U.S. Fish and Wildlife Service.

18.14 Davis Bacon Wage Rates

A. This contract requires compliance with the Davis-Bacon and Related Acts and adherence to the current U.S. Department of Labor Wage Decision ("Wage Decision"). Contractor must comply with the minimum rates for wages for laborers and mechanics as determined by the Secretary of Labor in accordance with the provisions of the Davis-Bacon and Related Acts. The Contract provisions and related matters set forth in 29 CFR Part 5- Section 5.5 are hereby made a part of this Contract. Attention is called to the fact that not less than the minimum salaries and wages set forth in the Contract Documents must be paid on this Project.

The Wage Decision, including modification, must be posted by Contractor on the Site. Contractor shall also maintain posted on site a copy of the Davis-Bacon and Related Acts poster (form WH-1321). The poster is available at the following website:

www.dol.gov/esa/WHD/regs/compliance/posters/davis.htm

The Engineer will review all certified payrolls or timesheets submitted to Engineer for compliance with the labor standards provisions. Copies of these payrolls will then be submitted to DDW on a monthly basis along with the Application for Payment.

18.15 Non-Discrimination

- A. During the performance of this Contract, Contractors and its Subcontractors shall not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, sexual orientation, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), age (over 40), marital status, and denial of family care leave.
- B. Contractor and its Subcontractors shall insure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment.

- C. Contractors and Subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code §12990 (a-f) et seq.) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 11000 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code Section 12990 (a-f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this Contract by reference and made a part hereof as if set forth in full.
- D. Contractor and Subcontractors shall give written notice of their obligations under this paragraph to labor organizations with which they have a collective bargaining or other agreement.
- E. Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under this Contract.

18.16 Debarment

- A. Contractor shall not subcontract with any party who is debarred or suspended or otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549, "Debarment and Suspension".
- B. Contractor shall not subcontract with any individual or organization on the United States Environmental Protection Agency's List of Violating Facilities. (40 CFR, Part 31.35, Gov. Code 4477).

18.17 Prompt Payment to Subcontractors

A. Contractor shall pay Subcontractors for satisfactory performance no more than 30 days from the Contractor's receipt of payment from the Owner, as required by 40 CFR 33.302(a).

18.18 American Iron and Steel

A. The Contractor acknowledges to and for the benefit of the Owner and the State of California (the "State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is

approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

18.19 Disadvantaged Business Enterprise (DBE) Requirements

A. Contractor shall and is required to comply with the six good faith efforts (GFE) identified by the CA SWRCB Division of Financial Assistance to ensure that DBEs, as described in 40 CFR 33.204-33.205 or certified by EPA, have the opportunity to compete for financial assistance dollars through CA DWSRF funding. Contractor shall provide evidence of the six GFEs including a list of all noticed bidders solicited for subcontracted work, practical outreach efforts to DBEs, posting of solicitation and bids, and use of the SBA and/or Minority Business Development Agency (MBDA) of the US Department of Commerce.

ARTICLE 19 – ADDITIONAL CALIFORNIA STATE REQUIREMENTS

- 19.01 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. Section 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor, without further acknowledgment by the parties.
- 19.02 Unless otherwise indicated in the Contract Documents, all utility lines, conduits, wires, or structures shall be maintained by Contractor and shall not be disturbed, disconnected, or damaged by Contractor during the progress of the Work, provided, that should Contractor in the performance of the Work disturb, disconnect, or damage any of the above, all expenses arising from such disturbance or in the replacement or repair thereof shall be borne by Contractor. However, Contractor may be entitled to compensation in accordance with Section 4215 of the California Government Code if any existing main or trunkline utility

facilities located on the Site are not indicated in the Contract Documents with reasonable accuracy.

- 19.03 Notwithstanding any other provision of law, every contract involving the expenditure of public funds in excess of Ten thousand dollars (\$10,000) entered into by any state agency, board, commission, or department or by any other public entity, including a city, county, city and county, or district, shall be subject to the examination and audit of State auditor, at the request of the public entity or as part of any audit of the public entity, for a period of three (3) years after final payment under the Contract.
- 19.04 Contractor acknowledges that, from time to time during the term of this Agreement, State may receive further guidance from the United States Environmental Protection Agency ("USEPA") which may require additional information/reporting from Supplier. Upon such guidance from USEPA, State will notify Contractor in writing. Upon notification, Contractor agrees to provide the requested information/reports to State in the time period specified. Contractor's failure to provide the requested information/report in the time specified, may be deemed by State to be a material breach of this agreement and may be treated as a default under Article A-27.
- 19.05 Contractor shall maintain current DUNS registration(s) in the Dun & Bradstreet database (http://fedgov.dnb.com/webform) at all times during which they have active federal awards funded with Drinking Water State Revolving Fund funds.

SC Exhibit



TO:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, D.C. 20460

MAR 2 0 2014

OFFICE OF WATER

MEMORANDUM

- SUBJECT: Implementation of American Iron and Steel provisions of P.L. 113-76, Consolidated Appropriations Act, 2014
- FROM: For Andrew D. Sawyers, Director Office of Wastewater Management (4201M)

Peter C. Grevatt, Director Office of Ground Water and Drinking Water (4601M)

Water Management Division Directors Regions I - X

P.L. 113-76, Consolidated Appropriations Act, 2014 (Act), includes an "American Iron and Steel (AIS)" requirement in section 436 that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State Revolving Loan Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system or treatment works if the project is funded through an assistance agreement executed beginning January 17, 2014 (enactment of the Act), through the end of Federal Fiscal Year 2014.

Section 436 also sets forth certain circumstances under which EPA may waive the AIS requirement. Furthermore, the Act specifically exempts projects where engineering plans and specifications were approved by a State agency prior to January 17, 2014.

The approach described below explains how EPA will implement the AIS requirement. The first section is in the form of questions and answers that address the types of projects that must comply with the AIS requirement, the types of products covered by the AIS requirement, and compliance. The second section is a step-by-step process for requesting waivers and the circumstances under which waivers may be granted.

Implementation

The Act states:

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the "Administrator") finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

The following questions and answers provide guidance for implementing and complying with the AIS requirements:

Project Coverage

1) What classes of projects are covered by the AIS requirement?

All treatment works projects funded by a CWSRF assistance agreement, and all public water system projects funded by a DWSRF assistance agreement, from the date of enactment through the end of Federal Fiscal Year 2014, are covered. The AIS requirements apply to the entirety of the project, no matter when construction begins or ends. Additionally, the AIS requirements apply to all parts of the project, no matter the source of funding.

2) Does the AIS requirement apply to nonpoint source projects or national estuary projects?

No. Congress did not include an AIS requirement for nonpoint source and national estuary projects unless the project can also be classified as a 'treatment works' as defined by section 212 of the Clean Water Act.

3) Are any projects for the construction, alteration, maintenance, or repair of a public water system or treatment works excluded from the AIS requirement?

Any project, whether a treatment works project or a public water system project, for which engineering plans and specifications were approved by the responsible state agency prior to January 17, 2014, is excluded from the AIS requirements.

4) What if the project does not have approved engineering plans and specifications but has signed an assistance agreement with a CWSRF or DWSRF program prior to January 17, 2014?

The AIS requirements do not apply to any project for which an assistance agreement was signed prior to January 17, 2014.

5) What if the project does not have approved engineering plans and specifications, but bids were advertised prior to January 17, 2014 and an assistance agreement was signed after January 17, 2014?

If the project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the approval date for purposes of the exemption in section 436(f).

6) What if the assistance agreement that was signed prior to January 17, 2014, only funded a part of the overall project, where the remainder of the project will be funded later with another SRF loan?

If the original assistance agreement funded any construction of the project, the date of the original assistance agreement counts for purposes of the exemption. If the original assistance agreement was only for planning and design, the date of that assistance agreement will count for purposes of the exemption only if there is a written commitment or expectation on the part of the assistance recipient to fund the remainder of the project with SRF funds.

7) What if the assistance agreement that was signed prior to January 17, 2014, funded the first phase of a multi-phase project, where the remaining phases will be funded by SRF assistance in the future?

In such a case, the phases of the project will be considered a single project if all construction necessary to complete the building or work, regardless of the number of contracts or assistance agreements involved, are closely related in purpose, time and place. However, there are many situations in which major construction activities are clearly undertaken in phases that are distinct in purpose, time, or place. In the case of distinct phases, projects with engineering plans and specifications approval or assistance agreements signed prior to January 17, 2014 would be excluded from AIS requirements while those approved/signed on January 17, 2014, or later would be covered by the AIS requirements.

8) What if a project has split funding from a non-SRF source?

Many States intend to fund projects with "split" funding, from the SRF program and from State or other programs. Based on the Act language in section 436, which requires that American iron and steel products be used in any project for the construction, alteration, maintenance, or repair of a public water system or treatment works receiving SRF funding between and including January 17, 2014 and September 30, 2014, any project that is funded in whole or in part with such funds must comply with the AIS requirement. A "project" consists of all construction necessary to complete the building or work regardless of the number of contracts or assistance agreements involved so long as all contracts and assistance agreements awarded are closely related in purpose, time and place. This precludes the intentional splitting of SRF projects into separate and smaller contracts or assistance agreements to avoid AIS coverage on some portion of a larger

project, particularly where the activities are integrally and proximately related to the whole. However, there are many situations in which major construction activities are clearly undertaken in separate phases that are distinct in purpose, time, or place, in which case, separate contracts or assistance agreement for SRF and State or other funding would carry separate requirements.

9) What about refinancing?

If a project began construction, financed from a non-SRF source, prior to January 17, 2014, but is refinanced through an SRF assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, AIS requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a responsible state agency prior to January 17, 2014. There is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to January 17, 2014.

10) Do the AIS requirements apply to any other EPA programs, besides the SRF program, such as the Tribal Set-aside grants or grants to the Territories and DC?

No, the AIS requirement only applies to funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12)

Covered Iron and Steel Products

11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

Lined or unlined pipes or fittings; Manhole Covers; Municipal Castings (defined in more detail below); Hydrants; Tanks; Flanges; Pipe clamps and restraints; Valves; Structural steel (defined in more detail below); Reinforced precast concrete; and Construction materials (defined in more detail below).

12) What does the term 'primarily iron or steel' mean?

'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem, coupling, valve, seals, etc). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

16) What does 'produced in the United States' mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

17) Are the raw materials used in the production of iron or steel required to come from US sources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

18) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

19) What is the definition of 'municipal castings'?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

> Access Hatches; Ballast Screen; Benches (Iron or Steel); Bollards; Cast Bases; Cast Iron Hinged Hatches, Square and Rectangular; Cast Iron Riser Rings; Catch Basin Inlet; Cleanout/Monument Boxes: Construction Covers and Frames; Curb and Corner Guards; Curb Openings; Detectable Warning Plates; Downspout Shoes (Boot, Inlet); Drainage Grates, Frames and Curb Inlets; Inlets; Junction Boxes; Lampposts; Manhole Covers, Rings and Frames, Risers;

Meter Boxes; Service Boxes; Steel Hinged Hatches, Square and Rectangular; Steel Riser Rings; Trash receptacles; Tree Grates; Tree Guards; Trench Grates; and Valve Boxes, Covers and Risers.

20) What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

21) What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

22) What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and

data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

Compliance

25) How should an assistance recipient document compliance with the AIS requirement?

In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement, all the way down to the purchase agreements. Sample language for assistance agreements and contracts can be found in Appendix 3 and 4.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure that producers adhere to the AIS requirement and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer,

processor, etc) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached, as Appendix 5, are sample certifications. These certifications should be collected and maintained by assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it may not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

26) How should a State ensure assistance recipients are complying with the AIS requirement?

In order to ensure compliance with the AIS requirement, States SRF programs must include specific AIS contract language in the assistance agreement. Sample language for assistance agreements can be found in Appendix 3.

States should also, as a best practice, conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

27) What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?

If a potentially non-compliant product is identified, the State should notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions: request a waiver where appropriate; require the removal of the non-domestic item; or withhold payment for all or part of the project. Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act, the Safe Drinking Water Act, and 40 CFR part 31 grant regulations, in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraud, waste, abuse, or any violation of the law is suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1888-546-8740 or OIG_Hotline@epa.gov. More information can be found at this website: http://www.epa.gov/oig/hotline.htm.

28) How do international trade agreements affect the implementation of the AIS requirements?

The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described below will allow States, on behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Only waiver requests received from states will be considered. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

Definitions

The following terms are critical to the interpretation and implementation of the AIS requirements and apply to the process described in this memorandum:

<u>Reasonably Available Quantity</u>: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

<u>Satisfactory Quality</u>: The quality of iron or steel products, as specified in the project plans and designs.

<u>Assistance Recipient:</u> A borrower or grantee that receives funding from a State CWSRF or DWSRF program.

Step-By-Step Waiver Process

Application by Assistance Recipient

Each local entity that receives SRF water infrastructure financial assistance is required by section 436 of the Act to use American made iron and steel products in the construction of its project. However, the recipient may request a waiver. Until a waiver is granted by EPA, the AIS requirement stands, except as noted above with respect to municipalities covered by international agreements.

The waiver process begins with the SRF assistance recipient. In order to fulfill the AIS requirement, the assistance recipient must in good faith design the project (where applicable) and solicit bids for construction with American made iron and steel products. It is essential that the assistance recipient include the AIS terms in any request for proposals or solicitations for bids, and in all contracts (see Appendix 3 for sample construction contract language). The assistance recipient may receive a waiver at any point before, during, or after the bid process, if one or more of three conditions is met:

- 1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
- 2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
- 3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Proper and sufficient documentation must be provided by the assistance recipient. A checklist detailing the types of information required for a waiver to be processed is attached as Appendix 1.

Additionally, it is strongly encouraged that assistance recipients hold pre-bid conferences with potential bidders. A pre-bid conference can help to identify iron and steel products needed to complete the project as described in the plans and specifications that may not be available from domestic sources. It may also identify the need to seek a waiver prior to bid, and can help inform the recipient on compliance options.

In order to apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) to the State SRF program. It is strongly recommended that the State designate a single person for all AIS communications. The State SRF designee will review the application for the waiver and determine whether the necessary information has been included. Once the waiver application is complete, the State designee will forward the application to either of two email addresses. For CWSRF waiver requests, please send the application to: cwsrfwaiver@epa.gov. For DWSRF waiver requests, please send the application to: dwsrfwaiver@epa.gov.

Evaluation by EPA

After receiving an application for waiver of the AIS requirements, EPA Headquarters will publish the request on its website for 15 days and receive informal comment. EPA Headquarters will then use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

In the event that EPA finds that adequate documentation and justification has been submitted, the Administrator may grant a waiver to the assistance recipient. EPA will notify the State designee that a waiver request has been approved or denied as soon as such a decision has been made. Granting such a waiver is a three-step process:

1. Posting – After receiving an application for a waiver, EPA is required to publish the application and all material submitted with the application on EPA's website for 15 days. During that period, the public will have the opportunity to review the request and provide informal comment to EPA. The website can be found at: <u>http://water.epa.gov/grants_funding/aisrequirement.cfm</u>

2. Evaluation – After receiving an application for waiver of the AIS requirements, EPA Headquarters will use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

3. Signature of waiver approval by the Administrator or another agency official with delegated authority – As soon as the waiver is signed and dated, EPA will notify the State SRF program, and post the signed waiver on our website. The assistance recipient should keep a copy of the signed waiver in its project files.

Public Interest Waivers

EPA has the authority to issue public interest waivers. Evaluation of a public interest waiver request may be more complicated than that of other waiver requests so they may take more time than other waiver requests for a decision to be made. An example of a public interest waiver that might be issued could be for a community that has standardized on a particular type or manufacturer of a valve because of its performance to meet their specifications. Switching to an alternative valve may require staff to be trained on the new equipment and additional spare parts would need to be purchased and stocked, existing valves may need to be unnecessarily replaced, and portions of the system may need to be redesigned. Therefore, requiring the community to install an alternative valve would be inconsistent with public interest.

EPA also has the authority to issue a public interest waiver that covers categories of products that might apply to all projects.

EPA reserves the right to issue national waivers that may apply to particular classes of assistance recipients, particular classes of projects, or particular categories of iron or steel products. EPA may develop national or (US geographic) regional categorical waivers through the identification of similar circumstances in the detailed justifications presented to EPA in a waiver request or requests. EPA may issue a national waiver based on policy decisions regarding the public's interest or a determination that a particular item is not produced domestically in reasonably available quantities or of a sufficient quality. In such cases, EPA may determine it is necessary to issue a national waiver.

If you have any questions concerning the contents of this memorandum, you may contact us, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 or Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

Attachments

Appendix 1: Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that States review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
General		
Waiver request includes the following information:		
 Description of the foreign and domestic construction materials 		
- Unit of measure		
– Quantity		
- Price		
 Time of delivery or availability 		
 Location of the construction project 		
 Name and address of the proposed supplier 		
 A detailed justification for the use of foreign construction materials 		
• Waiver request was submitted according to the instructions in the memorandum		
• Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in		
requests for proposals, contracts, and communications with the prime contractor		
Cost Waiver Requests		
Waiver request includes the following information:		
 Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and 		
steel products		
 Relevant excerpts from the bid documents used by the contractors to complete the comparison 		
- Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the		
process for identifying suppliers and a list of contacted suppliers		
Availability Waiver Requests		
• Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of		
the materials for which the waiver is requested:		
- Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery		
date for construction materials		
 Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process 		
for identifying suppliers and a list of contacted suppliers.		
 Project schedule 		
 Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials 		
• Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought		
• Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?		

Appendix 2: HQ Review Checklist for Waiver Request

Instructions: To be completed by EPA. Review all waiver requests using the questions in the checklist, and mark the appropriate box as Yes, No or N/A. Marks that fall inside the shaded boxes may be grounds for denying the waiver. If none of your review markings fall into a shaded box, the waiver is eligible for approval if it indicates that one or more of the following conditions applies to the domestic product for which the waiver is sought:

- 1. The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.
- 2. The inclusion of iron and/or steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Review Items	Yes	No	N/A	Comments
Cost Waiver Requests				
• Does the waiver request include the following information?				
- Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and				
steel products				
 Relevant excerpts from the bid documents used by the contractors to complete the comparison 				
- A sufficient number of bid documents or pricing information from domestic sources to constitute a reasonable survey of				
the market				
• Does the Total Domestic Project exceed the Total Foreign Project Cost by more than 25%?				
Availability Waiver Requests				
• Does the waiver request include supporting documentation sufficient to show the availability, quantity, and/or quality of the				
iron and/or steel product for which the waiver is requested?				
 Supplier information or other documentation indicating availability/delivery date for materials 				
 Project schedule 				
- Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of materials				
• Does supporting documentation provide sufficient evidence that the contractors made a reasonable effort to locate domestic				
suppliers of materials, such as a description of the process for identifying suppliers and a list of contacted suppliers?				
• Based on the materials delivery/availability date indicated in the supporting documentation, will the materials be unavailable				
when they are needed according to the project schedule? (By item, list schedule date and domestic delivery quote date or other				
relevant information)				
• Is EPA aware of any other evidence indicating the non-availability of the materials for which the waiver is requested?				
Examples include:				
 Multiple waiver requests for the materials described in this waiver request, for comparable projects in the same State 				
 Multiple waiver requests for the materials described in this waiver request, for comparable projects in other States 				
 Correspondence with construction trade associations indicating the non-availability of the materials 				
• Are the available domestic materials indicated in the bid documents of inadequate quality compared those required by the				
project plans, specifications, and/or permits?				

Appendix 3: Example Loan Agreement Language

ALL ASSISTANCE AGREEMENT MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN SRF ASSISTANCE AGREEMENTS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE LAW:

Comply with all federal requirements applicable to the Loan (including those imposed by the 2014 Appropriations Act and related SRF Policy Guidelines) which the Participant understands includes, among other, requirements that all of the iron and steel products used in the Project are to be produced in the United States ("American Iron and Steel Requirement") unless (i) the Participant has requested and obtained a waiver from the Agency pertaining to the Project or (ii) the Finance Authority has otherwise advised the Participant in writing that the American Iron and Steel Requirement is not applicable to the Project.

Comply with all record keeping and reporting requirements under the Clean Water Act/Safe Drinking Water Act, including any reports required by a Federal agency or the Finance Authority such as performance indicators of program deliverables, information on costs and project progress. The Participant understands that (i) each contract and subcontract related to the Project is subject to audit by appropriate federal and state entities and (ii) failure to comply with the Clean Water Act/Safe Drinking Water Act and this Agreement may be a default hereunder that results in a repayment of the Loan in advance of the maturity of the Bonds and/or other remedial actions.

Appendix 4: Sample Construction Contract Language

ALL CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN ALL CONTRACTS IN PROJECTS THAT USE SRF FUNDS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE OR LOCAL LAW:

The Contractor acknowledges to and for the benefit of the City of ("Purchaser") and the (the "State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Appendix 5: Sample Certifications

The following information is provided as a sample letter of <u>step</u> certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

- 1. Xxxx
- 2. Xxxx
- 3. Xxxx

Such process took place at the following location:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

- 1. Xxxx
- 2. Xxxx
- 3. Xxxx

Such process took place at the following location:

Signed by company representative

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

The Recipient shall have the primary responsibility to maintain payroll records as described in Section 3(ii)(A), below and for compliance as described in Section 5.

Requirements Under The Consolidated Appropriations Act, 2014 (P.L. 113-76)

For Recipients That Are Governmental Entities:

If a Recipient has questions regarding when David Bacon (DB) applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State Water Board.

The Recipient may also obtain additional guidance from DOL's web site at http://www.dol.gov/whd/

1. Applicability of the Davis- Bacon (DB) prevailing wage requirements.

Under the FY 2014 Consolidated Appropriation Act, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If the Recipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the Recipient must discuss the situation with the State Water Board before authorizing work on that site.

- 2. Obtaining Wage Determinations.
 - (a) Recipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.
 - (i) While the solicitation remains open, the Recipient shall monitor <u>www.wdol.gov</u> weekly to ensure that the wage determination contained in the solicitation remains current. The Recipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the Recipients may request a finding from the State Water Board that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State Water Board will provide a report of its findings to the Recipient.
 - (ii) If the Recipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State Water Board, at the request of the Recipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The Recipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.
 - (b) If the Recipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the Recipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.
- (c) Recipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.
- (d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a Recipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the Recipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the Recipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The Recipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.
- 3. Contract and Subcontract provisions.
 - (a) The Recipient shall insure that the Recipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2014 Consolidated Appropriations Act, the following clauses:
 - (1) Minimum wages.
 - (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)). the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. Recipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov.

- (ii)(A) The Recipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
 - (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (2) The classification is utilized in the area by the construction industry; and
 - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
 - (B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the Recipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.
 - (C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the Recipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
 - (D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

- (2) Withholding. The Recipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
- (3) Payrolls and basic records.
 - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.
 - (ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the Recipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the Recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Recipient(s) for transmission to the State or EPA

if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the Recipient(s).

- (B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - (1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
 - (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
 - (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.
- (D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.
- (iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.
- (4) Apprentices and trainees--
 - (i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary

employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above. shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the iourneyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.
- (5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
- (6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
- (7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.
- (10) Certification of eligibility.
 - (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
 - (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.
- 4. Contract Provision for Contracts in Excess of \$100,000.
 - (a) Contract Work Hours and Safety Standards Act. The Recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.
 - (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such

laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.
- (3) Withholding for unpaid wages and liquidated damages. The Recipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.
- (4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.
- (b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Recipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Recipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the USEPA, the Department of Labor, and the State Water Board, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.
- 5. Compliance Verification
 - (a) The Recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The Recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

- (b) The Recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.
- (c) The Recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The Recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the Recipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the Recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.
- (d) The Recipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.
- (e) Recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <u>http://www.dol.gov/contacts/whd/america2.htm</u>.

SC Exhibit

General Decision Number: CA170031 01/20/2017 CA31

Superseded General Decision Number: CA20160031

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

Counties: Inyo, Kern and Mono Counties in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS.

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification	Number	Publication	Date
0		01/06/2017	
1		01/20/2017	

ASBE0005-001 07/04/2016

INYO AND KERN

Rates Fringes Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain 17.31 walls).....\$ 26.15 Insulator/asbestos worker (Includes the application of all insulating materials, protective coverings, coatings & finishes to all types of mechanical systems)....\$ 38.37 20.13 _____ ASBE0005-005 07/04/2016 INYO AND KERN Rates Fringes

Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)....\$ 18.38 10.82 _____ _____ ASBE0016-003 08/01/2016 MONO Rates Fringes Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all 23.10 types of mechanical systems)....\$ 46.96 _____ _____ BOIL0092-005 10/01/2012 INYO AND KERN Rates Fringes BOILERMAKER.....\$ 41.17 28.27 _____ BOIL0549-003 01/01/2013 MONO COUNTY Rates Fringes BOILERMAKER.....\$ 38.37 31.32 _____ * BRCA0004-005 05/01/2016 Rates Fringes BRICKLAYER; MARBLE SETTER.....\$ 37.94 14.53 *The wage scale for prevailing wage projects performed in Blythe, China lake, Death Valley, Fort Irwin, Twenty-Nine Palms, Needles and 1-15 corridor (Barstow to the Nevada State Line) will be Three Dollars (\$3.00) above the standard San Bernardino/Riverside County hourly wage rate _____ BRCA0018-010 09/01/2016 Rates Fringes TERRAZZO FINISHER.....\$ 28.53 12.27 TERRAZZO WORKER/SETTER.....\$ 35.57 13.14 _____

https://www.wdol.gov/wdol/scafiles/davisbacon/CA31.dvb?v=1

BRCA0018-011 06/01/2016

	Rates	Fringes
TILE LAYER	\$ 35.89	9.08
BRCA0018-012 06/01/2016		
KERN		
	Rates	Fringes
MARBLE FINISHER TILE FINISHER	\$ 29.20 \$ 24.53	12.93 11.08
CARP0409-002 07/01/2008		
	Rates	Fringes
Diver (1) Wet	\$ 663.68 \$ 331.84 \$ 323.84 \$ 299.84	9.82 9.82 9.82 9.82 9.82
Amounts in "Rates' column are p	ber day	
CARP0409-005 07/01/2015		
	Rates	Fringes
Drywall DRYWALL INSTALLER/LATHER STOCKER/SCRAPPER	\$ 40.40 \$ 10.00	15.03 7.17
CARP0409-006 07/01/2015		
	Rates	Fringes
CARPENTER (01) Carpenter, cabinet installer, insulation installer, floor worker and acoustical installer (02) Millwright (03) Piledrivermen; Derrick barge; Bridge or Dock Carpenter; Heavy	\$ 39.83 \$ 40.90	11.58 11.58
Bargeman; Scowman (04) Shingler (Commercial (05) Table Power Saw	\$ 40.53 .).\$ 36.91	11.58 11.58
Operator	\$ 36.88	11.58
Power Stapler	\$ 37.03	11.58
Shingles (Commercial) (08) Saw Filer (09) Scaffold Builder	\$ 25.84 \$ 36.87 \$ 28.55	11.58 11.58 11.58

FOOTNOTE: Work of forming in the construction of open cut sewers or storm drains, on operations in which horizontal lagging is used in conjunction with steel H-Beams driven or placed in pre-drilled holes, for that portion of a lagged trench against which concrete is poured, namely, as a substitute for back forms (which work is performed by piledrivers): \$0.13 per hour additional.

ELEC0428-001 12/01/2016

1	Rates	Fringes
CABLE SPLICER		
China Lake Naval Weaons		
Center, Edwards AFB\$	48.49	3%+19.94
Remainder of Kern County\$	41.42	3%+19.94
ELECTRICIAN		
China Lake Naval Weapons		
Center, Edwards AFB\$	44.65	3%+19.94
Remainder of Kern County\$	37.65	3%+19.94

* ELEC0428-003 12/26/2016

COMMUNICATIONS AND SYSTEMS WORK

KERN COUNTY

	Rates	Fringes
Communications System		
Installer	\$ 31.56	13.69
Technician	\$ 30.83	11.17

SCOPE OF WORK:

Installation, testing, service and maintenance of systems utilizing the transmission and/or transference of voice, sound, vision and digital for commercial, educational, security and entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call systems, radio page, school intercom and sound, burglar alarms, fire alarm (see last paragraph below) and low voltage master clock systems in commercial buildings. Communication Systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding all other data systems or multiple systems which include control function or power supply; excluding installation of raceway systems, conduit systems, line voltage work, and energy management systems. Does not cover work performed at China Lake Naval Ordnance Test Station. Fire alarm work shall be performed at the current inside wireman total cost package.

ELEC0441-004 08/29/2016

Rates

Fringes

ELECTRICIAN (TRANSPORTATION SYSTEMS, TRAFFIC SIGNALS & STREET LIGHTING) Cable Splicer/Fiber Optic Splicer.....\$ 44.29 18.13 Electrician.....\$ 42.34 18.07 Technician.....\$ 31.76 16.75

SCOPE OF WORK: Electrical work on public streets, freeways, toll-ways, etc, above or below ground. All work necessary for the installation, renovation, repair or removal of Intelligent Transportation Systems, Video Surveilance Systems (CCTV), Street Lighting and and Traffic Signal work or systems whether underground or on bridges. Includes dusk to dawn lighting installations and ramps for access to or egress from freeways, toll-ways, etc. Intelligent Transportation Systems shall include all systems and components to control, monitor, and communicate with pedestrian or vehicular traffic, included but not limited to: installation, modification, removal of all Fiber optic Video System, Fiber Optic Data Systems, Direct interconnect and Communications Systems, Microwave Data and Video Systems, Infrared and Sonic Detection Systems, Solar Power Systems, Highway Advisory Radio Systems, highway Weight and Motion Systems, etc. Any and all work required to install and maintain any specialized or newly developed systems. All cutting, fitting and bandaging of ducts, raceways, and conduits. The cleaning, rodding and installation of "fish and pull wires". The excavation, setting, leveling and grouting of precast manholes, vaults, and pull boxes including ground rods or grounding systems, rock necessary for leveling and

JOURNEYMAN TRANSPORTATION ELECTRICIAN shall perform all tasks necessary toinstall the complete transportation system. JOURNEYMAN TECHNICIAN duties shall consist of: Distribution of material at job site, manual excavation and backfill, installation of system conduits and raceways for electrical, telephone, cable television and communication systems. Pulling, terminating and splicing of traffic signal and street lighting conductors and electrical systems including interconnect, dector loop, fiber optic cable and video/data.

drainagae as well as pouring of a concrete envelope if

ELEC0477-001 06/30/2014

INYO AND MONO

needed.

	Rates	Fringes
ELECTRICIAN	\$ 47.50	3%+19.78
CABLE SPLICER: \$1.00 above Ele TUNNEL WORK: 10% above Electri	ectrician. .cian.	

ELEC1245-001 06/01/2015		
	Rates	Fringes
LINE CONSTRUCTION (1) Lineman; Cable splicer (2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution	\$ 52.85	15.53
line equipment)	\$ 42.21 \$ 32.28	14.32
(4) Powderman	\$ 47.19	14.60
HOLIDAYS: New Year's Day, M.L Independence Day, Labor Day, and day after Thanksgiving, C ELEV0018-001 01/01/2015	. King Day, M Veterans Day, hristmas Day	emorial Day, Thanksgiving Day
	Rates	Fringes
ELEVATOR MECHANIC FOOTNOTE: PAID VACATION: Employer cont rate as vacation pay credit f years of service, and 6% for PAID HOLIDAYS: New Years Dav,	\$ 49.90 ributes 8% of or employees 6 months to 5 Memorial Dav	28.38 regular hourly with more than 5 years of service. , Independence Dav.
ELEVATOR MECHANIC FOOTNOTE: PAID VACATION: Employer cont rate as vacation pay credit f years of service, and 6% for PAID HOLIDAYS: New Years Day, Labor Day, Veterans Day, Than Thanksgiving, and Christmas D ENGI0012-003 07/01/2016	\$ 49.90 ributes 8% of or employees 6 months to 5 Memorial Day ksgiving Day, ay.	28.38 regular hourly with more than 5 years of service. , Independence Day, Friday after
ELEVATOR MECHANIC FOOTNOTE: PAID VACATION: Employer cont rate as vacation pay credit f years of service, and 6% for PAID HOLIDAYS: New Years Day, Labor Day, Veterans Day, Than Thanksgiving, and Christmas D ENGI0012-003 07/01/2016	\$ 49.90 ributes 8% of or employees 6 months to 5 Memorial Day ksgiving Day, ay. Rates	28.38 regular hourly with more than 5 years of service. , Independence Day, Friday after Fringes

GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP	18 \$ 19 \$ 20 \$ 21 \$ 22 \$ 23 \$ 24 \$ 25 \$	43.73 43.84 43.96 44.13 44.23 44.34 44.46 44.63	23.35 23.35 23.35 23.35 23.35 23.35 23.35 23.35 23.35
OPERATOR:	Power Equipment		
(Cranes, Pi	lledriving &		
Hoisting) GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP GROUP	1 \$ 2 \$ 3 \$ 4 \$ 5 \$ 6 \$ 7 \$ 8 \$ 9 \$ 10 \$ 11 \$ 12 \$ 13 \$	43.20 43.98 44.27 44.41 44.63 44.74 44.86 45.03 45.20 46.20 47.20 48.20 49.20	22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15 22.15
OPERATOR:	Power Equipment	10,20	
(Tunnel Wor	rk)		
GROUP GROUP GROUP GROUP GROUP GROUP	1\$ 2\$ 3\$ 4\$ 5\$ 6\$ 7\$	41.80 42.58 42.87 43.01 43.23 43.34 43.46	23.35 23.35 23.35 23.35 23.35 23.35 23.35 23.35

PREMIUM PAY:

\$3.75 per hour shall be paid on all Power Equipment Operator work on the followng Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: \$2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter(concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Selfpropelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bendng machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self-loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: \$1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds.and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons) TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

ENGINEERS ZONES

\$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N,m R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along

south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1s, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

\$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point whch is the SW corner of Section 34.T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a think strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

\$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of

Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

ENGI0012-004 08/01/2015		
	Rates	Fringes
OPERATOR: Power Equipment (DREDGING)		
(1) Leverman	\$ 49.50	23.60
(2) Dredge dozer	\$ 43.53	23.60
(3) Deckmate	\$ 43.42	23.60
(4) Winch operator (stern		
winch on dredge)	\$ 42.87	23.60
(5) Fireman-Oiler,		
Leveehand	\$ 42 33	23 60
(6) Barge Mate	\$ 42.94	23.60
IRON0377-002 07/01/2016		
	Rates	Fringes
Ironworkers:		
Fence Erector	\$ 28.33	20.64
Ornamental, Reinforcing		
and Structural	\$ 34.75	29.20
PREMIUM PAY:		
\$6.00 additional per hour at the	following locat:	ions:
China Lake Naval Test Station, Ch	ocolate Mountair	ns Naval
Reserve-Niland,		
Edwards AFB, Fort Irwin Military :	Station, Fort In	rwin Training
Center-Goldstone, San Clemente Is	land, San Nichol	las Island,
Susanville Federal Prison, 29 Pali	ns - Marıne Corp	ps, U.S. Marine

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

LABO0220-002 07/04/2016

KERN COUNTY

	I	Rates	Fringes
LABORER (TU	JNNEL)		
GROUP	1\$	38.09	19.07
GROUP	2\$	38.41	19.07
GROUP	3\$	38.87	19.07
GROUP	4\$	39.56	19.07
LABORER			
GROUP	1\$	32.34	19.07
GROUP	2\$	32.89	19.07
GROUP	3\$	33.44	19.07
GROUP	4\$	34.99	19.07
GROUP	5\$	35.34	19.07

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower

GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials ("applying" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled

GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt- rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast

GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Changehouse person; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.)

GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Vibrator person, jack hammer, pneumatic tools (except driller); Bull gang mucker, track person; Concrete crew, including rodder and spreader

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

LABO0220-005 07/01/2016

KERN COUNTY

Rates Fringes Brick Tender.....\$ 30.52 18.56 _____ LABO0300-005 01/01/2016 Rates Fringes Asbestos Removal Laborer.....\$ 30.43 16.07 SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations. _____ LABO0345-001 07/03/2016 Rates Fringes LABORER (GUNITE) GROUP 1.....\$ 37.89 20.50 GROUP 2.....\$ 36.94 20.50 GROUP 3.....\$ 33.40 20.50 FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall

receive 40 cents per hour above the foregoing applicable

https://www.wdol.gov/wdol/scafiles/davisbacon/CA31.dvb?v=1

1/23/2017

classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0" above base level and which work must be performed in whole or in part more than 75'-0" above base level, that work performed above the 75'-0" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

LABO0783-001 07/04/2016

INYO AND MONO COUNTIES

Rates Fringes

LABORER (TU	UNNEL)		
GROUP	1\$	38.09	19.07
GROUP	2\$	38.41	19.07
GROUP	3\$	38.87	19.07
GROUP	4\$	39.56	19.07
LABORER			
GROUP	1\$	32.34	19.07
GROUP	2\$	32.89	19.07
GROUP	3\$	33.44	19.07
GROUP	4\$	34.99	19.07
GROUP	5\$	35.34	19.07

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger

mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower

GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials ("applying" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled

GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt- rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast

GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Changehouse person; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.)

GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Vibrator person, jack hammer, pneumatic tools (except driller); Bull gang mucker, track person; Concrete crew, including rodder and spreader;

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

LABO0783-004 07/01/2016

INYO AND MONO COUNTIES

	Rates	Fringes
Brick Tender	\$ 30.52	18.56
LAB01184-001 07/04/2016		
	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer	\$ 33.65	13.95
(2) Vehicle Operator/Hauler.(3) Horizontal Directional	\$ 33.82	13.95
Drill Operator	\$ 35.67	13.95
Locator Laborers: (STRIPING/SLURRY	\$ 37.67	13.95
GROUP 1 GROUP 2 GROUP 3 GROUP 4	\$ 34.86 \$ 36.16 \$ 38.17 \$ 39.91	17.03 17.03 17.03 17.03

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

PAIN0036-009 10/01/2015

HIGH IRON & STEEL:

	Rates	Fringes
DRYWALL FINISHER/TAPER	\$ 32.05	16.82
PAIN0036-021 07/01/2015		
INYO AND MONO COUNTIES		
	Rates	Fringes
Painters: (Including Lead Abatement)		
 (1) Journeyman Painter (2) Repaint (4) All other work (5) Industrial 	\$ 26.41 \$ 24.19 \$ 26.41 \$ 32.02	12.83 12.83 12.83 12.83
REPAINT of any previously painted involving the aerospace industry recreational facilities, hotels establishments as part of hotel	ed structure y, breweries which opera service, an	. Exceptions: work , commercial te commercial d sports facilities.

Aerial towers, towers, radio towers, smoke stacks, flag poles (any flag poles that can be finished from the ground with a ladder excluded), elevated water towers, steeples and domes in their entirety and any other extremely high and hazardous work, cooning steel, bos'n chair, or other similar devices, painting in other high hazardous work shall be classified as high iron & steel

_____ PAIN0169-002 01/01/2015 Rates Fringes GLAZIER....\$ 34.83 19.75 _____ PAIN1247-001 05/01/2016 Rates Fringes SOFT FLOOR LAYER.....\$ 31.10 14.06 _____ PLAS0200-007 08/05/2015 Rates Fringes PLASTERER.....\$ 38.44 13.77 U.S. MARINE CORPS-PICKLE MEADOW & MOUNTAIN WARFARE TRAINING CENTER: \$3.00 additinal per hour. _____ PLAS0500-002 07/01/2016 Rates Fringes CEMENT MASON/CONCRETE FINISHER...\$ 33.30 23.33 _____ PLUM0345-001 07/01/2014 Rates Fringes PLUMBER Landscape/Irrigation Fitter.\$ 29.27 19.75 Sewer & Storm Drain Work....\$ 33.24 17.13 _____ PLUM0460-002 07/01/2013 Rates Fringes PLUMBER (Plumber, Pipefitter, Steamfitter, Refrigeration) 0 to 40 miles radius from 6718 Meany Avenue in Bakersfield.....\$ 40.57 22.84 40 to 75 miles radius.....\$ 45.07 22.84 75 miles to 100 miles 22.84 radius.....\$ 47.57

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over 100 miles radius.....\$ 51.07 22.84 FOOTNOTE: Work from a swinging scaffold, swinging basket, spider or from a bosun chair: 10% above the regular rate of pay for that day. ROOF0027-001 09/01/2014 Rates Fringes ROOFER.....\$ 26.37 12.68 FOOTNOTE: Work with pitch, pitch base of pitch impregnated products or any material containing coal tar pitch, on any building old or new, where both asphalt and pitchers are used in the application of a built-up roof or tear off: \$2.00 per hour additional. _____ SFCA0669-007 04/01/2016 Rates Fringes SPRINKLER FITTER.....\$ 37.32 20.27 _____ SHEE0105-003 07/01/2016 LOS ANGELES (South of a straight line drawn between Gorman and Big Pines) and Catalina Island, INYO, KERN (Northeast part, East of Hwy 395), MONO ORANGE, RIVERSIDE, AND SAN BERNARDINO COUNTIES Rates Fringes SHEET METAL WORKER (1) Commercial - New Construction and Remodel work.....\$ 41.86 26.88 (2) Industrial work including air pollution control systems, noise abatement, hand rails, guard rails, excluding aritechtural sheet metal work, excluding A-C, heating, ventilating systems for human comfort...\$ 41.86 26.88 _____ SHEE0105-004 07/01/2016 KERN (Excluding portion East of Hwy 395) & LOS ANGELES (North of a straight line drawn between Gorman and Big Pines including Cities of Lancaster and Palmdale) COUNTIES Rates Fringes

https://www.wdol.gov/wdol/scafiles/davisbacon/CA31.dvb?v=1

SHEET METAL WORKER.....\$ 31.69

26.21

TEAM0011-002 08/01/2016

		F	Rates	Fri	Fringes	
TRUCK DRIV	ER 1	Ś	29 09		26 39	
GROUP	2	\$	29.24		26.39	
GROUP	3	\$	29.37		26.39	
GROUP	4	\$	29.56		26.39	
GROUP	5	\$	29.59		26.39	
GROUP	6	••••\$	29.62		26.39	
GROUP	7	••••\$	29.87		26.39	
GROUP	8	••••\$	30.12		26.39	
GROUP	9	••••\$	30.32		26.39	
GROUP	10	••••\$	30.62		26.39	
GROUP	11	••••\$	31.12		26.39	
GROUP	12	\$	31.55		26.39	

WORK ON ALL MILITARY BASES:

PREMIUM PAY: \$3.00 per hour additional.

[29 palms Marine Base, Camp Roberts, China Lake, Edwards AFB, El Centro Naval Facility, Fort Irwin, Marine Corps Logistics Base at Nebo & Yermo, Mountain Warfare Training Center, Bridgeport, Point Arguello, Point Conception, Vandenberg AFB]

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Truck driver

GROUP 2: Driver of vehicle or combination of vehicles - 2 axles; Traffic control pilot car excluding moving heavy equipment permit load; Truck mounted broom

GROUP 3: Driver of vehicle or combination of vehicles - 3 axles; Boot person; Cement mason distribution truck; Fuel truck driver; Water truck - 2 axle; Dump truck, less than 16 yds. water level; Erosion control driver

GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete truck, less than 6-1/2 yds. water level

GROUP 5: Water truck, 3 or more axles; Truck greaser and tire person (\$0.50 additional for tire person); Pipeline and utility working truck driver, including winch truck and plastic fusion, limited to pipeline and utility work; Slurry truck driver

GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axles; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level

GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver

GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder

GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over

GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment

GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - \$1.25 additional when operating winch or similar special attachments

GROUP 12: Boom Truck 17K and above

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or

"UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can

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be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION


California State Water Resources Control Board Division of Financial Assistance 1001 I Street • Sacramento, California 95814 • (916) 341-5700 FAX (916) 341-5707 Mailing Address: P. O. Box 944212 • Sacramento, California • 94244-2120 Internet Address: http://www.waterboards.ca.gov



Guidelines for Meeting the California State Revolving Fund (CASRF) Programs (Clean Water and Drinking Water SRF) Disadvantaged Business Enterprise Requirements

The Disadvantaged Business Enterprise (DBE) Program is an outreach, education, and objectives program designed to increase the participation of DBEs in the Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) Programs.

How to Achieve the Purpose of the Program

Recipients of CWSRF/DWSRF financing that are subject to the DBE requirements (recipients) are required to seek, and are encouraged to use, DBEs for their procurement needs. Recipients should award a "fair share" of sub-agreements to DBEs. This applies to all sub-agreements for equipment, supplies, construction, and services.

The key functional components of the DBE Program are as follows:

- Fair Share Objectives
- DBE Certification
- Six Good Faith Efforts
- Contract Administration Requirements
- DBE Reporting

Disadvantaged Business Enterprises are:

- Entities owned and/or controlled by socially and economically disadvantaged individuals as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note) (10% statute), and Public Law 102-389 (42 U.S.C. 4370d) (8% statute), respectively;
- Minority Business Enterprise (MBE) entities that are at least 51% owned and/or controlled by a socially and economically disadvantaged individual as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note), and Public Law 102-389 (42 U.S.C. 4370d), respectively;
- Women Business Enterprise (WBE) entities that are at least 51% owned and/or controlled by women;
- Small Business Enterprise (SBE);
- Small Business in a Rural Area (SBRA);
- Labor Surplus Area Firm (LSAF); or
- Historically Underutilized Business (HUB) Zone Small Business Concern or a concern under a successor program.

Certifying DBE Firms:

Under the DBE Program, entities can no longer self-certify and contractors and sub-contractors must be certified at bid opening. Contractors and sub-contractors must provide to the CASRF recipient proof of DBE certification. Certifications will be accepted from the following:

- The U.S. Environmental Protection Agency (USEPA)
- The Small Business Administration(SBA)
- The Department of Transportation's State implemented DBE Certification Program (with U.S. citizenship)
- Tribal, State and Local governments
- Independent private organization certifications

If an entity holds one of these certifications, it is considered acceptable for establishing status under the DBE Program.

Six Good Faith Efforts (GFE)

All CWSRF/DWSRF financing recipients are required to complete and ensure that the prime contractor complies with the GFE below to ensure that DBEs have the opportunity to compete for financial assistance dollars.

- 1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practical through outreach and recruitment activities. For Tribal, State and Local Government Recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
- 2. Make information on forthcoming opportunities available to DBEs. Posting solicitations for bids or proposals for a minimum of 30 calendar days in a local newspaper, before the bid opening date.
- 3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs.
- 4. Encourage contracting with a group of DBEs when a contract is too large for one firm to handle individually.
- 5. Use the services of the SBA **and/or** Minority Business Development Agency (MBDA) of the US Department of Commerce.
- 6. If the prime contractor awards subcontracts, require the prime contractor to take the above steps.

The forms listed in the table below and attached to these guidelines; must be completed and submitted with the GFE:

FORM NUMBER	FORM NAME	REQUIREMENT	PROVIDED BY	COMPLETED BY	SUBMITTED TO
SWRCB Form 4500-2 or EPA Form	DBE Sub-Contractor Participation Form	As Needed to Report Issues	Recipient	Sub- contractor	EPA DBE Coordinator
SWRCB Form 4500-3 or EPA Form	DBE Sub-Contractor Performance Form	Include with Bid or Proposal Package	Prime Contractor	Sub- Contractor	SWRCB by Recipient
SWRCB Form 4500-4 or EPA Form	DBE Sub-Contractor Utilization Form	Include with Bid or Proposal Package	Recipient	Prime Contractor	SWRCB by Recipient

The completed forms must be submitted with each Bid or Proposal. The recipient shall review the bidder's documents closely to determine that the GFE was performed **prior** to bid or proposal opening date. Failure to complete the GFE and to substantiate completion of the GFE before the bid opening date could jeopardize CWSRF/DWSRF financing for the project. The following situations and circumstances require action as indicated:

- 1. If the apparent successful low bidder was rejected, a complete explanation must be provided.
- 2. Failure of the apparent low bidder to **perform** the GFE **prior** to bid opening constitutes a nonresponsive bid. The construction contract may then be awarded to the next low, responsive, and responsible bidder that meets the requirements or the Recipient may re-advertise the project.
- If there is a bid dispute, all disputes shall be settled <u>prior</u> to submission of the Final Budget Approval Form.

Administration Requirements

- A recipient of CWSRF/DWSRF financing must require entities receiving funds to create and maintain a Bidders List if the recipient of the financing agreement is subject to, or chooses to follow, competitive bidding requirements.
- The Bidders list must include all firms that bid or quote on prime contracts, or bid or quote on subcontracts, including both DBEs and non-DBEs.

- Information retained on the Bidder's List must include the following:
 - 1. Entity's name with point of contact;
 - 2. Entity's mailing address and telephone number;
 - 3. The project description on which the entity bid or quoted and when;
 - 4. Amount of bid/quote; and
 - 5. Entity's status as a DBE or non-DBE.
- The Bidders List must be kept until the recipient is no longer receiving funding under the agreement.
- The recipient shall include Bidders List as part of the Final Budget Approval Form.
- A recipient must require its prime contractor to pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the Recipient.
- A recipient must be notified in writing by its prime contractor prior to any termination of a DBE subcontractor by the prime contractor.
- If a DBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the six GFEs if soliciting a replacement subcontractor.
- A recipient must require its prime contractor to employ the six GFEs even if the prime contractor has achieved its fair share objectives.

Reporting Requirements

For the duration of the construction contract(s), the recipient is required to submit to the State Water Resources Control Board DBE reports annually by October 10 of each fiscal year on the attached Utilization Report form (UR-334). Failure to provide this information as stipulated in the financial agreement language may be cause for withholding disbursements.

CONTACT FOR MORE INFORMATION

SWRCB, CASRF – Barbara August (916) 341-6952 barbara.august@waterboards.ca.gov

US EPA, Region 9 – Joe Ochab (415) 972-3761 ochab.joe@epa.gov

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Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Participation Form

A Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE¹ subcontractor² the opportunity to describe work received and/or report any concerns regarding the funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the DBE Coordinator at any time during the project period of performance.

Subcontractor Name		Project Name	
Bid / Proposal No.	Assistance Agreemer	nt ID No. (if known)	Point of Contact
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Er	ntity

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services, Equipment or Supplies	Amount Received by Prime Contractor

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

Please use the space below to report any concerns regarding the above funded project:

Subcontractor Signature	Print Name
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

.....

Send completed Form 4500-2 to: Mr. Joe Ochab, DBE Coordinator US EPA, Region 9 75 Hawthorne Street San Francisco, CA 94105

FORM 4500-2 (DBE Subcontractor Participation Form)



Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Performance Form

This form is intended to capture the DBE¹ subcontractor's² description of work to be performed and the price of the work submitted to the prime contractor. A Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractor's bid or proposal package.

Subcontractor Name		Project Name	
Bid / Proposal No.	Assistance Agreemer	nt ID No. (if known)	Point of Contact
Address			
Telephone No.		Email Address	
Prime Contractor Name		Issuing/Funding Entity	

Contract Item Number	Description of Work Submitted from the Prime Contractor Involving Construction, Services, Equipment or Supplies		Price of Work Submitted to the Prime Contractor
DBE Certified By: DOT SBA		Meets/exceeds EPA certification standa	rds?
Other:		YESNOUnknown	

FORM 4500-3 (DBE Subcontractor Performance Form)

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name	
Title	Date	

Subcontractor Signature	Print Name
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

FORM 4500-3 (DBE Subcontractor Performance Form)



Disadvantaged Business Enterprise (DBE) Program DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE¹ subcontractor's² and the estimated dollar amount of each subcontract. A Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name	Project Name	Project Name		
Bid / Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact		
Address				
Telephone No.	Email Address			
Issuing/Funding Entity				

I have identified potential DBE certified subcontractors. <u>YES</u> NO If <i>yes</i> , please complete the table below. If <i>no</i> , please explain:				
Subcontractor Name/ Company Name	Company Address / Phone / Email	Estimated Dollar Amount	Currently DBE Certified?	

--Continue on back if needed--

FORM 4500-4 (DBE Subcontractor Utilization Form)

¹ A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

² Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
	-
Title	Date

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.



STATE WATER RESOURCES CONTROL BOARD - DIVISION OF FINANCIAL ASSISTANCE DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION CALIFORNIA STATE REVOLVING FUNDS (CASRF) FORM UR-334

1. Grant/Financ	e Agreement Numbe	er: 2.	Annual Report	ting Period	3. Purchase Period of Financing Agreement:		
10/1/ through 09/30/_							
4. Total Paymer	nts Paid to Prime Co	ntractor or Sub-Contr	actors During C	Current Reporting	Period: \$		
5. <u>Recipient's Name and Address:</u> 6. <u>Recipient's Contact Person and Phone Number:</u>							
7. LIST All DBE	Amount Paid to An	v DBE Contractor or	Date of	Procurement	Period: Name and Address of DBE Contractor of		
Purchase Paid by Recipient or	Sub-Contractor Fo	r Service Provided to	Payment (MM/DD/YY)	Type Code** (see below)	Sub-Contractor or Vendor		
Prime Contractor	MBE	WBE					
8. Initial here if no DBE contractors or sub-contractors paid during current reporting period:							
9. Initial here if all procurements for this contract are completed:							
10. Comments:							
11. Signature and Title of Recipient's Authorized Representative 12. Date							

Email Form UR-334 to:

DrinkingWaterSRF@waterboards.ca.gov OR CleanWaterSRF@waterboards.ca.gov

Questions may be directed to:

Barbara August, SWRCB Barbara.August@waterboards.ca.gov Phone: (916) 341-6952 (916) 327-7469 Fax:

- **Procurement Type:
 - Construction
 Supplies
- 3. Services (includes business services; professional services; repair services and personnel services)4. Equipment

STATE WATER RESOURCES CONTROL BOARD - DIVISION OF FINANCIAL ASSISTANCE DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION CALIFORNIA STATE REVOLVING FUNDS

INSTRUCTIONS FOR COMPLETING FORM UR-334

- **Box 1** Grant or Financing Agreement Number.
- Box 2 Annual reporting period.
- **Box 3** Enter the dates between which you made procurements under this financing agreement or grant.
- **Box 4** Enter the total amount of payments paid to the contractor or sub-contractors during this reporting period.
- **Box 5** Enter Recipient's Name and Address.
- **Box 6** Enter Recipient's Contact Name and Phone Number.
- Box 7 Enter details for the <u>DBE purchases only</u> and be sure to limit them to the current period.
 1) Use either an "R" or a "C" to represent "Recipient" or "Contractor." 2) Enter a dollar total for DBE and total the two columns at the bottom of the section. 3) Provide the payment date. 4) Enter a product type choice from those at the bottom of the page. 5) List the vendor name and address in the right-hand column
- **Box 8** Initial here if no DBE contractors or sub-contractors were paid during this reporting period.
- **Box 9** Initial this box only if all purchases under this financing agreement or grant have been completed during this reporting period or a previous period. If you initial this box, we will no longer send you a survey.
- **Box 10** This box is for explanatory information or questions.
- **Box 11** Provide an authorized representative signature.
- **Box 12** Enter the date form completed.

Notice of Award

Date: _____

Project: Bridgeport Public Utility District Arsenic Removal Project - Construction				
Owner: Bridgeport Public Utility District	Owner's Contract No.:			
Contract:	Engineer's Project No.: 0883-029			
Bidder:				

Bidder's Address: [send Notice of Award Certified Mail, Return Receipt Requested]

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____

[Indicate total Work, alternates, or sections of Work awarded.]

The Contract Price of your Contract is _____ Dollars (\$____).

[Insert appropriate data if unit prices are used. Change language for cost-plus contracts.]

_____ copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

- 1. Deliver to the Owner [____] fully executed counterparts of the Contract Documents.
- 2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), General Conditions (Paragraph 5.01), and Supplementary Conditions (Paragraph SC-5.01).
- 3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Owner

By:_____

Authorized Signature

Title

Copy to Engineer

EJCDC C-510 Notice of Award
Prepared by the Engineers Joint Contract Documents Committee and endorsed by the Construction Specifications Institute.
Page 1 of 1

Notice to Proceed

	Date:			
Project: Bridgeport Public Utility District Arsenic I	Removal Project - Construction			
Owner: Bridgeport Public Utility District	Owner's Contract No.:			
Contract:	Engineer's Project No.: 0883-029			
Contractor:				
Contractor's Address: [send Certified Mail, Return	Receipt Requested]			

You are notified that the Contract Times under the above Contract will commence to run on_____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is______, and the date of readiness for final payment is ______ [(or) the number of days to achieve Substantial Completion is ______, and the number of days to achieve readiness for final payment is ______].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds and loss payees) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must:

[add other requirements].

	Owner
	Given by:
	Authorized Signature
	Title
	Date
Copy to Engineer	
	EJCDC C-550 Notice to Proceed
Frepared by the Engineers Joint Contract	Documents Committee and endorsed by the Construction Specifications Institute.

Contractor's Application for Payment No.

	 	e la
	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

	Change Order Summary		-			
Approved Change Orders			1. ORIGINAL CO	NTRACI	ſ PRICE	. \$
Number	Additions	Deductions	2. Net change by Change Orders \$			
			3. Current Contrac	t Price (l	Line 1 ± 2)	. \$
			4. TOTAL COMPI	LETED A	AND STORED TO DATE	
			(Column F on Pr	ogress E	stimate)	. \$
			5. RETAINAGE:			
			a.	Х	Work Completed	. \$
			b.	Х	Stored Material	. \$
			с. Те	otal Reta	inage (Line 5a + Line 5b)	. \$
			6. AMOUNT ELIG	BLE T	O DATE (Line 4 - Line 5c)	\$
TOTALS			7. LESS PREVIOU	S PAYN	IENTS (Line 6 from prior Application)	. \$
NET CHANGE BY			8. AMOUNT DUE	THIS AI	PPLICATION	. \$
CHANGE ORDERS			9. BALANCE TO F	'INISH, I	PLUS RETAINAGE	
_			(Column G on Pr	ogress Es	stimate + Line 5 above)	. \$
Contractor's Certification The undersigned Contractor of payments received from Own account to discharge Contract	certifies that to the best of its knowledg ner on account of Work done under the tor's legitimate obligations incurred in	e: (1) all previous progress Contract have been applied on connection with Work covered by	Payment of:	\$	(Line 8 or other - attach explanation of th	e other amount)
prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances);		is recommended by	:: <u> </u>	(Engineer)	(Date)	
and is not defective.			Payment of	¢		
			i aynent or.	Ψ	(Line 8 or other attach explanation of th	e other amount)
					(Line 8 of other - attach explanation of th	
			is approved by:			
		is approved by.		(Owner)	(Date)	
					(Gwiler)	(Date)
By:		Date:	Approved by:			

Endorsed by the Construction Specifications Institute.

EJCDC C-620 Contractor's Application for Payment © 2007 National Society of Professional Engineers for EJCDC. All rights reserved. Page 1 of 4

Funding Agency (if applicable)

(Date)

Progress Estimate

Contractor's Application

For (contract):							Application Number:			
Application Period:						Application Date:				
А			В	С	D	E	F			
	Item				Estimated	i	Materials Presently	Total Completed	%	Balance to Finish
Bid Item No.	Description	Bid Quantity	Unit Price	Bid Value	Quantity Installed	Value	Stored (not in C)	and Stored to Date (D + E)	(F) B	(B - F)
	Totals									

Stored Material Summary

Contractor's Application

For (contract):					Application Numbe	er:			
Application Period:					Application Date:				
А	В	С	D		EF			G	
	Shop Drowing		Stored Previously		Stored	this Month	Incorporate	d in Work	Materials Remaining
Invoice No.	Transmittal No.	Materials Description	Date (Month/Year)	Amount (\$)	Amount (\$)	Subtotal	Date (Month/Year)	Amount (\$)	in Storage (\$) (D + E - F)
							<u>´</u>		\/
		Totals	1						

Certificate of Substantial Completion

Project:	
Owner:	Owner's Contract No.:
Contract:	Engineer's Project No.:

This [tentative] [definitive] Certificate of Substantial Completion applies to:

All Work under the Contract Documents:

The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

Amended Responsibilities

Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date		
Accepted by Contractor	Date		
Accepted by Owner	Date		

Work Change Directive

No. _____

Date of Issua	ance: E	Effective Date:
Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:
Contractor	is directed to proceed promptly with t	he following change(s):
Item No.	Description	

Attachments (list documents supporting change):

Purpose for Work Change Directive:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

□ Nonagreement on pricing of proposed change.

Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price \$	(increase/decrease)	Contract Time	(increase/decrease)
			lays
Recommended for Ap	pproval by Engineer:		Date
Authorized for Owner	r by:		Date
Received for Contract	tor by:		Date
Received by Funding	Agency (if applicable):		Date:

Change Order

No. _____

Date of Issuance:	Ef	fective Date:	
Project:	Owner:	Owner's Contract No.:	
Contract:		Date of Contract:	
Contractor:		Engineer's Project No.:	
The Contract Document	ts are modified as follows up	on execution of this Change Order:	

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	CHANGE I	CHANGE IN CONTRACT TIMES:		
Original Contract Price:	Original Contract Times: Substantial completion Ready for final paymen	Working Calendar days (days or date): t (days or date):		
[Increase] [Decrease] from previously approved Change Orders No to No. : \$	[Increase] [Decrease] fro Orders No To No Substantial completion Ready for final paymen	[Increase] [Decrease] from previously approved Change Orders No To No: Substantial completion (days): Ready for final payment (days):		
Contract Price prior to this Change Order:	Contract Times prior to the Substantial completion Ready for final payment	Contract Times prior to this Change Order: Substantial completion (days or date): Ready for final payment (days or date):		
[Increase] [Decrease] of this Change Order	: [Increase] [Decrease] of t Substantial completion Ready for final payment	this Change Order: (days or date): nt (days or date):		
Contract Price incorporating this Change	Contract Times with all a Substantial completion Ready for final paymer	Contract Times with all approved Change Orders: Substantial completion (days or date): Ready for final payment (days or date):		
RECOMMENDED: R.O. Anderson Engineering, Inc.	CCEPTED:	ACCEPTED:		
By: By	y:	By:		
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)		
Date: Date:		Date:		
Approved by Funding Agency (if applicable	e):			
NA	Date:			

SECTION 01100 - SUMMARY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Contract description.
 - 2. Bid Items.
 - 3. Work by Owner or other Work at the Site.
 - 4. Owner-furnished products.
 - 5. Contractor's use of Site and premises.
 - 6. Future work.
 - 7. Work sequence.
 - 8. Owner occupancy.
 - 9. Permits.
 - 10. Specification conventions.

1.2 GENERAL

- A. The WORK to be performed under this Contract shall consist of furnishing all plant, tools, equipment, materials, supplies, and manufactured articles and furnishing all labor, transportation, and services, including fuel, power and essential communications, and performing all work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The WORK shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.
 - 1. SEQUENCE OF OPERATION
 - a. Twin Lakes Well Pump
 - 1) Based upon the water levels in the tanks, the time of day, the day of the week, and pressure, a signal will be sent through SCADA to start the Twin Lakes Well pump motor. The motor will primarily be operated through the VFD. The VFD will be programmed to accelerate from 0 to full speed over 15 seconds and deaccelerate over 15 seconds, (variable from 5 to 30 seconds). Primarily the VFD will control the speed of the motor to maintain a set pressure of 115 psi based on PT1, (variable from 90 psi to 125 psi). Alternatively the VFD may be set to run at a constant speed of between 30 and 60 Hz. If set to run at a constant speed the motor should stop and an over pressure fault displayed in the VFD screen if the pressure from PT1 is above 125 psi for more than 3 seconds.
 - 2) The motor may also be operated in HAND mode where when switched to hand the motor starts through the VFD (ignoring all signals from SCADA) and operates as specified above.
 - 3) Finally the motor in an extreme emergency may be started and stopped in across the line mode. In this mode all signals from SCADA and the VFD will be ignored and upon turning the switch the motor will immediately accelerate to 100% and upon turning it off will immediately deaccelerate to 0.
 - 4) All controls for the Twin Lakes Well Pump will be located in the new building.

RΟΔ

- b. Chlorinator for Twin Lakes Well
 - 1) When the Twin Lakes Well Pump is running the power to the sodium hypochlorite injection pump is to be on. This is to be accomplished through a digital signal from the PLC. Chlorination will be at a constant rate and adjusted at the injection pump that is being relocated to the new chemical room in the new building.
- c. Pump to Waste for Twin Lakes Well
 - 1) The existing 3" clay valve from the old building will be relocated to the new building. This valve is to be controlled through the existing 4 way 110 v solenoid so that when the pump is running, water is introduced to the upper diaphragm through a throttling valve and the lower diaphragm is vented causing the pump to waste valve to slowly close. The time to close should be adjusted to approximately 60 seconds through the throttling valve. When the motor is stopped the 4 way 110 v solenoid changes positions and introduces water to the lower diaphragm venting the upper diaphragm causing the pump to waste valve to open. The limit switches and control relays on the existing installation will not be used in the new installation because the VFD will slowly start and stop the pump eliminating hydraulic surges.
- d. Emergency Generator / Automatic Transfer Switch
 - 1) The operation of these will not be changed. The new and existing buildings as well as the Twin Lakes Well pump will be run on emergency power if line power is lost. The ATS will remain on the exterior wall of the old building.
- e. Intrusion / Fire Alarms
 - 1) The existing intrusion and fire alarm in the old building will remain. The new building will have intrusion alarms through motion sensors as well as a fire alarm through heat detectors. These will tie into the SCADA system and require the operator to deactivate the alarm through the OIT.
- f. HVAĈ
 - The new building will have two propane fired unit heaters (PH 1 & PH 2) tied to a common thermostat that will maintain a minimum temperature in the building. The main room of the building will have a fixed louvered intake and an exhaust fan (EF 1). The exhaust fan will always be on at a rate of 600 CFM. If the common thermostat senses a high temperature the exhaust fan speed will increase to 750 CFM. The 2 each chemical rooms will have continuous ventilation from the main room through the fixed louvers in the doors and out through a common exhaust fan (EF 2). The ducting and fan will be adjusted to a continuous flow rate of 100 CFM from each room.
- g. SCADA
 - The existing SCADA system was developed in 2002 through 2005 and has had little modification since that time. The Bridgeport PUD SCADA System Instruction Manual by Sierra Control Systems Dated February 5, 2005 describes the existing system in detail. With this project the SCADA system will be modified. The modifications include:
 - 2) The RTU in the existing building at the Twin Lakes Well Site will remain and monitor the fire and intrusion alarms in that building as well as the emergency generator. It also will be used to activate / deactivate the intrusion alarm at that building through the existing OIT. The discrete inputs of HOA for the well pump, well pump running, high pressure lockout as well as the analog inputs of system pressure will be removed.



- 3) The Human Machine Interface (HMI) equipment in the main office including the SCADA desktop computer, uninterruptible power supply, modems, automatic dialer, and software are to be replaced as part of this project.
- 4) The Main Terminal Unit (MTU) in the Cain well office is 900 Mhz unlicensed spread spectrum.
- 5) The existing programing, SCADA screens, alarms, and automatic dialer settings of the HMI are to be reproduced in the latest version of Wonderware and installed on the new HMI in the main office. Also, new screens for the new Twin Lakes Well Controls are to be developed similar to the existing screens. Screens, controls and information developed by the treatment system manufacturer are to be added to the HMI. The programing to start well pumps will be modified so that the lead and lag well pumps can be set by the day of the week (it is anticipated that the Cain well will be lead 6 days a week and the Twin Lakes Well will be lead 1 day per week). Finally the programing to start the lead and lag pump will be modified to allow different on and off levels depending upon the day of the week and the time of the day with each day split up into three periods (it is anticipated that the periods will correspond to power company off-peak, peak, and high peak times and set levels will be determined to minimize pump use when power costs are high and maximize use when power costs are low.
- 6) The new building will have an OIT that has all the screens and functionality of the HMI in the Office Building. This is separate from the OIT for treatment that is to be supplied by the treatment supplier.
- 7) There will be the following inputs and outputs to SCADA at the new building:
 - a) Discrete Inputs
 - (1) Motion Detector
 - (2) Heat Detector
 - (3) HOA switch well pump
 - (4) Well pump running
 - (5) Well pump VFD fault (overload, voltage or phase loss, etc.)
 - (6) High pressure lockout (from VFD and PT 1)
 - (7) AC/DC Control power fail
 - b) Analog Inputs
 - (1) Flow rate from FM1 (Twin lakes Well Flow)
 - (2) Pressure from PT 1 (Twin Lakes Well Pressure)
 - (3) Pressure from PT 2 (Cain Well Pressure at treatment)
 - (4) Battery Voltage
 - (5) Power Meter
 - (6) Bypass Flow (from FM 2)
 - c) Discrete Outputs
 - (1) Twin Lakes Well Start
 - (2) Common Alarm

1.3 CONTRACT DESCRIPTION

A. Work of the Project includes construction of a new, complete and operational water treatment plant for the removal of arsenic from a potable water supply. It includes construction of a new approximately 1370 sf mechanical building, installation and connection of an Owner supplied Arsenic Removal System, piping modifications, valves and appurtenances, paving, landscaping, and electrical



and SCADA modifications as shown on the Drawings and described in the Specifications for a fully functional water treatment plant.

B. Perform Work of Contract under executed Contract with Owner according to Conditions of Contract.

1.4 BID ITEMS

- A. MOBILIZATION AND DEMOBILIZATION:
 - 1. Measurement for payment for Mobilization and Demobilization and related Material will be on a percent complete basis of the lump sum bid price.
 - 2. Payment for Mobilization and Demobilization and related Material will be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item. The lump sum bid price for Mobilization and Demobilization and related Material shall not exceed 5% of the total bid price or the bid may be determined to be unbalanced.

B. TRAFFIC CONTROL:

- 1. Measurement for payment for Traffic Control will be on a percent complete basis of the lump sum bid price.
- 2. Payment for Traffic Control will be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, signage, flaggers, barricades, traffic cones, and flashing signal lights for all construction work performed within public right-of-ways.

C. DEMOLITION, UTILITY CONNECTIONS, UTILITY COORDINATION & SITE GRADING

- 1. Measurement for payment for Demolition and Site Grading will be on a percent complete basis of the lump sum bid price.
- Payment for Demolition and Site Grading will be made at the lump sum price named in the 2. Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to: site demolition of existing aggregate base driveway, saw-cutting, removal and disposal of AC paving, demolition of 6" steel drain line, valve boxes, hog-wire fencing, 24" CMP storm drain culvert; removal and salvage to Owner of bollards; capping of existing abandoned well; relocation of existing propane tank complete with new pad and connection; abandoning in place existing propane lines and water lines, including all excavation and trenching as required; building pad preparation including: site grading, site drainage including rip rap and open channel ditches, fill, gravel, disposal of unusable excavated material, backfilling, backfill materials, surface restoration, compaction, and dewatering. This bid item includes supplying and installing all necessary temporary chain link fencing and gates necessary to protect the site and progress of the Work until the permanent fence has been installed. This bid item also includes any necessary trenching, backfilling, conduit etc., necessary to accommodate utility service connections (gas, electric, phone, internet), as well as all coordination effort with each Utility as necessary complete the Work. All utilities have been requested by the Owner and all connection fees for the utility services will be paid for directly by the Owner however, the contractor shall coordinate the installation and hookup of each Utility and shall provide incidental material and work under this bid item.



D. LANDSCAPING:

- 1. Measurement for payment for Landscaping will be on a percent complete basis of the lump sum bid price.
- 2. Payment for Landscaping will be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, planting trees, shrubs and other design vegetation shown on the Landscaping Plan. This bid item shall include all irrigation piping, connections, sprinklers, backflow prevention, mulch, soil amendments and other incidentals necessary to provide a sustainable site landscaping improvement as shown on the Drawings.

E. FURNISH AND INSTALL CHAIN LINK FENCE AND GATES:

- 1. Measurement for payment for Chain Link Fence and Gates will be based on a per LINEAL foot basis, on the actual length of fence replaced.
- 2. Payment for Chain Link Fence and Gate will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item in accordance with the Contract Documents. The contractor shall not reuse the removed fence materials. The contractor shall coordinate with fence owners.
- F. STORM DRAINS:
 - 1. Measurement for payment for the storm drain improvements will be based on a per lineal foot basis, on the actual length of pipe installed, except for the Storm Drain Drop Inlet, which will be measured by each unit installed. Measurement will be made along the centerline of the pipe, in place, prior to covering or backfilling.
 - 2. Payment for storm drain improvements including 10" PVC and 21" RCP, as well as the drop inlet, will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, coordination, delivery, inspection and storage, excavation, disposal of unusable excavated material, furnishing and installing all fittings, sealants, concrete cap, flared end sections, installing the pipe, cutting, backfilling, backfill materials, compaction, dewatering, and traffic control, in accordance with the Contract Documents and manufacturers recommendations.

G. ARSENIC REMOVAL SYSTEM INSTALLATION:

- 1. Measurement for payment for Arsenic Removal System Installation will be on a percent complete basis of the lump sum bid price.
- 2. Payment for the Arsenic Removal System Installation will be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for placement, all labor, equipment, tools, supplies and materials required to complete this item and provide a fully functional plant. Bid item shall include the installation of the skid mounted packaged water treatment system, including all equipment provided by supplier (all treatment filters, piping, valves, gauges, and any incidentals; control panel, all electrical associated with the equipment, and all other items necessary for the system). This item includes but is not limited to supplying and installing all necessary piping within the building and connecting to the raw water line and startup of the plant. Connection piping shall include excavation, disposal of unusable excavated material, furnishing and installation of the pipe and fittings, backfilling, backfill materials and compaction. This item also includes but is not limited to



supplying and installing all equipment necessary for full functionality that is not supplied by the supplier.

H. CONSTRUCTION OF NEW MECHANICAL BUILDING:

- 1. Measurement for payment for the Building will be on a percent complete basis of the lump sum bid price.
- 2. Payment for Furnishing and Installing Building will be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, the excavation, disposal of unusable excavated material, backfilling (aggregate base for pad), backfill materials, compaction, and dewatering and construction of new reinforced PCC footings, grade beams, building pad, stem walls, etc. This bid item includes the framing, erection, insulating, roofing and siding necessary to construct of a new approximately 1370 square foot mechanical building, including all electrical distribution and lighting, mechanical systems including unit heaters, exhaust fans, louvers and vents thermostats, emergency showers and eyewash stations, chemical storage rooms, ADA accessible bathroom with sink and lavatory, floor drains, windows, metal man-doors, roll up door, and all other incidentals as shown in the plans and specifications as are required to provide and install a complete and functioning water treatment building.

I. CONSTRUCT NEW WATER LINE IMPROVEMENTS:

- 1. Measurement for payment for all construction of 6" and 8" Ductile Iron, 8" C-900 PVC, and 1" PE Water Line will be based on a per lineal foot basis, on the actual length of pipe installed. Measurement will be made along the centerline of the pipe, in place, prior to covering or backfilling.
- 2. Payment will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to: coordination, delivery, inspection and storage; excavation, trenching, and disposal of unusable excavated material; furnishing and installing all fittings, connections, thrust blocks, concrete encasement, sanitary crossings, and appurtenances; corrosion protection including bituminous coatings, polyethylene sleeves, etc.; locate stations, restraints, etc., installing and testing the pipe, cutting, backfilling, backfill materials, compaction, dewatering, and traffic control, in accordance with the Contract Documents and manufacturers recommendations.

J. FURNISH AND INSTALL NEW VALVES:

- 1. Measurement for payment for Furnishing and Installing New Valves will be based on the actual number of valves installed.
- 2. Payment for new Valves, including plug valves, gate valves, butterfly valves, drain valves, ball valves, check valves and air release valves, will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item in accordance with the Contract Documents.

K. FURNISH AND INSTALL 8" MAGNETIC FLOW METER WITH AC POWER CONNECTION:

1. Measurement for payment for 8" Magnetic Flow Meters w/ AC Power Connection will be on a basis of the lump sum bid price.



2. Payment for 8" Magnetic Flow Meters w/ AC Power Connection will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, connection to existing AC power equipment, disinfection, testing, backfill, compaction, tools, supplies and materials required to complete this item in accordance with the Contract Documents. The Mag Meter and AC power equipment shall be installed in accordance with the manufacturer's specifications.

L. FURNISH AND INSTALL 8" SDR 35 SEWER MAIN:

- 1. Measurement for payment for Furnish and Install 8" SDR 35 Sewer Main will be based on a per lineal foot basis, on the actual length of pipe installed. Measurement will be made along the centerline of the pipe, in place, prior to covering or backfilling.
- 2. Payment for Furnish and Install 8" SDR 35 Sewer Main will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, coordination of delivery and inspection and storage, excavation, disposal of unusable excavated material, furnishing and installing all fittings, corrosion protection, locate stations, restraints, etc., installing and testing the pipe, cutting, backfilling, backfill materials, compaction, dewatering, and traffic control, in accordance with the Contract Documents and manufacturers recommendations.

M. FURNISH AND INSTALL ELECTRICAL AND CONTROL IMPROVEMENTS, PANELS, BREAKERS, CONDUIT, RACEWAYS AND OTHER ELECTRICAL IMPROVMENTS:

- 1. Measurement for payment for Building Electrical/Controls and Conduit will be on a percent complete basis.
- 2. Payment for Furnish and Install Building Electrical/Controls and Conduit will be made on a percent complete basis of the lump sum price in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item. Electrical shall include, but is not limited to, conduit, conductors and wiring, support and fasteners, connection of all electrical and communications components, inside of the buildings. This item shall also include start up. Contractors shall review all plan sheets when preparing this bid item not the Electrical sheets alone to understand the incidentals needed and included to provide the owner with a fully functioning facility.

N. SCADA UPGRADES:

- 1. Measurement for payment for Furnish and Install SCADA Upgrades will be on a basis of the percent complete of the lump sum bid price.
- 2. Payment for Furnish and Install SCADA Upgrades will be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item. SCADA shall include, but is not limited to, electrical, alarms, equipment, the receivers, transmitters, integration with all the District's existing RTU's as well as a receiver and transmitter at the new Water Treatment Plant. This item shall also include connection of all equipment the existing system, start up, providing a master control unit at the new Water Treatment Plant and associated programming and incorporation of the Water Treatment Plant filter control panel as defined on the electrical sheets and SCADA specifications. The Plant antenna shall include mounting on the new building on site.

O. FURNISH AND INSTALL PROPANE GAS LINE:



- 1. Measurement for payment for Furnish and Install Propane Gas Line will be based on a per lineal foot basis, on the actual length of pipe installed. Measurement will be made along the centerline of the pipe, in place, prior to covering or backfilling.
- 2. Payment for Furnish and Install Propane Gas line will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, coordination, delivery, inspection and storage, excavation, disposal of unusable excavated material, furnishing and installing all fittings, connections to the relocated propane tank, connections to propane fired equipment, corrosion protection, locate stations, restraints, etc., installing the pipe, cutting, backfilling, backfill materials, compaction, dewatering, in accordance with the Contract Documents and manufacturers recommendations.

P. REMOVE AND REPLACE EXISTING PIPING IN BUILDING:

- 1. Measurement for payment for Remove and Replace Piping in Existing Building will be based on a lump sum bid price.
- 2. Payment for Remove and Replace Piping in Existing Building will be made at the lump sum price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, coordination, delivery, inspection and storage; excavation, disposal of unusable excavated material, furnishing and installing all fittings, corrosion protection, locate stations, restraints, etc., removing and installing the pipe, cutting, backfilling, backfill materials, compaction, dewatering, concrete removal and placement, wall removal, building support, and in accordance with the Contract Documents and manufacturers recommendations.

Q. FURNISH AND INSTALL 4" AC PAVEMENT ON 6" AGGREGATE BASE:

- 1. Measurement for payment for 4" AC Pavement on 6" Aggregate Base will be based on the actual square feet of AC Pavement installed.
- 2. Payment for 4" AC Pavement on 6" Aggregate Base will be made at the square foot unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item, including, but not limited to, street cut permit when required, contractor and suppliers QAQC testing, traffic control, furnishing, placing and compaction of backfill and base course materials, striping, and placement of new hot mix asphalt concrete pavement in accordance with the Contract Documents. AC shall be type 2 with Type 2 slurry or the AC shall be type 3 with a fog seal. This item shall also include temporary patching for trenches left unpaved for a month and trench plates at no additional cost. This item shall include saw cutting at the time of digging and the second saw cut 6" back from the first prior to paving.

R. FURNISH AND INSTALL CURB AND GUTTER:

- 1. Measurement for payment for Curb and Gutter will be based on a per lineal foot basis. Measurement will be made along the top of the curb.
- 2. Payment for Curb and Gutter will be made at the unit price named in the Bid Schedule, which price shall constitute full compensation for all labor, equipment, tools, supplies and materials required to complete this item in accordance with the Contract Documents.

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

A. Construction Plan: Before start of construction, submit electronic copy of construction plan regarding access to Work, use of Site, and utility outages for acceptance by Owner. After



acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.6 WORK SEQUENCE

- A. Construct Work in stages during construction period. Coordinate construction schedule and operations with Engineer and Owner.
- B. Sequencing of Construction Plan: Before start of construction, submit electronic copy of construction plan regarding phasing and new Work for acceptance by Engineer. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.7 OWNER OCCUPANCY

- A. Schedule and substantially complete designated portions of the Work for occupancy before Substantial Completion of the entire Work.
 - 1. Owner's use and occupancy of designated areas before Substantial Completion of the entire Project do not relieve Contractor of responsibility to maintain specified insurance coverages on a 100 percent basis until date of final payment.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.8 PERMITS

- A. The Owner has applied for and acquired the following necessary permits for construction of Work including the following:
 - 1. Mono County Building Permit
 - 2. Mono County Encroachment Permit

1.9 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01200 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Schedule of Values.
 - B. Application for Payment.
 - C. Change procedures.
 - D. Defect assessment.
 - E. Unit prices.
 - F. Alternates.

1.2 SCHEDULE OF VALUES

- A. Submit schedule on Progress Estimate schedule on EJCDC C-620. Contractor's standard form or electronic media printout will be considered for this use.
- B. Submit Schedule of Values electronically within 15 days after date of Owner-Contractor Agreement established in Notice to Proceed.
- C. Format: Use Table of Contents of this Project Manual. Identify each line item with number and title of major Specification Section. Also identify Site mobilization, bonds and insurance, and general requirements.
- D. Include within each line item, direct proportional amount of Contractor's overhead and profit.
- E. Revise schedule to list approved Change Orders with each Application for Payment.

1.3 APPLICATION FOR PAYMENT

- A. Submit electronically each Application for Payment on EJCDC C-620 Contractor's Application for Payment.
- B. Content and Format: Use Schedule of Values for listing items in Application for Payment.
- C. Submit updated construction schedule with each Application for Payment.
- D. Payment Period: Submit at intervals stipulated in the Agreement.
- E. Submit submittals with transmittal letter as specified in Section 013300 Submittal Procedures.
- F. Submit three original copies of any waivers requested by Owner.

PRICE AND PAYMENT PROCEDURES 01200



- G. Substantiating Data: When Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
 - 1. Current construction photographs specified in Section 01330 Submittal Procedures.
 - 2. Partial release of liens from major Subcontractors and vendors.
 - 3. Record Documents as specified in Section 01700 Execution and Closeout Requirements, for review by Owner, which will be returned to Contractor.
 - 4. Affidavits attesting to off-Site stored products.
 - 5. Construction Progress Schedule, revised and current as specified in Section 01330 Submittal Procedures.

1.4 CHANGE PROCEDURES

- A. Submittals: Submit name of individual who is authorized to receive change documents and is responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- B. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Engineer of any error, inconsistency, omission, or apparent discrepancy.
- C. Requests for Interpretation (RFI) and Clarifications: Allot time in construction scheduling for liaison with Engineer; establish procedures for handling queries and clarifications.
 - 1. Use Contractor's standard form for requesting interpretations.
 - 2. Engineer may respond with a direct answer on the Request for Interpretation form, EJCDC C-942 Field Order, or Proposal Request.
- D. Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on EJCDC C-942.
- E. Engineer may issue Proposal Request including a detailed description of proposed change with supplementary or revised Drawings and Specifications, a change in Contract Time for executing the change. Contractor will prepare and submit estimate within ten days.
- F. Contractor may propose changes by submitting a request for change to Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change and the effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on the Work by separate or other Contractors.
- G. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Engineer.
- H. Unit Price Change Order: For Contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of that which are not predetermined, execute Work under Work Directive Change. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- I. Work Directive Change: Engineer may issue directive, on EJCDC C-940 Work Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and



designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

- J. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.
- K. Maintain detailed records of Work done on time and material basis. Provide full information required for evaluation of proposed changes and to substantiate costs for changes in the Work.
- L. Document each quotation for change in Project Cost or Time with sufficient data to allow evaluation of quotation.
- M. Change Order Forms: EJCDC C-941 Change Order.
- N. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.
- O. Correlation of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.
 - 2. Promptly revise Progress Schedules to reflect change in Contract Time, revise subschedules to adjust times for other items of Work affected by the change, and resubmit.
 - 3. Promptly enter changes in Record Documents.

1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of Engineer, it is not practical to remove and replace the Work, Engineer will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price reduced 50 percent at discretion of Owner upon recommendation by Engineer.
- D. Defective Work will be partially repaired according to instructions of Engineer, and unit sum/price will be adjusted to new sum/price reduced 50 percent at discretion of Owner upon recommendation of Engineer.
- E. Individual Specification Sections may modify these options or may identify specific formula or percentage sum/price reduction.
- F. Authority of Engineer to assess defects and identify payment adjustments is final.
- G. Nonpayment for Rejected Products: Payment will not be made for rejected products for any of the following reasons:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from transporting vehicle.



- 4. Products placed beyond lines and levels of the required Work.
- 5. Products remaining on hand after completion of the Work.
- 6. Loading, hauling, and disposing of rejected products.

1.6 UNIT PRICES

- A. Authority: Measurement methods are delineated in individual Specification Sections.
- B. Measurement methods delineated in individual Specification Sections complement criteria of this Section. In event of conflict, requirements of individual Specification Section govern.
- C. Take measurements and compute quantities. Engineer will verify measurements and quantities.
- D. Unit Quantities: Quantities and measurements indicated on Bid Form are for Contract purposes only. Quantities and measurements supplied or placed in the Work shall determine payment. Actual quantities provided shall determine payment.
 - 1. When actual Work requires more or fewer quantities than those quantities indicated, provide required quantities at contracted unit sum/prices.
 - 2. When actual Work requires 25 percent or greater change in quantity than those quantities indicated, Owner or Contractor may claim a Contract Price adjustment.
- E. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application, or installation of item of the Work; overhead and profit.
- F. Final payment for Work governed by unit prices will be made on basis of actual measurements and quantities accepted by Engineer multiplied by unit sum/price for Work incorporated in or made necessary by the Work.
- G. Measurement of Quantities:
 - 1. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
 - 2. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.

1.7 ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in Owner-Contractor Agreement. The Owner-Contractor Agreement may identify certain Alternates to remain an Owner option for a stipulated period of time.
- B. Coordinate related Work and modify surrounding Work. Description for each Alternate is recognized to be abbreviated but requires that each change shall be complete for scope of Work affected.
 - 1. Coordinate related requirements among Specification Sections as required.
 - 2. Include as part of each Alternate: Miscellaneous devices, appurtenances, and similar items incidental to or necessary for complete installation.
 - 3. Coordinate Alternate with adjacent Work and modify or adjust as necessary to ensure integration.



PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01250 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance.
- B. Product options.
- C. Product substitution procedures.

1.2 QUALITY ASSURANCE

- A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.
- B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.
- C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT OPTIONS

A. See Section 01600 - Product Requirements.

1.4 PRODUCT SUBSTITUTION PROCEDURES

- A. Engineer will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement established in Notice to Proceed.
- B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- C. Document each request with complete data, substantiating compliance of proposed substitution with Contract Documents, including:
 - 1. Manufacturer's name and address, product, trade name, model, or catalog number, performance and test data, and reference standards.
 - 2. Itemized point-by-point comparison of proposed substitution with specified product, listing variations in quality, performance, and other pertinent characteristics.
 - 3. Reference to Article and Paragraph numbers in Specification Section.
 - 4. Cost data comparing proposed substitution with specified product and amount of net change to Contract Sum.
 - 5. Changes required in other Work.
 - 6. Availability of maintenance service and source of replacement parts as applicable.
 - 7. Certified test data to show compliance with performance characteristics specified.
 - 8. Samples when applicable or requested.


- 9. Other information as necessary to assist Engineer's evaluation.
- D. A request constitutes a representation that Bidder or Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
 - 6. Will reimburse Owner for review or redesign services associated with reapproval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.
- F. Substitution Submittal Procedure:
 - 1. Submit requests for substitutions on Contractor's standard form.
 - 2. Submit electronic copies of Request for Substitution for consideration. Limit each request to one proposed substitution.
 - 3. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 - 4. Engineer will notify Contractor in writing of decision to accept or reject request.

1.5 INSTALLER SUBSTITUTION PROCEDURES

- A. Engineer will consider requests for substitutions only within 15 days after date of Owner-Contractor Agreement established in Notice to Proceed.
- B. Document each request with:
 - 1. Installer's qualifications.
 - 2. Installer's experience in work similar to that specified.
 - 3. Other information as necessary to assist Engineer's evaluation.
- C. Substitution Submittal Procedure:
 - 1. Submit electronic copy of Request for Substitution for consideration. Limit each request to one proposed substitution.
 - 2. Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

SECTION 01300 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and Project conditions.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Preinstallation meetings.
- F. Closeout meeting.
- G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - 1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.
- D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.
- E. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.
- F. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

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1.3 PRECONSTRUCTION MEETING

- A. Engineer will schedule and preside over meeting after Notice of Award.
- B. Attendance Required: Engineer, Owner and Contractor.
- C. Minimum Agenda:
 - 1. Distribution of Contract Documents.
 - 2. Designation of personnel representing parties in Contract, and Engineer.
 - 3. Communication procedures.
 - 4. Procedures and processing of requests for interpretations, field decisions, field orders, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
 - 5. Scheduling.
 - 6. Critical Work sequencing.
- D. Contractor: Record minutes and distribute copies to participants within two days after meeting, with copies each to Engineer, Owner, and those affected by decisions made.

1.4 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.
- C. Attendance Required: Job superintendent, major Subcontractors Contractors and suppliers, and Engineer, Owner, as appropriate to agenda topics for each meeting.
- D. Minimum Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems impeding planned progress.
 - 5. Review of submittal schedule and status of submittals.
 - 6. Review of off-Site fabrication and delivery schedules.
 - 7. Maintenance of Progress Schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on Progress Schedule and coordination.
 - 13. Other business relating to Work.
- E. Contractor: Record minutes and distribute copies to participants within two days after meeting, with copies each to Engineer, Owner, and those affected by decisions made.



1.5 PREINSTALLATION MEETINGS

- A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.
- B. Require attendance of parties directly affecting, or affected by, Work of specific Section.
- C. Notify Engineer four days in advance of meeting date.
- D. Prepare agenda and preside over meeting:
 - 1. Review conditions of installation, preparation, and installation procedures.
 - 2. Review coordination with related Work.
- E. Record minutes and distribute copies to participants within two days after meeting, with copies each to Engineer, Owner, and those affected by decisions made.

1.6 CLOSEOUT MEETING

- A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.
- B. Attendance Required: Contractor Construction Manager, major Contractors major Subcontractors, Engineer, Owner, and others appropriate to agenda.
- C. Notify Engineer four days in advance of meeting date.
- D. Minimum Agenda:
 - 1. Start-up of facilities and systems.
 - 2. Operations and maintenance manuals.
 - 3. Testing, adjusting, and balancing.
 - 4. System demonstration and observation.
 - 5. Operation and maintenance instructions for Owner's personnel.
 - 6. Contractor's inspection of Work.
 - 7. Contractor's preparation of an initial "punch list."
 - 8. Procedure to request Engineer inspection to determine date of Substantial Completion.
 - 9. Completion time for correcting deficiencies.
 - 10. Inspections by authorities having jurisdiction.
 - 11. Certificate of Occupancy and transfer of insurance responsibilities.
 - 12. Partial release of retainage.
 - 13. Final cleaning.
 - 14. Preparation for final inspection.
 - 15. Closeout Submittals:
 - a. Project record documents.
 - b. Operating and maintenance documents.
 - c. Operating and maintenance materials.
 - d. Affidavits.
 - 16. Final Application for Payment.
 - 17. Contractor's demobilization of Site.
 - 18. Maintenance.



E. Record minutes and distribute copies to participants within two days after meeting, with copies each to Engineer, Owner, and those affected by decisions made.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 ALTERATION PROCEDURES

- A. The Site will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.
 - 1. Perform Work not to interfere with operations of occupied areas.
 - 2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
 - 3. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.
- B. Materials: As specified in product Sections; match existing products with new and salvaged products for patching and extending Work.
- C. Employ skilled and experienced installer to perform alteration and renovation Work.
- D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 017000 Execution and Closeout Requirements
- E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- F. Remove debris and abandoned items from area and from concealed spaces.
- G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.
- H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.
- I. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to original or specified condition.
- J. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- K. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Engineer for review.
- L. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.



M. Finish surfaces as specified in individual product Sections.

SECTION 01321 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Submittals.
 - B. Quality assurance.
 - C. Format for network analysis schedules.
 - D. Network analysis schedules.
 - E. Bar chart schedules.
 - F. Review and evaluation.
 - G. Updating schedules.
 - H. Distribution.

1.2 SUBMITTALS

- A. Within 10 days after date of Owner-Contractor Agreement, established in Notice to Proceed, submit proposed preliminary network diagram defining planned operations for the Work of the entire project.
- B. Participate in review of preliminary and complete network diagrams jointly with Engineer.
- C. Submit updated network schedules with each Application for Payment.
- D. Submit network schedules under transmittal letter form specified in Section 013300 Submittal Procedures.
- E. Schedule Updates:
 - 1. Overall percent complete, projected and actual.
 - 2. Completion progress by listed activity and subactivity, to within five days prior to submittal.
 - 3. Changes in Work scope and activities modified since submittal.
 - 4. Delays in submittals or resubmittals, deliveries, or Work.
 - 5. Adjusted or modified sequences of Work.
 - 6. Other identifiable changes.
 - 7. Revised projections of progress and completion.
- F. Narrative Progress Report:
 - 1. Submit with each submission of Progress Schedule.
 - 2. Summary of Work completed during the past period between reports.
 - 3. Work planned during the next period.



- 4. Explanation of differences between summary of Work completed and Work planned in previously submitted report.
- 5. Current and anticipated delaying factors and estimated impact on other activities and completion milestones.
- 6. Corrective action taken or proposed.

1.3 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel specializing in CPM scheduling with two years' minimum experience in scheduling construction work of complexity comparable to the Project.
- B. Contractor's Administrative Personnel: Two years' minimum experience in using and monitoring CPM schedules on comparable Projects.

1.4 FORMAT FOR NETWORK ANALYSIS SCHEDULE

- A. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable Specification Section number.
- B. Diagram Sheet Size: 11 inches high x 17 inches wide.
- C. Scale and Spacing: To allow for notations and revisions.

1.5 NETWORK ANALYSIS SCHEDULES

- A. Prepare network analysis diagrams and supporting mathematical analyses using critical path method.
- B. Illustrate order and interdependence of activities and sequence of Work; how start of given activity depends on completion of preceding activities, and how completion of activity may restrain start of subsequent activities.
- C. Illustrate complete sequence of construction by activity, identifying Work of separate stages. Indicate dates for submittals and return of submittals; dates for procurement and delivery of critical products; and dates for installation and provision for testing. Include legend for symbols and abbreviations used.
- D. Mathematical Analysis: Tabulate each activity of detailed network diagrams using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15-day intervals. Status of critical activities.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; accrue float time to Owner and to Owner's benefit.



- 11. Monetary value of activity, keyed to Schedule of Values.
- 12. Percentage of activity completed.
- 13. Responsibility.
- E. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and of recomputing of scheduled dates and float.
- F. Required Sorts: List activities in sorts or groups:
 - 1. By preceding Work item or event number from lowest to highest.
 - 2. By longest float, then in order of early start.
 - 3. By responsibility in order of earliest possible start date.
 - 4. In order of latest allowable start dates.
 - 5. In order of latest allowable finish dates.
 - 6. Contractor's periodic payment request sorted by Schedule of Values list.
 - 7. List of basic input data-generating report.
 - 8. List of activities on critical path.
- G. Prepare subschedules for each stage of Work and Sequencing of Construction Plan identified in Section 01100 Summary.
- H. Coordinate contents with Schedule of Values in Section 013300 Submittal Procedures.

1.6 BAR CHART SCHEDULES

- A. Format: Bar chart Schedule, to include at least:
 - 1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:
 - a. Subcontract Work.
 - b. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.
 - c. Move-in and other preliminary activities.
 - d. Equipment and equipment system test and startup activities.
 - e. Project closeout and cleanup.
 - f. Work sequences, constraints, and milestones.
 - 2. Listings identified by Specification Section number.
 - 3. Identification of the following:
 - a. Horizontal time frame by year, month, and week.
 - b. Duration, early start, and completion for each activity and subactivity.
 - c. Critical activities and Project float.
 - d. Subschedules to further define critical portions of Work.

1.7 REVIEW AND EVALUATION

- A. Participate in joint review and evaluation of schedules with Engineer at each submittal.
- B. Evaluate Project status to determine Work behind schedule and Work ahead of schedule.

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1.8 UPDATING SCHEDULES

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Annotate schedules to depict current status of Work.
- C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- D. Upon approval of a Change Order, include the change in the next schedule submittal.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit sorts as required to support recommended changes.
- G. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect including effects of changes on schedules of separate Contractors.

1.9 DISTRIBUTION

- A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, to Subcontractors, suppliers, Engineer, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Definitions.
 - B. Submittal procedures.
 - C. Construction progress schedules.
 - D. Proposed product list.
 - E. Product data.
 - F. Use of electronic CAD files of Project Drawings.
 - G. Shop Drawings.
 - H. Other submittals.
 - I. Design data.
 - J. Test reports.
 - K. Certificates.
 - L. Manufacturer's instructions.
 - M. Manufacturer's field reports.
 - N. Erection Drawings.
 - O. Contractor review.
 - P. Engineer review.

1.2 **DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.
- B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

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1.3 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Engineer-accepted form.
- B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.
- C. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.
- D. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite Project, and submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.
- F. For each submittal for review, allow 10 days excluding delivery time to and from Contractor.
- G. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.
- H. Allow space on submittals for Contractor and Engineer review stamps.
- I. When revised for resubmission, identify changes made since previous submission.
- J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.
- K. Submittals not requested will not be recognized nor processed.
- L. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with Section 013216 - Construction Progress Schedule

1.5 PROPOSED PRODUCT LIST

- A. Within 15 days after date of Owner-Contractor Agreement, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.



1.6 PRODUCT DATA

- A. Product Data: Action Submittal: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.
- B. Submit electronic submittals via email as PDF electronic files.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01700 Execution and Closeout Requirements.

1.7 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

- A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.
- B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:
 - Use of files is solely at receiver's risk. Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
 - 2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
 - 3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
 - 4. Receiver shall not hold Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
 - 5. Receiver shall understand that even though Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
 - 6. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall hold Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

1.8 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.



- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.
 - 1. Include signed and sealed calculations to support design.
 - 2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
 - 3. Make revisions and provide additional information when required by authorities having jurisdiction.
- D. Submit electronic submittals via email as PDF electronic files.
- E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 01700 Execution and Closeout Requirements.

1.9 OTHER SUBMITTALS

- A. Closeout Submittals: Comply with Section 01700 Execution and Closeout Requirements.
- B. Informational Submittal: Submit data for Engineer's knowledge as Contract administrator or for Owner.
- C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.10 TEST REPORTS

- A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 CERTIFICATES

- A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.

1.12 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.



- B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Engineer in quantities specified for Product Data.
- C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.13 MANUFACTURER'S FIELD REPORTS

- A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit report in duplicate within 5 days of observation to Engineer for information.
- C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.14 ERECTION DRAWINGS

- A. Informational Submittal: Submit Drawings for Engineer's knowledge as Contract administrator or for Owner.
- B. Submit Drawings for information assessing conformance with information given and design concept expressed in Contract Documents.
- C. Data indicating inappropriate or unacceptable Work may be subject to action by Engineer or Owner.

1.15 CONTRACTOR REVIEW

- A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.
- B. Contractor: Responsible for:
 - 1. Determination and verification of materials including manufacturer's catalog numbers.
 - 2. Determination and verification of field measurements and field construction criteria.
 - 3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.
 - 4. Determination of accuracy and completeness of dimensions and quantities.
 - 5. Confirmation and coordination of dimensions and field conditions at Site.
 - 6. Construction means, techniques, sequences, and procedures.
 - 7. Safety precautions.
 - 8. Coordination and performance of Work of all trades.
- C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.
- D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

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1.16 ENGINEER REVIEW

- A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.
- B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.
- C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.
- D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order, Field Order, or Work Change Directive.
- E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Quality control.
 - B. Tolerances.
 - C. References.
 - D. Labeling.
 - E. Mockup requirements.
 - F. Testing and inspection services.
 - G. Manufacturers' field services.

1.2 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Perform Work using persons qualified to produce required and specified quality.
- D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.
- E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

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 - C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current as of date of Contract Documents except where specific date is established by code.
- C. Obtain copies of standards and maintain on Site when required by product Specification Sections.
- D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

- A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.
- B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:
 - 1. Model number.
 - 2. Serial number.
 - 3. Performance characteristics.
- C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 TESTING AND INSPECTION SERVICES

- A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.
 - 1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time Professional Engineer specialist and responsible officer.
 - 2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer, Owner, and authorities having jurisdiction.
 - 1. Laboratory: Authorized to operate at Project location in State of Nevada.
 - 2. Laboratory Staff: Maintain full-time Professional Engineer on staff to review services.



- 3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.
- C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.
- D. Reports shall be submitted by independent firm to Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.
 - 1. Submit final report indicating correction of Work previously reported as noncompliant.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Engineer and independent firm 24 hours before expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.
- F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.
- G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
- H. Agency Responsibilities:
 - 1. Test Samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.
 - 3. Perform indicated sampling and testing of products according to specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.
 - 6. Perform additional tests required by Engineer.
 - 7. Attend preconstruction meetings and progress meetings.
- I. Agency Reports: After each test, promptly submit electronic copies of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Name of inspector.
 - 4. Date and time of sampling or inspection.
 - 5. Identification of product and Specification Section.
 - 6. Location in Project.
 - 7. Type of inspection or test.
 - 8. Date of test.
 - 9. Results of tests.



- 10. Conformance with Contract Documents.
- J. Limits on Testing Authority:
 - 1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency or laboratory may not approve or accept any portion of the Work.
 - 3. Agency or laboratory may not assume duties of Contractor.
 - 4. Agency or laboratory has no authority to stop the Work.

1.7 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.
- C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
- D. Refer to Section 013300 Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary facilities under Construction Management Agreement.
- B. Temporary Utilities:
 - 1. Temporary sanitary facilities.
 - 2. Temporary Water for Construction
- C. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.
 - 6. Traffic regulation.
 - 7. Fire-prevention facilities.
- D. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Security.
 - 4. Water control.
 - 5. Dust control.
 - 6. Erosion and sediment control.
 - 7. Noise control.
 - 8. Pollution control.
- E. Removal of utilities, facilities, and controls.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E 90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 3. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 TEMPORARY FACILITIES UNDER CONSTRUCTION MANAGEMENT AGREEMENT

- A. Temporary Provisions Provided by Construction Manager:
 - 1. Temporary barriers, barricades, covered walkways, fencing, exterior closures, and interior closures.



- 2. Temporary field offices.
- 3. Cleaning during construction.
- 4. Access roads and approaches.
- 5. Temporary sanitary facilities.
- 6. Temporary electrical service and distribution system for power and lighting.
- B. Each Contractor: Coordinate provisions with Construction Manager and provide the following items as necessary for execution of the Work including associated costs:
 - 1. Construction aids.
 - 2. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls.
 - 3. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public.
 - 4. On Construction Manager's approval, may provide temporary field office including electrical service and temporary telephone.
 - 5. Temporary tree and plant protection.
 - 6. Temporary heating before building enclosure.
 - 7. Electrical service required in addition to temporary service and distribution provided by Construction Manager.
 - 8. Temporary provisions for protection of installed Work.

1.4 TEMPORARY UTILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.
- B. Water for construction can be obtained from the Owner at the fire hydrant near the intersection of Kingsley Street and Twin Lakes Road. Water use must be logged and submitted to the owner.

1.5 FIELD OFFICES AND SHEDS

- A. Designated existing spaces may be used for field offices and for storage:
 - 1. Site (Limited).
 - 2. Treatment Plant.
- B. When permanent facilities are enclosed with operable utilities, relocate field offices and storage into building, with written agreement of Owner, and remove temporary buildings.
- C. Environmental Control:
 - 1. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.
- D. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 01600 Product Requirements.
- E. Preparation: Fill and grade Sites for temporary structures sloped for drainage away from buildings.



F. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.6 VEHICULAR ACCESS

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.
- C. Locate as indicated on Drawings approved by Engineer.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Use designated existing on-Site roads for construction traffic.

1.7 PARKING

- A. If Site space is not adequate, provide additional off-Site parking.
- B. Use of designated areas of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.
- C. Use of designated areas of existing parking facilities used by construction personnel is permitted.
- D. Do not allow heavy vehicles or construction equipment in parking areas.
- E. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
 - 2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.
- F. Removal, Repair:
 - 1. Remove temporary materials and construction before Substantial Completion.
 - 2. Repair existing facilities damaged by use, to original condition.
- G. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.8 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.
- B. Collect and remove waste materials, debris, and rubbish from Site weekly and dispose of off-Site.



C. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.9 PROJECT IDENTIFICATION – OPTIONAL AT CONTRACTOR'S DISCRETION

- A. Project Identification Signs:
 - 1. One sign, 6-sq ft area, bottom 4 feet aboveground.
 - 2. Content:
 - a. Project number, title, and name of Owner.
 - b. Names and titles of authorities.
 - c. Names and titles of Engineer and Consultants.
 - d. Name of Prime Contractor.
 - 3. Lettering: Series C of Standard Alphabet for Traffic Control Devices, "Manual on Uniform Traffic Control Devices for Streets and Highways," Federal Highway Administration.
- B. Project Informational Signs:
 - 1. Informational signs of same colors and lettering as Project identification sign or standard products; size lettering for legibility at 100-foot distance.
 - 2. Provide sign at each end of project site's intersection with existing bike & pedestrian pathway and provide directional signs to direct pedestrian and bicycle traffic around Site. Relocate as Work progress requires.
 - 3. Signs shall clearly state "No Trespassing" and indicate that active construction is occurring.
 - 4. No other signs are allowed without Owner's permission except those required by law.
- C. Sign Materials:
 - 1. As necessary to convey project information and provide for public safety.
- D. Installation:
 - 1. Install Project identification sign within 15 days after date established by Notice to Proceed.
 - 2. Erect at designated location of high public visibility adjacent to main entrance to Site.
 - 3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
 - 4. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Maintenance: Maintain clean signs and supports; repair deterioration and damage.
- F. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.10 TRAFFIC REGULATION

- A. Signs, Signals, and Devices:
 - 1. Traffic Cones and Drums: As approved by authorities having jurisdiction.
 - 2. Flag Person Equipment: As required by authorities having jurisdiction.
- B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.



- 1. Drawings indicate haul routes designated by authorities having jurisdiction for use by construction traffic.
- 2. Confine construction traffic to designated haul routes.
- 3. Provide traffic control at critical areas of haul routes to regulate traffic and to minimize interference with public traffic.
- C. Traffic Signs and Signals:
 - 1. Provide signs at approaches to Site and on Site, at crossroads, detours, and elsewhere as needed to direct construction and affected public traffic.
- D. Removal:
 - 1. Remove equipment and devices when no longer required.
 - 2. Repair damage caused by installation.

1.11 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.
 - 1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
 - 2. Provide 6-foot-high barriers around drip line, with access for maintenance.
 - 3. Replace trees and plants damaged by construction operations.
- C. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.12 ENCLOSURES AND FENCING

- A. Construction: Commercial-grade chain-link fence.
- B. Provide 6-foot-high fence around construction Site; equip with vehicular gates with locks.

1.13 SECURITY

- A. Security Program:
 - 1. Protect Work on existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
 - 2. Initiate program in coordination with Owner's existing security system at Project mobilization.
 - 3. Maintain program throughout construction period until directed by Engineer.
- B. Entry Control:
 - 1. Restrict entrance of persons and vehicles to Project Site.
 - 2. Allow entrance only to authorized persons with proper identification.

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1.14 WATER CONTROL

- A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.
- B. Protect Site from puddles or running water. Provide water barriers as required to protect Site from soil erosion.

1.15 DUST CONTROL

- A. Execute Work by methods that minimize raising dust from construction operations.
- B. Provide positive means to prevent airborne dust from dispersing into atmosphere.
- 1.16 EROSION AND SEDIMENT CONTROL
 - A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - B. Minimize surface area of bare soil exposed at one time.
 - C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.
 - D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.
 - E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.
 - F. Comply with sediment and erosion control plan indicated on Drawings.

1.17 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.
- B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.18 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials before Final Application for Payment inspection.
- B. Remove underground installations to minimum depth of 2 feet. Grade Site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary Work.



D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Products.
 - B. Product delivery requirements.
 - C. Product storage and handling requirements.
 - D. Product options.
 - E. Equipment electrical characteristics and components.

1.2 PRODUCTS

- A. At minimum, comply with specified requirements and reference standards.
- B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.
- C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.
- D. Domestic Products: Unless a waiver to this requirement is approved by the Engineer all iron and steel products provided by the Contractor and used in this project will be or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement.
- E. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.
- F. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products according to manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.
- 1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS
 - A. Store and protect products according to manufacturer's instructions.



- B. Store products with seals and labels intact and legible.
- C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.
- D. For exterior storage of fabricated products, place products on sloped supports aboveground.
- E. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 01250 -Substitution Procedures.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.
- B. Cord and Plug: Furnish minimum 6-foot long cord and plug including grounding connector for connection to electric wiring system. Cord of longer length may be specified in individual Specification Sections.

PART 3 EXECUTION - Not Used

SECTION 01700 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

- 1.1 SECTION INCLUDES
 - A. Field engineering.
 - B. Closeout procedures.
 - C. Starting of systems.
 - D. Demonstration and instructions.
 - E. Testing, adjusting, and balancing.
 - F. Project record documents.
 - G. Operation and maintenance data.
 - H. Manual for equipment and systems.
 - I. Spare parts and maintenance products.
 - J. Product warranties and product bonds.
 - K. Maintenance service.
 - L. Examination.
 - M. Preparation.
 - N. Execution.
 - O. Cutting and patching.
 - P. Protecting installed construction.
 - Q. Final cleaning.

1.2 FIELD ENGINEERING

- A. Employ land surveyor registered at Project location in State of Nevada and acceptable to Engineer.
- B. Owner will locate and Contractor shall protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.
- C. Control datum for survey is established by Owner-provided survey.



- D. Prior to beginning Work, verify and establish elevations of existing ground to ensure that new Work will meet existing elevations as shown on the Drawings.
- E. Verify setbacks and easements; confirm Drawing dimensions and elevations.
- F. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.
- G. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.
- H. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.3 CLOSEOUT PROCEDURES

- A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:
 - 1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
 - 2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
 - 3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
 - 4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
 - 5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
 - 6. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
 - 7. Perform final cleaning according to this Section.
- B. Substantial Completion Inspection:
 - 1. When Contractor considers Work to be substantially complete, submit to Engineer:
 - a. Written certificate that Work, or designated portion, is substantially complete.
 - b. List of items to be completed or corrected (initial punch list).
 - 2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
 - 3. Should Engineer determine that Work is not substantially complete:
 - a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
 - b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.



- 4. When Engineer finds that Work is substantially complete, Engineer will:
 - a. Prepare Certificate of Substantial Completion on EJCDC C-625 Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
 - b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
- 5. After Work is substantially complete, Contractor shall:
 - a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
 - b. Complete Work listed for completion or correction within time period stipulated.
- C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.
 - 1. When Contractor considers Work to be complete, submit written certification that:
 - a. Contract Documents have been reviewed.
 - b. Work has been examined for compliance with Contract Documents.
 - c. Work has been completed according to Contract Documents.
 - d. Work is completed and ready for final inspection.
 - 2. Submittals: Submit following:
 - a. Final punch list indicating all items have been completed or corrected.
 - b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
 - d. Accounting statement for final changes to Contract Sum.
 - e. Contractor's affidavit of payment of debts and claims.
 - f. Contractor affidavit of release of liens.
 - g. Consent of surety to final payment.
 - 3. Perform final cleaning for Contractor-soiled areas according to this Section.
- D. Final Completion Inspection:
 - 1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.
 - 2. Should Engineer consider Work to be incomplete or defective:
 - a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
 - b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
 - c. Engineer will reinspect Work.
 - d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.4 STARTING OF SYSTEMS

- A. Coordinate schedule for startup of various equipment and systems.
- B. Notify Engineer and Owner seven days prior to startup of each item.



- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.
- G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.
- H. Submit a written report according to Section 01330 Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment and instructed by qualified manufacturer's representative who is knowledgeable about the Project.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual Specification Sections.
- 1.6 TESTING, ADJUSTING, AND BALANCING

1.7 PROJECT RECORD DOCUMENTS

- A. Maintain on Site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.



- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates used.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:
 - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
 - 2. Include locations of concealed elements of the Work.
 - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
 - 4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
 - 5. Identify and locate existing buried or concealed items encountered during Project.
 - 6. Measured depths of foundations in relation to finish floor datum.
 - 7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 9. Field changes of dimension and detail.
 - 10. Details not on original Drawings.
- G. Submit marked-up paper copy documents to Engineer with claim for final Application for Payment.
- H. Submit PDF electronic files of marked-up documents to Engineer with claim for final Application for Payment.

1.8 OPERATION AND MAINTENANCE DATA

- A. Submit in PDF composite electronic indexed file.
- B. Submit data bound in 8-1/2 x 11-inch text pages, three D side ring binders with durable plastic covers.
- C. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project.
- D. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

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- E. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- F. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Safety precautions to be taken when operating and maintaining or working near equipment.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop Drawings and product data.
 - b. Originals of warranties.

1.9 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- B. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy will be reviewed and returned after final inspection, with Engineer comments. Revise content of document sets as required prior to final submission.
- C. Submit two sets of revised final volumes within ten days after final inspection.
- D. Submit in PDF composite electronic indexed file of final manual within ten days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- G. Include color-coded wiring diagrams as installed.
- H. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.



- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- P. Additional Requirements: As specified in individual product Specification Sections.
- Q. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.
- 1.10 SPARE PARTS AND MAINTENANCE PRODUCTS
 - A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.
 - B. Deliver to and place in location as directed by Owner; obtain receipt prior to final payment.

1.11 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.
- B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Submit prior to final Application for Payment.
- F. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
 - 2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.


3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.12 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in Specification Sections for one year from date of Substantial Completion during warranty period.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual Specification Sections.
- D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.



3.3 EXECUTION

- A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.
- B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.
- D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
 - 1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
 - 2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
 - 3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Engineer for final decision.
- E. Allow for expansion of materials and building movement.
- F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.
 - 1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
 - 2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.
- G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.
 - 1. Refer questionable mounting heights choices to Engineer for final decision.
 - 2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.
- H. Adjust operating products and equipment to ensure smooth and unhindered operation.
- I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

- A. Employ original skilled and experienced installers to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements affecting:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight-exposed elements.

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 - 5. Work of Owner or separate contractor.
 - C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and nonconforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
 - D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.
 - E. Cut masonry and concrete materials using masonry saw or core drill.
 - F. Restore Work with new products according to requirements of Contract Documents.
 - G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
 - H. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed Work and provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.
- C. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

- A. Execute final cleaning prior to final Project assessment.
- B. Clean Site; sweep paved areas, rake clean landscaped surfaces.
- C. Remove waste and surplus materials, rubbish, and construction facilities from Site.

SECTION 02100 - SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.
 - 2. Removing designated paving, curbs.
 - 3. Removing designated trees, shrubs, and other plant life.
 - 4. Removing abandoned utilities.
- 1.2 SUBMITTALS NOT USED
- 1.3 QUALITY ASSURANCE
 - A. Conform to TRPA Handbook for Best Management Practices, including site clearing and tree removal, disposal of debris.
 - B. Perform Work in accordance with TRPA Handbook.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.
- C. Identify waste area and stockpile location for placing removed materials.

3.2 PREPARATION

- A. Call Local Utility Line Information service at CALL BEFORE YOU DIG 1-800-227-2600 not less than 48 hours before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- 3.3 **PROTECTION**
 - A. Locate, identify, and protect utilities indicated to remain, from damage.
 - B. Protect trees, plant growth, and features designated to remain, as final landscaping as specified in Section 01500 Temporary Facilities and Controls and where shown on the Drawings.



C. Protect bench marks, survey control points, and existing structures from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work to minimum depths shown on the Drawings.
- B. Remove trees and shrubs within marked areas. Remove stumps, main root ball, root system to depths required, surface rock, and subsurface rocks.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Partially remove paving, curbs, and, as indicated on Drawings. Neatly saw cut edges at right angle to surface.
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.

3.6 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-landscaped, or regraded, without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.
- C. Stockpile in area designated on site to depth not exceeding those shown on the Drawings feet and protect from erosion. Stockpile material on impervious material and cover over with same material, until disposal.
- D. Remove excess topsoil not intended for reuse, from site.

3.7 SCHEDULES

- A. Remove the following materials:
 - 1. Trees specifically identified on Drawings for removal.
- B. Protect the following materials:
 - 1. Bike Path and Stream Crossings.
 - 2. Other trees outside project area.
 - 3. Existing fencing.

SECTION 02150 - FILL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

- 1. Backfilling building perimeter to subgrade elevations.
- 2. Backfilling site structures to subgrade elevations.
- 3. Fill under slabs-on-grade.
- 4. Fill under paving.
- 5. Fill for over-excavation.
- B. Related Sections:
 - 1. Section 03300 Cast-In-Place Concrete: Concrete materials.
 - 2. Section 02200 Soils for Earthwork: Soils for fill.
 - 3. Section 02300 Excavation.
 - 4. Section 02400 Trenching: Backfilling of utility trenches.
 - 5. Section 15050 Site Water Utility Distribution Piping.
- 1.2 UNIT PRICE MEASUREMENT AND PAYMENT NOT USED

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
 - 2. ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - 3. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
 - 4. ASTM D2167 Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 - 5. ASTM D2922 Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 6. ASTM D3017 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 SUBMITTALS

- A. Section 013300 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for geotextile fabric indicating fabric and construction.



- C. Materials Source: Submit name of imported fill materials suppliers.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
- 1.5 QUALITY ASSURANCE
 - A. Perform Work in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.

PART 2 PRODUCTS

- 2.1 FILL MATERIALS
 - A. Subsoil Fill: Type S2 as specified in Section 02200.
 - B. Structural Fill: Type S1 as specified in Section 02200.
 - C. Granular Fill: as specified in Section 02200.
 - D. Concrete: Structural concrete as specified in Section 03300 with compressive strength of 4,000 psi.
- 2.2 ACCESSORIES NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 013000 Administrative Requirements: Coordination and project conditions.
- B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- C. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
- D. Verify structural ability of unsupported walls to support loads imposed by fill.

3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with granular fill and compact to density equal to or greater than requirements for subsequent fill material.
- C. Scarify subgrade surface to depth of 6 inches.



D. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material. No visible deflection of subgrade shall be allowed prior to placing of bedding.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Place geotextile fabric over any aggregate fill, or structural remediation for poor subgrade conditions described in Section 3.2 prior to placing next lift of fill.
- D. Place material in continuous layers as follows:
 - 1. Subsoil Fill: Maximum 8 inches compacted depth.
 - 2. Structural Fill: Maximum 6 inches compacted depth.
 - 3. Granular Fill: Maximum 8 inches compacted depth.
- E. Employ placement method that does not disturb or damage other work.
- F. Maintain optimum moisture content of backfill materials to attain required compaction density.
- G. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.
- H. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- I. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
- J. Make gradual grade changes. Blend slope into level areas.
- K. Remove surplus backfill materials from site.
- L. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

- A. Section 01400 Quality Requirements: Tolerances.
- B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.
- C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.



- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D1556, or ASTM D2922.
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- E. Frequency of Tests: Once per lift.
- F. Proof roll compacted fill surfaces under slabs-on-grade, paving, and bedding for SRP Tanks.
- 3.6 PROTECTION OF FINISHED WORK
 - A. Section 01700 Execution and Closeout Requirements: Protecting finished work.
 - B. Reshape and re-compact fills subjected to vehicular traffic.

3.7 SCHEDULE

- A. Underground Tanks:
 - 1. Initial fill of Fill Type S 1, 6 inches thick, compacted to 90 percent.
 - 2. Remaining fill of Fill Type S 2, to subgrade elevation. Max 8" lift, compact uniformly to 90 percent of maximum density.
- B. Fill Under Asphalt Paving:
 - 1. Compact subsoil to 95 percent of its maximum dry density.
 - 2. Fill Type S2, to 3 inches below finish paving elevation, compact uniformly to 95 percent of maximum density.

SECTION 02200 - SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Subsoil materials.
 - 2. Topsoil materials.

B. Related Sections:

- 1. Section 02400- Trenching.
- 2. Section 02150 Fill.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
 - 2. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
 - 3. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.3 SUBMITTALS

- A. Section 01330 Submittal Procedures: Requirements for submittals.
- B. Materials Source: Submit name of imported materials source.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Furnish each subsoil material from single source throughout the Work.
- B. Perform Work in accordance with 2015 State Specifications for Public Works Project (Green Book).

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PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

- A. Subsoil Type S1 Bedding: Conforming to 2015 State Specifications for Public Works Project (Green Book) Class A Bedding standard.
- B. Subsoil Type S2 Initial Backfill: Conforming to ASTM D2321 Class I.
 - 1. Excavated and re-used native sandy granular material per Geotechnical Report recommendations or Imported borrow Conforming to ASTM D2321 Class I.
 - 2. Graded.
- C. Subsoil Type S3 Final Backfill:
 - 1. Excavated and re-used material.
 - 2. Graded.
 - 3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

2.2 SOURCE QUALITY CONTROL

- A. Section 01400 Quality Requirements: Testing and Inspection Services Testing and analysis of soil material.
- B. When tests indicate materials do not meet specified requirements, change material and retest.
- C. Furnish materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.
- C. Remove excess excavated materials not intended for reuse, from site.
- D. Remove excavated materials not meeting requirements for subsoil materials from site.

3.2 STOCKPILING

- A. Stockpile materials on site at locations indicated.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Prevent intermixing of soil types or contamination.



- E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- F. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.
- B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

SECTION 02300 - EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Soil densification.
 - 2. Excavating for building foundations.
 - 3. Excavating for site structures.

B. Related Sections:

- 1. Section 02200 Soils for Earthwork: Stockpiling excavated materials.
- 2. Section 02400 Trenching: Excavating for utility trenches.
- 3. Section 02150 Fill.
- 1.2 UNIT PRICE MEASUREMENT AND PAYMENT NOT USED

1.3 REFERENCES

A. Local utility standards when working within 24 inches of utility lines.

1.4 SUBMITTALS

- A. Section 01330 Submittal Procedures: Requirements for submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with 2012 State Standard Specifications for Public Works (Orange Book) standards.

1.6 QUALIFICATIONS

A. Prepare excavation protection plan for approval by Engineer.

PART 2 PRODUCTS – Not Used.

PART 3 EXECUTION

3.1 PREPARATION

A. Call Local Utility Line Information service CALL BEFORE YOU DIG 1-800-227-2600 not less than 48 hours before performing Work.



- 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Notify utility company prior to removing or relocating utilities.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns, rock outcroppings and other features remaining as portion of final landscaping.
- F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- 3.2 SOIL DENSIFICATION VIBRO-COMPACTION
 - A. Vibro-compact substrates below footing bearing surfaces for footings as indicated on Drawings before excavating site.
 - B. Densify existing subsoils with relative density rating of compact to dense to attain relative density rating of very dense.
 - C. Densification Equipment:
 - 1. Depth Vibrator: Poker type with follower tubes with visible marking every 12 inches to enable insertion depth measurement.
 - 2. Motion: radial in horizontal plane.
 - 3. Data Acquisition System: Record amps or pressure of the vibrator motor over time and depth.
 - D. Insert vibrator to maximum specified depth. Densify soils for 30 seconds or other time as directed by Engineer. Withdraw vibrator every 12 inches increments and repeat densification at each increment.
 - 1. When subsurface obstruction prevents vibrator insertion to specified depth, request instructions from Engineer to compensate for obstruction.
 - E. Tolerances:
 - 1. Maximum Deviation from Center of Completed Compaction: 8 inches from indicated position.
 - 2. Maximum Deviation from Vertical: 4 degrees during vibrator insertion.

3.3 EXCAVATION

- A. Underpin adjacent structures which may be damaged by excavation work.
- B. Excavate subsoil to accommodate SRP Storage Tanks, construction operations, and light traffic.
- C. Excavate to working elevation for installing SRP Structures.



- D. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 02150 and Section 02200.
- E. Slope banks with machine to angle of repose or less until shored.
- F. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- G. Trim excavation. Remove loose matter.
- H. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume. Remove larger material as specified in Section 02150.
- I. Notify Engineer of unexpected subsurface conditions.
- J. Correct areas over excavated with structural fill Type S2 specified in Section 02150, as directed by Engineer.
- K. Remove excess and unsuitable material from site.
- L. Repair or replace items indicated to remain damaged by excavation.
- 3.4 FIELD QUALITY CONTROL
 - A. Section 01400 Quality Requirements: Field inspecting, testing, adjusting, and balancing.
 - B. Perform inspection of excavation and controlled fill operations in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
 - C. Request visual inspection of bearing surfaces by Engineer before installing subsequent work.

3.5 **PROTECTION**

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

SECTION 02400 - TRENCHING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating trenches for utilities from outside building to utility service.
 - 2. Compacted fill from top of utility bedding to subgrade elevations.
 - 3. Backfilling and compaction.

B. Related Sections:

- 1. Section 03300 Cast-In-Place Concrete: Concrete materials.
- 2. Section 02150 Soils for Earthwork: Soils for fill.
- 3. Section 02300 Excavation: General building excavation.
- 4. Section 02150 Fill: General backfilling.
- 5. Section 15064 Sanitary Utility Sewerage Piping: Sanitary sewer piping and bedding from building to utility service.
- 1.2 UNIT PRICE MEASUREMENT AND PAYMENT NOT USED

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T180 Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

- 1. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
- 2. ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- 3. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
- 4. ASTM D2167 Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- 5. ASTM D2922 Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- 6. ASTM D3017 Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.5 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.



- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Product Data: Submit data for geotextile fabric indicating fabric and construction.
- D. Materials Source: Submit name of imported fill materials suppliers.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance 2015 State Standard Specifications for Public Works (Green Book) standards.
- 1.7 QUALIFICATIONS
 - A. Prepare excavation protection plan for approval of Engineer.
- 1.8 FIELD MEASUREMENTS
 - A. Verify field measurements prior to fabrication.
- 1.9 COORDINATION
 - A. Section 013000 Administrative Requirements: Coordination and project conditions.
 - B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

- 2.1 FILL MATERIALS
 - A. Subsoil Fill: Type as specified in Section02150.
 - B. Structural Fill: Type S1 as specified in Section 02150.
 - C. Granular Fill: Type S2 as specified in Section 02150.
 - D. Concrete: Structural concrete as specified in Section 03300 with compressive strength of 4000 psi.



2.2 ACCESSORIES – NOT USED

PART 3 EXECUTION

3.1 LINES AND GRADES

- A. Lay pipes to lines and grades indicated on Drawings.
 - 1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

- A. Call Local Utility Line Information service at CALL BEFORE YOU DIG 1-800-227-2600 not less than 48 hours before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.
- D. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- E. Maintain and protect above and below grade utilities indicated to remain.
- F. Establish temporary traffic control and detours when trenching is performed in public right-ofway. Relocate controls and reroute traffic as required during progress of Work.

3.3 TRENCHING

- A. Excavate subsoil required for utilities to utility service.
- B. Remove lumped subsoil, boulders, and rock up of 1/6 cubic yard, measured by volume. Remove larger material as specified in Section 02300.
- C. Perform excavation within 24 inches of existing utility service in accordance with utility's requirements.
- D. Do not advance open trench more than 200 feet ahead of installed pipe.
- E. Cut trenches to width indicated on Drawings. Remove water or materials that interfere with Work.
- F. Excavate bottom of trenches maximum 4 feet wider than outside diameter of pipe.



- G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
- H. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Engineer until suitable material is encountered.
- I. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type S1 and compact to density equal to or greater than requirements for subsequent backfill material.
- J. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- K. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.
- L. Remove excess subsoil not intended for reuse, from site.

3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- C. Design sheeting and shoring to be removed at completion of excavation work.
- D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BACKFILLING

- A. Backfill trenches to contours and elevations with unfrozen fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place material in continuous layers as follows:
 - 1. Subsoil Fill: Maximum 8 inches compacted depth.
 - 2. Structural Fill: Maximum 6 inches compacted depth.
 - 3. Granular Fill: Maximum 8 inches compacted depth.
- D. Employ placement method that does not disturb or damage foundation perimeter drainage, utilities in trench, and SRP Tank invert elevations.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.



- F. Do not leave more than 50 feet of trench open at end of working day.
- G. Protect open trench to prevent danger to the public.

3.6 TOLERANCES

- A. Section 01400 Quality Requirements: Tolerances.
- B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch 0.08 feet from required elevations.
- C. Top Surface of General Backfilling: Plus or minus 1 inch 0.08 feet from required elevations.

3.7 FIELD QUALITY CONTROL

- A. Section 01400 Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557.
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.
- E. Frequency of Tests: Once per lift.

3.8 PROTECTION OF FINISHED WORK

- A. Section 01700 Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.9 SCHEDULE

- A. Storm and Sanitary Piping:
 - 1. Cover pipe and bedding with Fill Type S2: To subgrade elevation.
 - 2. Compact uniformly to minimum 95 percent of maximum density.

SECTION 02500 - ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Asphalt materials.
 - 2. Aggregate materials.
 - 3. Aggregate subbase.
 - 4. Asphalt paving base course, binder course, and wearing course.
 - 5. Asphalt paving overlay for existing paving.
 - 6. Surface slurry.

B. Related Requirement:

- 1. Section 02100 Site Clearing.
- 2. Section 02150 Fill: Compacted subbase for paving.

1.2 PRICE AND PAYMENT PROCEDURES – NOT USED

1.3 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO M17 Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
 - 2. AASHTO M29 Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
 - 3. AASHTO M140 Standard Specification for Emulsified Asphalt.
 - 4. AASHTO M208 Standard Specification for Cationic Emulsified Asphalt.
 - 5. AASHTO M288 Standard Specification for Geotextile Specification for Highway Applications.
 - 6. AASHTO M320 Standard Specification for Performance-Graded Asphalt Binder.
 - 7. AASHTO M324 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
 - 8. AASHTO MP1a Standard Specification for Performance-Graded Asphalt Binder.
- B. Asphalt Institute:
 - 1. AI MS-2 Mix Design Methods for Asphalt Concrete and Other Hot- Mix Types.
 - 2. AI MS-19 Basic Asphalt Emulsion Manual.
 - 3. AI SP-2 Superpave Mix Design.
- C. ASTM International:
 - 1. ASTM C1371-2004a Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
 - 2. ASTM C1549-2004 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
 - 3. ASTM D242 Standard Specification for Mineral Filler For Bituminous Paving Mixtures.
 - 4. ASTM D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.

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- 5. ASTM D946 Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
- 6. ASTM D977 Standard Specification for Emulsified Asphalt.
- 7. ASTM D1073 Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
- 8. ASTM D1188 Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
- 9. ASTM D2027 Standard Specification for Cutback Asphalt (Medium-Curing Type).
- 10. ASTM D2397 Standard Specification for Cationic Emulsified Asphalt.
- 11. ASTM D2726 Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
- 12. ASTM D2950 Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.
- 13. ASTM D3381 Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.
- 14. ASTM D3515 Standard Specification for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
- 15. ASTM D3549 Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.
- 16. ASTM D3910 Standard Practices for Design, Testing, and Construction of Slurry Seal.
- 17. ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
- 18. ASTM E408-1971(1996)e1 Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
- 19. ASTM E903-1996 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
- 20. ASTM E1918-1997 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
- 21. ASTM E1980-2001 Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

1.4 SUBMITTALS

- A. Section 01330 Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit product information for asphalt and aggregate materials.
 - 2. Submit mix design with laboratory test results supporting design.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Mixing Plant: Conform to 2015 State Standard Specifications for Public Works (Green Book) standards.
- B. Obtain materials from same source throughout.
- C. Perform Work in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.



1.6 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum five years experience.

1.7 AMBIENT CONDITIONS

- A. Section 01500 Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.
- B. Do not place asphalt mixture between November 1 and March 1.
- C. Do not place asphalt mixture when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.1 ASPHALT PAVING

- A. Performance / Design Criteria:
 - 1. Paving: Design for light duty commercial vehicles.
- B. Asphalt Materials:
 - 1. Asphalt Binder: In accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
 - 2. Primer: In accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
 - 3. Tack Coat: In accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
 - 4. Reclaimed Asphalt Pavement (RAP): Processed material obtained by milling or full depth removal of existing asphalt paving.
 - 5. Oil: 2015 State Standard Specifications for Public Works (Green Book) standards.
- C. Aggregate Materials:
 - 1. Coarse Aggregate: 2015 State Standard Specifications for Public Works (Green Book) standards.
 - 2. Fine Aggregate: 2015 State Standard Specifications for Public Works (Green Book) standards.

2.2 MIXES

- A. Use dry material to avoid foaming. Mix uniformly.
- B. Asphalt Paving Mixtures: Designed in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
- C. Surface Slurry: ASTM D3910, Type 3; emulsified asphalt slurry.



- D. Paving Surfaces: Minimum solar reflectance index (SRI) of 29, calculated in accordance with ASTM E1980.
 - 1. Reflectance: Measured in accordance with ASTM E903, ASTM E1918, or ASTM C1549.
 - 2. Emittance: Measured in accordance with ASTM E408 or ASTM C1371.

2.3 ACCESSORIES

- A. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.
- B. Sealant: ASTM D6690, Type IV; hot applied type.

2.4 SOURCE QUALITY CONTROL

- A. Section 014000 Quality Requirements: Testing, inspection and analysis requirements.
- B. Submit proposed mix design of each class of mix for review prior to beginning of Work.
- C. Test samples in accordance with AI MS-2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 017000 Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted subgrade subbase is dry and ready to support paving and imposed loads.
 - 1. Proof roll subbase with vibratory compactor in minimum two perpendicular passes to identify soft spots.
 - 2. Remove soft subbase and replace with compacted fill as specified in Section 02150.
- D. Verify gradients and elevations of base are correct.
- E. Verify gutter drainage grilles and frames, manhole frames and risers are installed in correct position and elevation.

3.2 PREPARATION

A. Prepare subbase in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.

3.3 DEMOLITION

A. Saw cut and notch existing paving as indicted on Drawings.



- B. Clean existing paving to remove foreign material, excess joint sealant and crack filler from paving surface.
- C. Repair surface defects in existing paving to provide uniform surface to receive new paving.

3.4 INSTALLATION

- A. Subbase:
 - 1. Prepare subbase in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
- B. Primer:
 - 1. Apply primer in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
- C. Tack Coat:
 - 1. Apply tack coat in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
- D. Single Course Asphalt Paving:
 - 1. Install Work in accordance with 2015 State Standard Specifications for Public Works (Green Book) standards.
 - 2. Place asphalt within 24 hours of applying primer or tack coat.
 - 3. Place asphalt wearing course to match existing thickness.
 - 4. Compact paving by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
 - 5. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.
- E. Double Course Asphalt Paving:
 - 1. Place asphalt binder course within 24 hours of applying primer or tack coat.
 - 2. Place binder course to match existing thickness.
 - 3. Place wearing course within 24 hours of placing and compacting binder course. When binder course is placed more than 24 hours before placing wearing course, clean surface and apply tack coat before placing wearing course.
 - 4. Place wearing course to match existing thickness.
 - 5. Compact each course by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
 - 6. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.
- F. Surface Slurry
 - 1. Install uniform thickness surface slurry over existing paving in accordance with ASTM D3910.
 - 2. Allow slurry to cure.
 - 3. Roll paving to achieve uniform surface.
- G. Curbs
 - 1. Install extruded asphalt curbs of 6 inch profile as indicated on Drawings.

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3.5 TOLERANCES

- A. Section 01400 Quality Requirements: Tolerances.
- B. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- C. Scheduled Compacted Thickness: Match existing.
- D. Variation from Indicated Elevation: Within 1/2 inch.

3.6 FIELD QUALITY CONTROL

- A. Section 014000 Quality Requirements: Requirements for inspecting, testing.
- B. Take samples and perform tests 2015 State Standard Specifications for Public Works (Green Book) standards.
- C. Asphalt Paving Mix Temperature: Measure temperature at time of placement.
- D. Asphalt Paving Thickness: ASTM D3549; test one core sample from every 1000 square yards compacted paving.
- E. Asphalt Paving Density: ASTM D1188 or ASTM D2726; test one core sample from every 500 square yards compacted paving.
- F. Asphalt Paving Density: ASTM D2950 nuclear method; test one location for every 500 square yards compacted paving.

3.7 PROTECTION

- A. Section 01700 Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from mechanical injury for 24 hours or until surface temperature is less than 140 degrees F.

3.8 ATTACHMENTS

- A. Paving at Truck Ramp and Garbage Area: Single course of 3-1/2 inch compacted thickness, with surface slurry.
- B. Paving at Parking Areas: Two courses; binder course of 2-1/2 inch compacted thickness and wearing course of 1 inch compacted thickness.
- C. Paving Front Sidewalks: Thickness and compaction of subbase to support moderate pedestrian traffic.



SECTION 02660 - DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Disinfection of potable water distribution and transmission system.
 - 2. Testing and reporting of results.
- B. Related Requirements:
 - 1. Section 15050 Public Water Utility Distribution Piping: Product and execution requirements for installation and testing of site domestic water distribution piping.
- 1.2 UNIT PRICE MEASUREMENT AND PAYMENT NOT USED

1.3 REFERENCE STANDARDS

- A. American Water Works Association:
 - 1. AWWA B300 Hypochlorites.
 - 2. AWWA B302 Ammonium Sulfate.
 - 3. AWWA B303 Sodium Chlorite.
 - 4. AWWA C651 Disinfecting Water Mains.

1.4 SUBMITTALS

- A. Section 013300 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit procedures, proposed chemicals, and treatment levels.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Certify that cleanliness of water distribution system meets or exceeds specified requirements.
- E. Certify that water conforms or fails to conform to bacterial standards of the Division of Drinking Water.
- F. Test and Evaluation Reports: Indicate testing results comparative to specified requirements.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Qualifications Statements:
 - 1. Submit qualifications for water treatment firm and testing firm.

1.5 CLOSEOUT SUBMITTALS

A. Section 01700 - Execution and Closeout Requirements: Requirements for submittals.



B. Disinfection Report:

- 1. Type and form of disinfectant used.
- 2. Date and time of disinfectant injection start and time of completion.
- 3. Test locations.
- 4. Name of person collecting samples.
- 5. Initial and 24-hour disinfectant residuals in treated water in ppm for each outlet tested.
- 6. Date and time of flushing start and completion.
- 7. Disinfectant residual after flushing in ppm for each outlet tested.
- C. Bacteriological Report:
 - 1. Date issued, project name, and testing laboratory name, address, and telephone number.
 - 2. Time and date of water sample collection.
 - 3. Name of person collecting samples.
 - 4. Test locations.
 - 5. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.
 - 6. Coliform bacteria test results for each outlet tested.
 - 7. Submit bacteriologist's signature and authority associated with testing.

1.6 QUALITY ASSURANCE

- A. Perform Work according to AWWA C651.
- 1.7 QUALIFICATIONS
 - A. Testing Firm: Company specializing in testing potable water systems, approved by State of California.

PART 2 PRODUCTS

2.1 DISINFECTION CHEMICALS

- A. Chemicals:
 - 1. Hypochlorite: Comply with AWWA B300.
 - 2. Sodium Chlorite: Comply with AWWA B303.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01700 Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that piping system has been cleaned, inspected, and pressure tested.
- C. Perform scheduling and disinfecting activity with startup, water pressure testing, adjusting and balancing, and demonstration procedures, including coordination with related systems.



3.2 INSTALLATION

- A. Provide and attach required equipment to perform Work of this Section.
- B. Perform disinfection of water distribution system and installation of system and pressure testing as specified in Section 15050 Public Water Utility Distribution Piping.
- C. Introduce treatment into piping system.
- D. Maintain disinfectant in system for 24 hours.
- E. Flush, circulate, and clean until required cleanliness is achieved using municipal domestic water.
- F. Replace permanent system devices that were removed for disinfection.

3.3 FIELD QUALITY CONTROL

- A. Section 01400 Quality Requirements: Requirements for inspecting and testing.
- B. Disinfection, Flushing, and Sampling:
 - 1. Disinfect pipeline installation according to AWWA C651.
 - 2. Use of liquid chlorine is not permitted.
 - 3. Upon completion of retention period required for disinfection, flush pipeline until chlorine concentration in water leaving pipeline is no higher than that generally prevailing in existing system or is acceptable for domestic use.
 - 4. Disposal:
 - a. Legally dispose of chlorinated water.
 - b. When chlorinated discharge may cause damage to environment, apply neutralizing chemical to chlorinated water to neutralize chlorine residual remaining in water.
 - 5. After final flushing and before pipeline is connected to existing system or placed in service, employ an approved independent testing laboratory to sample, test, and certify that water quality meets quality standards of the Division of Drinking Water.



SECTION 02820 – ROLLING GATE, OPERATOR, AND SWING GATE

PART 1 GENERAL

1.1 SUMMARY OF WORK INCLUDED

- A. The contractor shall provide all labor, materials and appurtenances necessary for installation of the steel roll gate system, operator, and steel swing gate system defined herein at the BPUD Twin Lakes Well Site in Bridgeport, California.
- B. Related Work:
 - 1. Section 02200 Soils for Earthwork
 - 2. Section 03300 Cast-in-Place Concrete

1.2 SYSTEM DESCRIPTION

- A. The manufacturer shall supply a total roll gate system of Ameristar[®] PassPort[®] Commercial Ornamental design series, Classic style, or approved equal. The roll gate system shall be 6 foot height from grade. The system shall include all components (i.e., pickets, rails, gate uprights, wheels and hardware) required.
- B. The manufacturer shall supply a total fence system of Montage II[®] *Welded and Rackable* (ATF All Terrain Flexibility) Ornamental Steel Classic[™] design, or approved equal. The ornamental fence system shall be 6 foot height from grade. The system shall include all components (i.e. panels, posts, gates, and hardware) required.

1.3 QUALITY ASSURANCE

A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

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1.4 REFERENCES

- ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- ASTM B117 Practice for Operating Salt-Spray (Fog) Apparatus
- ASTM D523 Test Method for Specular Gloss
- ASTM D714 Test Method for Evaluating Degree of Blistering in Paint
- ASTM D822 Practice for Conducting Tests on Paint and Related Coatings and Materials Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- ASTM D1654 Test Method for Evaluation of Painted of Coated Specimens Subjected to Corrosive Environments
- ASTM D2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates
- ASTM D2794 Test Method for Resistance of Organic Compounds to the Effects of Rapid Deformation (Impact)
- ASTM D3359 Test Method for Measuring Adhesion by Tape Test

ASTM F2408 - Ornamental Fences Employing Galvanized Steel Tubular Pickets

1.5 SUBMITTALS

A. The manufacturer's submittal package consisting of gate elevations, hardware details, and installation details shall be submitted prior to installation.

1.6 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage and to protect against damage, weather, vandalism, and theft.

1.7 PRODUCT WARRANTY

- All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from the date of original purchase.
 Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.
- B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufacturer's warranty shall be guaranteed for five (5) years from date of original purchase.



PART 2 PRODUCTS

2.1 MANUFACTURER

- A. The steel roll gate system shall conform to Ameristar PassPort Commercial Ornamental design series, Classic style, and 2-rail frame configuration manufactured by Ameristar Fence Products, Inc. in Tulsa, Oklahoma, or approved equal.
- B. The fence system shall conform to Montage II[®] *Welded and Rackable* (ATF All Terrain Flexibility) Ornamental Steel, Classic[™] design, flush bottom rail treatment, 2-Rail style manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma, or approved equal.

2.2 MATERIAL

- A. Steel material for roll gate components (i.e. pickets, rails, diagonals and uprights), shall be commercial steel with a minimum yield strength of 45,000 psi.
- B. Ornamental picket material for the roll gate system shall be ³/₄" square x 14 Ga. tubing. Picket spacing shall be 4-5/8". Material for toprails, uprights and diagonal rails shall be 2" square x 12 Ga. Material for the bottom rail shall be 2" x 4" x 11 Ga. Posts shall be a minimum of 4" square x 11 Ga.
- C. Steel material for the swing gate system fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft², Coating designation G-90.
- D. Material for the swing gate pickets shall be 1" square x 14 Ga. tubing. The rails shall be steel channel, 1.75" x 1.75" x 0.105". Picket holes in the rail shall be spaced 4.715" o.c. Fence posts and gate posts shall meet the minimum size requirements of Table 2.

2.3 FABRICATION OF ROLL GATE SYSTEM

- A. Pickets, rails, uprights and posts shall be precut to specified lengths. Diagonals shall be precut to specified lengths and angles. Frame materials shall be joined by welding. Pickets shall be face welded to roll gate frame.
- B. The manufactured roll gates and bolt-on panels (if applicable) shall be subjected to the PermaCoat® thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pre-treatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be Black. The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 1.
- C. Completed gates shall be capable of supporting a 200 lb. load applied at mid-span without permanent deformation.

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2.4 FABRICATION OF SWING GATE SYSTEM

- A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar's proprietary fusion welding process, thus completing the rigid panel assembly.
- C. The manufactured panels and posts shall be subjected to an inline electrodeposition coating (E-Coat) process consisting of a multi-stage pretreatment/wash (with zinc phosphate), followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be Black. The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 1.
- D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.
- E. Swing gates shall be fabricated using 1.75" x 14 Ga. forerunner double channel rail, 2" square x 11 Ga. gate ends, and 1" square x 14 Ga. pickets. All rails and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding. Gusset plates will be welded at each upright to rail intersection.

PART 3 EXECUTION

3.1 PREPARATION

A. All new gate installations shall be laid out by the contractor in accordance with the construction plans.

3.2 ROLL GATE INSTALLATION

A. Gateposts shall be set in accordance with the spacing's shown in the construction plans. The "Earthwork for Soils" and "Cast-in-Place Concrete" sections of this specification shall govern post base material requirements. 6" wheels shall be bolted to the gate (between the wheel plates welded near the ends of the gate bottom rail). The gate shall be set upright with the V-grooved wheels positioned over the pre-installed steel V-track that traverses the gate opening. Roller guides shall be affixed to the gateposts at a height even with the gate toprail to hold the gate in a vertical position. Gate stops shall be welded to the end of the gate of track so gate cannot pass rollers in either direction.

3.3 SWING GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturer's gate drawings, dependent of the standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturer's gate drawings shall identify the necessary gate hardware required for the



application. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer's recommendations.

3.4 CLEANING

A. The contractor shall clean the jobsite of excess materials; post hole excavations shall be scattered uniformly away from posts.

Table 1 – Coating Performance Requirements		
Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,000 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball)
Weathering Resistance	D822, D2244, D523 (60° Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

Table 2 – Minimum sizes for Montage II Posts		
Fence Posts	Panel Height	
2-1/2" x 12 Ga.	Up to & Including 6' Height	
	Gate Height	
Gate Leaf	Over 4' Up to and Including 6'	
4'1" to 6'	4" x 11 Ga.	

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3.5 GATE OPERATOR

- A. Description: Systems that open and close sliding gate when properly activated through the use of operator pedestal.
- B. Design, supply of equipment and components, installation, and on-call service shall be product of individual company with record of installations meeting requirements specified in this article.
- C. Gate Operators:
 - 1. Model 9150 Vehicular Slide Gate Operator from Doorking or approved equal designed to open and close sliding gate provided. Supply manufacturer of gate operator with complete details of gate, hardware, track rollers, adjacent fence posts, and fence construction for development and detailing of gate operator.
 - 2. Furnish with the following features:
 - a. Metal enclosure with finish and design suitable for exterior installation in all-weather environment.
 - b. Minimum ¹/₂ hp motor, 115VAC, 60-Hz electric power.
 - c. Electric motor driven drive sprocket with #40 chain secured to mounts on gate. Transmission of opening and closing forces to gate shall be by chain tension caused by rotation of the drive sprocket.
 - d. Positive limit switches that sense position of gate and provide control to prevent damage to gate operator.
 - e. Manual operation feature or disconnect, without use of tools, for easy operation during power failure, malfunction, or emergency.
 - f. Gate Travel Speed:
 - 1) Minimum 10 in./sec.
 - 2) Speed adjusting feature that provides range of appropriate speeds for slide gate operation is acceptable but not required.
 - g. Component parts of operator, including attachments, shall be constructed with materials or plated, coated, or finished as necessary to provide reliable service in exterior all-weather environment. A thermostatically controlled heater kit is recommended for the colder environment of the project site.
 - h. Compatible with gate operator control devices provided.
 - i. Radio receiver for remote access.
- D. Pedestal Access System
 - 1. Keypad in weatherproof enclosure mounted on steel tube post anchored to concrete foundation outside gate.
 - 2. Provide loop detectors minimum of 4 feet away from each side of gate in paved areas for safety.
 - 3. Provide pedestal-mounted key switch adjacent to key pad for Fire Department access.
 - 4. Gate Operation:
 - a. Entry: Gate opens when activated by key pad access, radio receiver, or by Fire Department key switch. Gate closes after adjustable time period up to 23 seconds.
 - b. Exit: Gate opens when activated by detector loop in pavement. Gate closes as for entry.
 - c. Override or 7-day timer to allow gate to remain open for up to 12 hours with equipment at rest.



d. Gate operator release to allow for manual operation of gate in the event of a power failure or other emergency.
SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Cast-in-place concrete.

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. 318 Building Code Requirements for Structural Concrete.
 - 2. Manual of Concrete Practice.
 - 3. Recommended Practices.

B. American Society for Testing and Materials (ASTM):

- 1. C 31 Practice for Making and Curing Concrete Test Specimens in the Field.
- 2. C 33 Specification for Concrete Aggregates.
- 3. C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- 4. C 40 Test Method for Organic Impurities in Fine Aggregates for Concrete.
- 5. C 42 Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- 6. C 88 Test Method of Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
- 7. C 94 Specification for Ready-Mixed Concrete.
- 8. C 114 Test Methods for Chemical Analysis of Hydraulic Cement.
- 9. C 131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- 10. C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- 11. C 143 Test Method for Slump of Hydraulic Cement Concrete.
- 12. C 150 Specification for Portland Cement.
- 13. C 157 Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
- 14. C 172 Practice for Sampling Freshly Mixed Concrete.
- 15. C 173 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- 16. C 203 Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
- 17. C 227 Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
- 18. C 260 Specification for Air-Entraining Admixtures for Concrete.
- 19. C 289 Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
- 20. C 309 Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- 21. C 311 Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete.

- 22. C 469 Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.
- 23. C 494 Specification for Chemical Admixtures for Concrete.
- 24. C 595 Specification for Blended Hydraulic Cements.
- 25. C 618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland-Cement Concrete.
- 26. D 75 Practices for Sampling Aggregates.

1.03 DEFINITIONS

- A. Alkali: Is defined to mean sum of sodium oxide and potassium oxide calculated as sodium oxide.
- B. Hairline Crack: Crack with a crack width of less than 4 thousandths of an inch.

1.04 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. General:
 - a. Except as otherwise specified, provide concrete composed of Portland cement, fine aggregate, coarse aggregate, and water so proportioned and mixed as to produce plastic, workable mixture in accordance with requirements as specified in this Section and suitable to specific conditions of placement.
 - b. Proportion materials in manner such as to secure lowest water-cement ratio which is consistent with good workability, plastic, cohesive mixture, and one which is within specified slump range.
 - c. Proportion fine and coarse aggregate in manner such as not to produce harshness in placing nor honeycombing in structures.
 - 2. Watertightness of Concrete Work: It is intent of this Section to secure for every part of the Work concrete and grout of homogeneous structure, which when hardened will have required strength, watertightness, and durability.
 - a. It is recognized that some surface hairline cracks and crazing will develop in the concrete surfaces.
 - b. Construction, contraction, and expansion joints have been positioned in structures as indicated on the Drawings, and curing methods specified, for purpose of reducing number and size of these expected cracks, due to normal expansion and contraction expected from specified concrete mixes.
 - c. Class A, Class B, and Class D Concrete: Watertight: Repair cracks which develop in walls or slabs and repair cracks which show any signs of leakage until all leakage is stopped.
 - d. Pressure inject visible cracks, other than hairline cracks and crazing, in following areas with epoxy as specified in Section 03931.
 - 1) Floors and walls of water bearing structures.
 - 2) Walls and overhead slabs of passageways or occupied spaces, outsides of which are exposed to weather or may be washed down and are not specified to receive separate waterproof membrane.
 - 3) Other Items Not Specified to Receive Separate Waterproof Membrane: Slabs over water channels, wet wells, reservoirs, and other similar surfaces.

- e. Walls or slabs, as specified above, that leak or sweat because of porosity or cracks too small for successful pressure grouting: Repair using methods as required by the ENGINEER.
- f. Grouting and Sealing: Continue as specified above until structure is watertight and remains watertight for not less than one year after final acceptance or date of final repair, whichever occurs later in time.
- 3. Workmanship and Methods: Provide concrete work, including detailing of reinforcing, conforming with best standard practices and as set forth in ACI 318, Manuals, and Recommended Practices.

1.05 SUBMITTALS

- A. Product Data: Submit data completely describing products.
- B. Information on Heating Equipment to Be Used for Cold Weather Concreting: Submit information on type of equipment to be used for heating materials and/or new concrete in process of curing during excessively cold weather.
- C. For conditions that promote rapid drying of freshly placed concrete such as low Humidity, high temperature, and wind: Submit corrective measures proposed for use prior to placing concrete.
- D. Copies of Tests of Concrete Aggregates: Submit certified copies in triplicate of commercial laboratory tests not more than 90 days old of all samples of concrete aggregates.
 - 1. Fine Aggregate:
 - a. Clay lumps.
 - b. Reactivity.
 - c. Shale and chert.
 - d. Soundness.
 - e. Color.
 - f. Decantation.
 - 2. Coarse Aggregate:
 - a. Clay lumps and friable particles.
 - b. Reactivity.
 - c. Shale and chert.
 - d. Soundness.
 - e. Abrasion loss.
 - f. Coal and lignite.
 - g. Materials finer than 200 sieve.
- E. Sieve Analysis: Submit sieve analyses of fine and coarse aggregates being used in triplicate at least every 3 weeks and at any time there is significant change in grading of materials.
- F. Concrete Mixes: Submit full details, including mix design calculations for concrete mixes proposed for use for each class of concrete.
 - 1. Include information on correction of batching for varying moisture contents of fine aggregate.
 - 2. Submit source quality test records with mix design submittal.
 - a. Include calculations for f'cr based on source quality test records.

- G. If There is Change in Aggregate Source, or Aggregate Quality from Same Source: Submit new set of design mixes covering each class of concrete.
- H. Test Batch Test Data:
 - 1. Submit data for each test cylinder.
 - 2. Submit data that identifies mix and slump for each test cylinder.
- I. Sequence of Concrete Placing: Submit proposed sequence of placing concrete showing proposed beginning and ending of individual placements.
- J. Curing Compound Other than Specified Compound: Submit complete data on proposed compound.
- K. Repair of Defective Concrete: Submit mix design for grout.
- L. Acceptance of Method of Concrete Repair: Make no repair until the ENGINEER has accepted method of preparing surfaces and proposed method of repair.
- M. If Either Fine or Coarse Aggregate Is Batched from More than One Bin: Submit analyses for each bin, and composite analysis made up from these, using proportions of materials to be used in mix.
- N. Cement Mill Tests: Include alkali content, representative of each shipment of cement for verification of compliance with specified requirements.
- O. Pozzolan Certificate of Compliance: Identify source of pozzolan and certify compliance with requirements of ASTM C 618.
- P. Information on mixing equipment.
- Q. Drying shrinkage test data.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping:
 - 1. Deliver, store, and handle concrete materials in manner as to prevent damage and inclusion of foreign substances.
 - 2. Deliver and store packaged materials in original containers until ready for use.
 - 3. Deliver aggregate to mixing site and handle in such manner that variations in moisture content will not interfere with steady production of concrete of specified degree of uniformity and slump.
- B. Acceptance at Site: Reject material containers or materials showing evidence of water or other damage.

1.07 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Hot Weather Concreting:
 - a. When Ambient Air Temperature Is above 90 Degrees Fahrenheit: Prior to placing concrete, cool forms and reinforcing steel to by water cooling to below 90 degrees Fahrenheit.

- b. Temperature of Concrete Mix at Time of Placement: Keep temperature below 90 degrees Fahrenheit by methods which do not impair quality of concrete.
- 2. Cold Weather Concreting:
 - a. Concrete placed below ambient air temperature of 45 degrees Fahrenheit and falling or below 40 degrees Fahrenheit: Make provision for heating water.
 - b. If materials have been exposed to freezing temperatures to degree that any material is below 35 degrees Fahrenheit: Heat such materials.
 - c. Heating Water, Cement, or Aggregate Materials:
 - 1) Do not heat in excess of 160 degrees Fahrenheit.
 - d. Protection of Concrete in Forms:
 - 1) Protect by means of covering with tarpaulins, or other acceptable covering.
 - 2) Provide means for circulating warm moist air around forms in manner to maintain temperature of 50 degrees Fahrenheit for at least 5 days.
- 3. For conditions that promote rapid drying of freshly placed concrete such as low humidity, high temperature, and wind: Take corrective measures to minimize rapid water loss from concrete.
 - a. Furnish and use sufficient number of maximum and minimum selfrecording thermometers to adequately measure temperature around concrete.

1.08 SEQUENCING AND SCHEDULING

A. Schedule placing of concrete in such manner as to complete any single placing operation to construction, contraction, or expansion joint.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate:

- 1. General:
 - a. Provide concrete aggregates that are sound, uniformly graded, and free of deleterious material in excess of allowable amounts specified.
 - b. Grade aggregate in accordance with ASTM D 75 and C 136.
 - c. Provide unit weight of fine and coarse aggregate which produces in place concrete with weight of not less than 140 pounds per cubic foot.
- B. Fine Aggregate:
 - 1. Provide fine aggregate for concrete or mortar consisting of clean, natural sand or of sand prepared from crushed stone or crushed gravel.
 - 2. Do not provide aggregate having deleterious substances in excess of following percentages by weight of contaminating substances. In no case shall total exceed percent listed.

Item	Test Method	Percent
Removed by decantation (dirt, silt, etc.)	ASTM C 117	3
Clay Lumps	ASTM C 142	1

- 1. Except as otherwise specified, grade fine aggregate from coarse to fine in accordance with requirements of ASTM C 33.
- C. Coarse Aggregate:
 - 1. General: Provide coarse aggregate consisting of gravel or crushed stone made up of clean, hard, durable particles free from calcareous coatings, organic matter, or other foreign substances.
 - 2. Weight: Not exceeding 15 percent, for thin or elongated pieces having length greater than 5 times average thickness.
 - 3. Deleterious Substances: Not in excess of following percentages by weight, and in no case having total of all deleterious substances exceeding 2 percent.

Item	Test Method	Percent		
Coal and lignite	ASTM C 123	1/4		
Clay lumps and friable particles	ASTM C 142	1/4		
Materials finer than Number 200 sieve ASTM C 117		1/2*		
* Except when material finer than Number 200 sieve consists of crusher dust, maximum amount shall be 1 percent.				

- 4. Grading:
 - a. Aggregate: As specified in ASTM C 33, Size Number 57, except as otherwise specified or authorized in writing by the ENGINEER.
 - b. Aggregate for Class CE Concrete for Encasement of Electrical Conduits:
 - Graded as specified in ASTM C 33, Size Number 8.
 Provide concrete utilizing this aggregate equal to Class C concrete in all other respects, and is designated as Class CE.

D. Portland Cement:

- 1. General: Conform to specifications and tests for ASTM C 150, Type V, except as specified otherwise.
- 2. Low Alkali Portland: Have total alkali containing not more than 0.60 percent.
- 3. Exposed Concrete in Any Individual Structure: Use only one brand of portland cement.
- 4. Cement for Finishes: Provide cement from same source and of same type as concrete to be finished.
- E. Admixtures:
 - 1. General:
 - a. Do not use admixtures of any type, except as specified, unless written authorization has been obtained from the ENGINEER.
 - b. Compatible with concrete and other admixtures.
 - c. Do not use admixtures containing chlorides calculated as chloride ion in excess of 0.5 percent by weight.
 - d. Use in accordance with manufacturer's recommendations and add each admixture to concrete mix separately.
 - 2. Air Entraining Admixture:
 - a. Provide all concrete with 5 percent, plus or minus 1 percent, entrained air of evenly dispersed air bubbles at time of placement.
 - b. Conform to ASTM C 260.
 - 3. Fly Ash Pozzolan Admixture:

- a. Pozzolan:
 - 1) Conforming to requirements of ASTM C 618, Class F, may be used as admixture in concrete made with Type V Portland cement.
 - 2) Pozzolan may replace portland cement at ratio of 1.0 pound fly ash for each pound of portland cement replaced.
 - Maximum of 15 percent by weight of minimum quantities of portland cement listed in Table A under paragraph 2.03E may be replaced
 with pozzelen
 - with pozzolan.
 - 4) Do not use pozzolan as an admixture in concrete made with portland-pozzolan cement.
- b. Loss on Ignition for Pozzolan: Not exceed four percent.
- 4. Water Reducing Admixture:
 - a. May be used at the CONTRACTOR's option.
 - b. Conform to ASTM C 494, Type A or Type D.
 - c. Not contain air entraining agents.
 - d. Liquid form before adding to the concrete mix.
 - e. No decrease in cement is permitted as result of use of water reducing admixture.
- 5. Superplasticizers: Are not to be used without acceptance by ENGINEER.
- F. Water:
 - 1. Water for Concrete, Washing Aggregate, and Curing Concrete: Clean and free from oil and deleterious amounts of alkali, acid, organic matter, or other substances.
 - 2. Chlorides and Sulfate Ions:
 - a. Water for Conventional Reinforced Concrete: Use water not containing more than 1,000 (mg/L) of chlorides calculated as chloride ion, nor more than 1,000 (mg/L) of sulfates calculated as sulfate ion.
 - b. Water for Prestressed or Post-tensioned Concrete: Use water not containing more than 650 (mg/L)milligrams per liter of chlorides calculated as chloride ion, nor more than 800 (mg/L) of sulfates calculated as sulfate ion.
- G. Nonslip Abrasive:
 - 1. Type: Aluminum oxide abrasive of size 8/16, having structure of hard aggregate, homogenous, nonglazing, rustproof, and unaffected by freezing, moisture, or cleaning compounds.
 - 2. Manufacturers: One of the following or equal:
 - a. Exolon Company, Tonawanda, New York.
 - b. Abrasive Materials, Incorporated, Hillsdale, Michigan.
- H. Concrete Sealer:
 - 1. Manufacturers: One of the following or equal:
 - a. W.R. Meadows, Liqui Hard.
- I. Conduit Encasement Coloring Agent:
 - 1. Color: Red color concrete used for encasement of electrical ducts, conduits, similar type items.
 - 2. Manufacturers: One of the following or equal.
 - a. Frank D. Davis Company, Red Oxide Number 1117.
 - b. I. Reiss Company, Inc., equivalent product.

- 3. Conduit Encasement Concrete: Mix into each cubic yard of concrete 10 pounds of coloring agent.
- J. Keyway Material: Steel, plastic, or lumber.
- K. Sprayed Membrane Curing Compound: Clear type with fugitive dye conforming to ASTM C 309, Type 1D.
- L. Evaporation Retardant:
 - . Manufacturers: One of the following or equal:
 - a. Degussa, Shakopee, Minnesota, Confilm.
 - b. Euclid Chemical Company, Cleveland, Ohio, Eucobar.
- M. Plastic Membrane Curing: Use polyethylene film.
 - 1. Color: White
 - 2. Thickness: Minimum 6 mils.
 - 3. Loss of Moisture: Not to exceed 0.055 grams per square centimeter of surface when tested in accordance with ASTM C156.

2.02 EQUIPMENT

- A. Mixing Concrete:
 - 1. Mixers may be of stationary plant, paver, or truck mixer type.
 - 2. Provide adequate equipment and facilities for accurate measurement and control of materials and for readily changing proportions of material.
 - 3. Mixing Equipment:
 - a. Capable of combining aggregates, cement, and water within specified time into thoroughly mixed and uniform mass and of discharging mixture without segregation.
 - b. Maintain concrete mixing plant and equipment in good working order and operated at loads, speeds, and timing recommended by manufacturer or as specified.
 - c. Proportion cement and aggregate by weight.
- B. Machine Mixing:
 - 1. Batch plant shall be capable of controlling delivery of all material to mixer within 1 percent by weight of individual material.
 - 2. If bulk cement is used, weigh it on separate visible scale which will accurately register scale load at any stage of weighing operation from zero to full capacity.
 - 3. Prevent cement from coming into contact with aggregate or with water until materials are in mixer ready for complete mixing with all mixing water.
 - 4. Procedure of mixing cement with sand or with sand and coarse aggregate for delivery to project site, for final mixing and addition of mixing water will not be

permitted.

- 5. Retempering of concrete will not be permitted.
- 6. Discharge entire batch before recharging.
- 7. Volume of Mixed Material Per Batch: Not exceed manufacturer's rated capacity of mixer.
- 8. Mixers:
 - a. Perform mixing in batch mixers of acceptable type.

- b. Equip each mixer with device for accurately measuring and indicating quantity of water entering concrete, and operating mechanism such that leakage will not occur when valves are closed.
- c. Equip each mixer with device for automatically measuring, indicating, and controlling time required for mixing.
 - 1) Interlock device to prevent discharge of concrete from mixer before expiration of mixing period.
- C. Transit-mixed Concrete:
 - 1. Mix and deliver in accordance with ASTM C 94.
 - 2. Total Elapsed Time Between Addition of Water at Batch Plant and Discharging Completed Mix: Not to exceed 90 minutes or elapsed time at project site shall not exceed 30 minutes.
 - 3. Under conditions contributing to quick setting, total elapsed time permitted may be reduced by the ENGINEER.
 - 4. Equip each truck mixer with device interlocked so as to prevent discharge of concrete from drum before required number of turns and furnish such device that is capable of counting number of revolutions of drum.
 - 5. Continuously revolve drum after it is once started until it has completely discharged its batch.
 - a. Do not admit water until drum has started revolving.
 - b. Right is reserved to increase required minimum number of revolutions or to decrease designated maximum number of revolutions allowed, if necessary, to obtain satisfactory mixing. The CONTRACTOR will not be entitled to additional compensation because of such increase or decrease.
- D. Other Types of Mixers: In case of other types of mixers, mixing shall be as follows:
 - 1. Mix concrete until there is uniform distribution of materials, and discharge mixer completely before recharging.
 - 2. Neither speed nor volume loading of mixer shall exceed manufacturer's recommendations.
 - 3. Continue mixing for minimum of 1-1/2 minutes after all materials are in drum, and for batches larger than one cubic yard increase minimum mixing time

15 seconds for each additional cubic yard or fraction thereof.

2.03 MIXES

- A. Measurements of Materials:
 - 1. Measure materials by weighing, except as otherwise specified or where other methods are specifically authorized in writing by the ENGINEER.
 - 2. Furnish apparatus for weighing aggregates and cement that is suitably designed and constructed for this purpose.
 - 3. Accuracy of Weighing Devices: Furnish devices that have capability of providing successive quantities of individual material that can be measured to within one percent of desired amount of that material.
 - 4. Measuring or Weighing Devices: Subject to review by the ENGINEER, and bear valid seal of the Sealer of Weights and Measures having jurisdiction.
 - 5. Weighing Cement:
 - a. Weigh cement separately.
 - b. Cement in Unbroken Standard Packages (Sacks): Need not be weighed. c. Bulk Cement and Fractional Packages: Weigh such cement.
 - 6. Mixing Water: Measured by volume or by weight.

- B. Concrete Proportions and Consistency:
 - 1. Concrete Consistency and Composition:
 - a. Provide concrete that can be worked readily into corners and angles of forms and around reinforcement without excessive vibration and without permitting materials to segregate or free water to collect on surface.
 - b. Prevent unnecessary or haphazard changes in consistency of concrete.
 - 2. Ratio of Coarse Aggregate to Fine Aggregate: Not less than 1.0 nor more than 2.0 for all concrete Classes, with exception of Class CE.
 - 3. Aggregate:
 - a. Obtain aggregate from source which is capable of providing uniform quality, moisture content, and grading during any single day's operation.
 - 4. Concrete Mix Water to Cement Ratio, Minimum Cement Content, and Slump Range: Conform to values specified in Table A in this Section.
 - 5. Concrete Batch Weights: Control and adjust so as to secure maximum yield, and at all times maintain proportions of concrete mix within specified limits.
 - 6. Mixture Modification: If required, by the ENGINEER, modify mixture within limits set forth in this Section.
- C. Concrete Mixes:
 - 1. Proportioning of Concrete Mix: Proportion mixes on required average on compressive strength f'cr as defined in Subparagraph 2.04A2.
 - 2. Mixes:
 - a. Adjusting of Water: After acceptance, do not change mixes without acceptance by ENGINEER, except that at all times adjust batching of water to compensate for free moisture content of fine aggregate.
 - b. Total Water Content of Each Concrete Class: Not exceed those specified in Table A in this Section.
 - c. Checking Moisture Content of Fine Aggregate: Furnish satisfactory means at batching plant for checking moisture content of fine aggregate.
 - 3. Change in Mixes: Undertake new trial batch and test program as specified in this Section.
- D. Hand Mixed Concrete:
 - 1. Hand mix concrete only when acceptable to the ENGINEER.
 - 2. Prepare hand mixed concrete on watertight, level platform in batches not to exceed 1/3 cubic yard each.
 - 3. Aggregate:
 - a. First spread required amount of coarse aggregate on platform in an even and uniform layer, and then over such aggregate spread proper proportion of fine aggregate.
 - b. Combined Depth of Both Such Layers: Not be greater than one foot.
 - 4. Cement:
 - a. First evenly spread required quantity of cement over fine aggregate.
 - b. Then turn entire batch with shovels at least twice before adding water.
 - 5. Water:
 - a. Then uniformly sprinkle or spray proper amount of water over batched materials.
 - b. Then turn with shovels not less than three times before being removing from platform.

- E. Classes of Concrete:
 - 1. Provide concrete consisting of 3 classes, referred herein as Classes A, B, and C specified in this Section and use where specified or indicated on the Drawings.
 - 2. Weight of Concrete Classes: Provide classes of concrete having minimum weight of 145 pounds per cubic foot.
 - 3. Class A Concrete: Class A concrete shall be used for the pad for the rolling gate operator, pad for the propane tank, pad for the rolling gate v-track, post footings, valve collars, air release valve footings and box, sanitary sewer clean out collar, valve box, ADA parking sign footing, and the concrete cap on the storm drain driveway crossing.
 - 4. Class B Concrete: Class B concrete shall be used for thrust blocks and for the concrete encasement of pipe.
 - 5. Class C Concrete: Class C concrete shall be used for the building floor, stem walls, and building footings.
 - 6. All other concrete, unless specified or otherwise indicated on the Drawings: Use Class A concrete.

TABLE A CONCRETE WITH AIR ENTRAINMENT				
CONCRETE WITH AIR ENTRAINMENT				
Class	Specified Compressive Strength f'c at 28 Days (Pounds per Square Inch)	Maximum Net Water to Cement Ratio	Slump Range (Inches)	
А	4,000	0.45	4 - 8**	
В	4,000	-	-	
С	2,500	0.62	3 to 6*	
* NOTE: Slump for slabs, decks, walks, and beams shall be not more than				

* NOTE: Slump for slabs, decks, walks, and beams shall be not more than 3-1/2 inches."

**NOTE: (4-8) = (max initial slump - max slump after addition of high range water reducers)

- 8. Pumped Concrete: Provide pumped concrete that complies with all requirements of this Section.
- 9. Do not place concrete with slump outside limits indicated in Table A.
- 10. Classes:
 - a. Classes A, B, and C Concrete: Make with Type II cement.
 - b. Admixtures: Provide admixtures as specified in this Section.
- F. Air Entraining Admixture:
 - 1. Add agent to batch in portion of mixing water.
 - 2. Batch solution by means of mechanical batcher capable of accurate measurement.

2.04 SOURCE QUALITY CONTROL

- A. Tests:
 - 1. Concrete testing is not anticipated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Under conditions which result in rapid evaporation of moisture from the surface of the concrete, immediately after the concrete has been screeded, coat the surface of the concrete with a liquid evaporation retardant. Apply the evaporation retardant again after each work operation as necessary to prevent drying shrinkage cracks. Conditions which result in rapid evaporation of moisture may include one or more of the following:
 - 1. Low humidity.
 - 2. Windy conditions.
 - 3. High temperature.
- B. Joints and Bonding:
 - 1. As far as practicable construct concrete work as monolith.
 - 2. Locations of contraction, construction, expansion, and other joints are indicated on the Drawings or as specified in this Section.
 - 3. For the Following Structures:
 - a. All Waterbearing Structures.
 - 1) In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints shown. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall have cured at least 7 days for hydraulic structures and 3 days for all other structures before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the two adjacent wall panels have cured at least 14 days for hydraulic structures and 7 days for all other structures.
 - 2) Place concrete for slabs in checker board pattern with not less than 14 days between placement of concrete in adjacent concrete slab placements.
 - 4. Construction Joints:
 - a. Where construction joints are not indicated on the Drawings, provide slabs and walls with construction joints at intervals not greater than 30 feet.
 - b. In order to preserve strength and watertightness of structures, make no other joints, except as authorized the ENGINEER.
 - c. At construction joints, thoroughly clean concrete of laitance, grease, oil, mud, dirt, curing compounds, mortar droppings, or other objectionable matter by means of heavy sandblasting, and wash surfaces just prior to succeeding concrete placement.
 - d. At Horizontal Joints: Immediately prior to resuming concrete placing operations, thoroughly spread bed of grout not less than 1/2 inch in thickness nor more than 1 inch in thickness over horizontal joint surfaces.
 - 5. Keyways in Joints:
 - a. Provide keyways in joints as indicated on the Drawings.
 - b. Treat lumber keyway material with form release coating, applied in accordance with manufacturer's instructions.
 - 6. Take special care to ensure that concrete is well consolidated around and

against waterstops and that waterstops are secured in proper position.

- 7. Cleaning of Construction Joints:
 - a. Wash construction joints free of sawdust, chips, and other debris after forms are built and immediately before concrete or grout placement.
 - b. Should formwork confine sawdust, chips, or other loose matter in such manner that it is impossible to remove them by flushing with water, use vacuum cleaner for their removal, after which flush cleaned surfaces with water.
 - c. Provide cleanout hole at base of each wall and column for inspection and cleaning.
- 8. Expansion, Contraction, and Construction Joints
 - a. Constructed where and as indicated on the Drawings.
 - b. Waterstops, Expansion Joint Material, Synthetic Rubber Sealing Compound, and Other Similar Materials: As specified in Sections 03150 and 07900.
- 9. Repair of Concrete: Where it is necessary to repair concrete by bonding mortar or new concrete to concrete which has reached its initial set, first coat surface of set concrete with epoxy bonding agent as specified in Section 03071.
- C. Conveying and Placing Concrete:
 - 1. Convey concrete from mixer to place of final deposit by methods which prevent separation or loss of materials.
 - 2. Use equipment for chuting, pumping, and conveying concrete of such size and design as to ensure practically continuous flow of concrete at delivery end without separation of materials.
 - 3. Design and use chutes and devices for conveying and depositing concrete that direct concrete vertically downward when discharged from chute or conveying device.
 - 4. Keep equipment for conveying concrete thoroughly clean by washing and scraping upon completion of any day's placement.
- D. Placing Concrete:
 - 1. Place no concrete without prior authorization of the ENGINEER.
 - 2. Do Not Place Concrete Until:
 - a. Reinforcement is securely and properly fastened in its correct position and loose form ties at construction joints have been retightened.
 - b. Dowels, bucks, sleeves, hangers, pipes, conduits, bolts, and any other fixtures required to be embedded in concrete have been placed and adequately anchored.
 - c. Forms have been cleaned and oiled as specified.
 - 3. Placement of concrete in which initial set has occurred, or of retempered concrete, will not be permitted.
 - 4. Place no concrete during rainstorms or high velocity winds.
 - 5. Protect concrete placed immediately before rain to prevent water from coming in contact with such concrete or winds causing excessive drying.
 - 6. Keep sufficient protective covering on hand at all times for protection of concrete.

7. After acceptance, adhere to proposed sequence of placing concrete, except when specific changes are requested and accepted by the ENGINEER.

8. Notify the ENGINEER in writing of readiness, not just intention, to place concrete in any portion of the work.

a. Provide this notification in such time in advance of operations as the ENGINEER deems necessary to make final inspection of preparations at location of proposed concrete placing.

b. Place forms, steel, screeds, anchors, ties, and inserts in place before

notification of readiness is given to the ENGINEER.

- c. Depositing Concrete:
 - 1) Deposit concrete at or near its final position to avoid segregation caused by rehandling or flowing.
 - 2) Do not deposit concrete in large quantities in one place and work along forms with vibrator or by other methods.
 - 3) Do not drop concrete freely into place from height greater than 5 feet.
 - 4) Use tremies for placing concrete where drop is over 5 feet.
 - 5) Commence placement of concrete on slopes, at bottom of slope.

If more that

- 9. Place concrete in approximately horizontal layers not to exceed 24 inches in depth and bring up evenly in all parts of forms.
- 10. Continue concrete placement without avoidable interruption, in continuous operation, until end of placement is reached.
- 11.

operation to previously placed concrete within 20 minutes.

- 12. If concrete is to be placed over previously placed concrete and more than 20 minutes have elapsed, then spread layer of grout not less than 1/2-inch in thickness nor more than 1 inch in thickness over surface before placing additional concrete.
- 13. Placement of Concrete for Slabs, Beams, or Walkways:
 - a. If cast monolithically with walls or columns, do not commence until concrete in walls or columns has been allowed to set and shrink.
 - b. Allow set time of not less than one hour for shrinkage.
- E. Consolidating Concrete:
 - 1. Place concrete with aid of acceptable mechanical vibrators.
 - 2. Thoroughly consolidate concrete around reinforcement, pipes, or other shapes built into the work.
 - 3. Provide sufficiently intense vibration to cause concrete to flow and settle readily into place and to visibly affect concrete over radius of at least 18 inches.
 - 4. Vibrators:
 - a. Keep sufficient vibrators on hand at all times to vibrate concrete as placed.
 - b. In addition to vibrators in actual use while concrete is being placed, have on hand minimum 1 spare vibrator in serviceable condition.
 - c. Place no concrete until it has been ascertained that all vibrating equipment, including spares, are in serviceable condition.
 - 5. Take special care to place concrete solidly against forms so as to leave no voids.
 - 6. Take every precaution to make concrete solid, compact, and smooth, and if for any reason surfaces or interiors have voids or are in any way defective, repair such concrete in manner acceptable to the ENGINEER.
 - F. Footings and Slabs on Grade:
 - 1. Do not place concrete on ground or compacted fill until subgrade is in moist condition acceptable to the ENGINEER.
 - 2. If necessary, sprinkle subgrade with water not less than 6 nor more than 20 hours in advance of placing concrete.
 - 3. If it becomes dry prior to actual placing of concrete, sprinkle again, without forming pools of water.
 - 4. Place no concrete if subgrade is muddy or soft.
 - G. Loading Concrete:
 - 1. Green Concrete:
 - a. No heavy loading of green concrete will be permitted.

- b. Green concrete is defined as concrete with less than 100 percent of the specified strength.
- 2. No backfill shall be placed against concrete walls until the concrete has reached the specified strength and the connecting slabs and beams have been cast and have reached the specified strength.
- 3. Use construction methods, sequencing, and allow time for concrete to reach adequate strength to prevent overstress of the concrete structure during construction.
- H. Curing Concrete:
 - 1. General:
 - a. Cure concrete by methods specified in this Section.
 - b. Cure concrete minimum of 7 days.
 - c. Cure concrete to be painted with water or plastic membrane.
 - d. Do not use curing compound on concrete surfaces that are to receive paint or upon which any material is to be bonded.
 - e. Water cure or plastic membrane cure concrete slabs which are specified to be sealed by concrete sealer.
 - f. Cure other concrete by water curing or sprayed curing membrane at the CONTRACTOR's option.
 - g. Floor slabs may be cured using plastic membrane curing.
 - 2. Water Curing:

3.

- a. Keep surfaces of concrete being water cured constantly and visibly moist day and night for period of not less than 7 days.
- b. Each day forms remain in place may count as 1 day of water curing.
- c. No further curing credit will be allowed for forms in place after contact has once been broken between concrete surface and forms.
- d. Do not loosen form ties during period when concrete is being cured by leaving forms in place.
- e. Flood top of walls with water at least 3 times per day, and keep concrete surfaces moist at all times during 7 day curing period.
- Sprayed Membrane Curing:
- a. Apply curing compound to concrete surface after repairing and patching, and within 1 hour after forms are removed.
- b. If more than 1 hour elapses after removal of forms, do not use membrane curing compound, but apply water curing for full curing period.
- c. If surface requires repairing or painting, water cure such concrete surfaces.
- d. Curing Compound:
 - 1) Do not remove curing compound from concrete in less than 7 days.
 - 2) Curing compound may be removed only upon written request by the CONTRACTOR and acceptance by the ENGINEER, stating what measures are to be performed to adequately cure structures.
 - 3) Take care to apply curing compound in area of construction joints to see that curing compound is placed within construction joint silhouette.
 - 4) Remove curing compound placed within construction joint silhouette by heavy sandblasting prior to placing any new concrete.
 - 5) CONTRACTOR's Option: Instead of using curing compound for curing of construction joints such joints may be water cured.
 - 6) Apply curing compound by mechanical, power operated sprayer and mechanical agitator that will uniformly mix all pigment and compound.
- 7) Apply compound in at least 2 coats.
- 8) Apply each coat in direction 90 degrees to preceding coat.
- 9) Apply compound in sufficient quantity so that concrete has uniform appearance and that natural color is effectively and completely concealed at time of spraying.

- 10) Continue to coat and recoat surfaces until specified coverage is achieved and until coating film remains on concrete surfaces.
- 11) Thickness and Coverage of Compound: Provide compound having film thickness that can be scraped from surfaces at any and all points after drying for at least 24 hours.
- 12) The CONTRACTOR is cautioned that method of applying curing compound specified herein may require more compound than normally suggested by manufacturer of compound and also more than is customary in the trade.
- 13) Apply amounts specified herein, regardless of manufacturer's recommendations or customary practice, if curing compound is used in place of water curing.
- 14) If the CONTRACTOR desires to use curing compound other than specified compound, coat sample areas of concrete wall with proposed compound and also similar adjacent area with specified compound in specified manner for comparison.
 - a) If proposed sample is not equal or better, in opinion of the ENGINEER, in all features, proposed substitution will not be allowed.
- 15) Prior to final acceptance of the work, remove, by sandblasting or other acceptable method, any curing compound on surfaces exposed to view, so that only natural color of finished concrete is visible uniformly over entire surface.
- 4. Plastic Membrane Curing:
 - a. Polyethylene film may be used to cure slabs. Seal joints and edges with small sand berm.
 - b. Install plastic membrane as soon as concrete is finished and can be walked on without damage.
 - c. Keep concrete moist under plastic membrane.

3.02 CONCRETE FINISHING

- A. Provide concrete finishes in accordance with Section 03366 and the Concrete Finish Schedule indicated on the Drawings.
- B. Edges of Joints:
 - 1. Provide joints having edges as indicated on the Drawings.
 - 2. Protect wall and slab surfaces at edges against concrete spatter and thoroughly clean upon completion of each placement.
- C. Concrete Sealer:
 - 1. Floors and Slabs to Receive Sealer: As indicated on finish schedule.
 - 2. Apply Sealer:
 - a. Apply sealant at coverage rate not to exceed 300 square feet per gallon.
 - b. Apply as soon as slab or floor will bear weight.
 - c. Sealer:
 - 1) Before applying sealer, sweep entire surface clean with very soft bristled brush which will not mark finish. Remove all residue, oil,

sealers, waxes, contaminants, and laitance. Fill and repair all holes, cracks, and deteriorated areas to sound concrete.

- 2) Using sprayer, saturate surface with sealer.
- 3) While keeping surfaces wet with sealer, scrub surface with a bristle broom or mechanical scrubber until material gels (approximately 45 minutes).
- 4) Spray material lightly with water. Continue to work it into the surface for another 5 to 10 minutes. Flush surface with water,

removing any excess material with mop or squeegee. Repeat with a second application as above.

- 5) Paint rollers are not acceptable.
- 6) Workmen shall wear flat soled shoes which will not mark or scar surface.
- 7) Do not allow traffic on floors and slabs until sealer has dried and hardened.

3.03 FIELD QUALITY CONTROL

- A. Testing of Concrete:
 - 1. During progress of construction, the OWNER may have tests made to determine whether the concrete, as being produced, complies with requirements specified.
 - 2. Tests will be performed in accordance with ASTM C 31, ASTM C 39, and ASTM C 172.
 - 3. The ENGINEER will make and deliver test cylinders to the laboratory and testing expense will be borne by the OWNER.
 - 4. Required Number Cylinders:
 - a. Not less than 3 cylinder specimens, 6 inch diameter by 12 inch long, will be tested for each 150 cubic yards of each class of concrete with minimum of 3 three specimens for each class of concrete placed and not less than 3 specimens for each half day's placement.
 - b. One cylinder will be broken at 7 days and 2 at 28 days.
 - 5. The CONTRACTOR shall:
 - a. Test slump of concrete using slump cone in accordance with requirements of ASTM C 143.
 - b. Furnish test equipment.
 - c. Do not use concrete that does not meet specification requirements in regards to slump, but remove such concrete from project site.
 - d. Test slump at the beginning of each placement, as often as necessary to keep slump within the specified range, and when requested to do so by the ENGINEER.
 - e. Make provisions for and furnish concrete for test specimens, and provide manual assistance to the ENGINEER in preparing said specimens.
 - f. Assume responsibility for care of and providing of curing conditions for test specimens in accordance with ASTM C 31.
- B. Air Entraining Admixture:
 - 1. Test percent of entrained air in concrete at beginning of each placement, as often as necessary to keep entrained air within specified range, and when requested to do so by the ENGINEER.
 - 2. Provide test equipment.
 - 3. Do not use concrete that does not meet Specification requirements as to air entrainment and shall remove such concrete from project site.
 - 4. Test air entrainment in concrete in accordance with ASTM C 173.
 - 5. The ENGINEER may at any time test percent of entrained air in concrete received on project site.
- C. Enforcement of Strength Requirement:
 - 1. Concrete is expected to reach higher compressive strength than that which is indicated in Table A as specified compressive strength f'c.
 - 2. Strength Level of Concrete: Will be considered acceptable if following conditions are satisfied.
 - a. Averages of all sets of 3 consecutive strength test results is greater or equal to specified compressive strength f'_c .

- b. No individual strength test (average of 2 cylinders) falls below specified compressive strength f'_c by more than 500 pounds per square inch.
- c. Whenever one, or both, of 2 conditions stated above is not satisfied, provide additional curing of affected portion followed by cores taken in accordance with ASTM C 42 and ACI 318 and comply with following requirements:
 - 1) If additional curing does not bring average of 3 cores taken in affected area to at least specified compressive strength f'_c, designate such concrete in affected area as defective.
 - 2) The ENGINEER may require the CONTRACTOR to strengthen defective concrete by means of additional concrete, additional reinforcing steel, or replacement of defective concrete, all of the CONTRACTOR's expense.

3.04 ADJUSTING

- A. Repair of Defective Concrete:
 - 1. Remove and replace or repair defective work.
 - 2. Correct defective work as specified in this Article.
 - 3. Do not patch, repair, or cover defective work without inspection by the ENGINEER.
 - 4. Provide repairs having strength equal to or greater than specified concrete for areas involved.
 - a. Chip out and key imperfections in the work and make them ready for repair.
 - 5. Dry Pack Method:
 - a. Dry Pack Method: Use for holes having depth nearly equal to or greater than least surface dimension of hole, for cone-bolt, and narrow slots cut for repair.
 - b. Smooth Holes: Clean and roughen by heavy sandblasting before repair.
 - 6. Mortar Method of Replacement: Use for following:
 - a. Holes too wide to dry pack and too shallow for concrete replacement.
 - b. Comparatively shallow depressions, large or small, which extend no
 - deeper than reinforcement nearest surface.
 - 7. Concrete Replacement:
 - a. Use: When holes extend entirely through concrete section or when holes are more than 1 square foot in area and extend halfway or more through the section.
 - b. Method of Repair for Surfaces of Set Concrete to Be Repaired: First coat with epoxy bonding agent.
 - 8. Acceptable Method of Concrete Repair:
 - a. Make no repair until the ENGINEER has accepted method of preparing surfaces and proposed method of repair.

END OF SECTION





SECTION 05501

MISCELLANEOUS METAL FABRICATION

PART 1 - GENERAL

1.1 SUMMARY

A. DESCRIPTION: Provide Miscellaneous Metal Fabrications, as shown and specified per Contract Documents.

1.2 SUBMITTALS

- A. GENERAL: Refer to Section 01300 SUBMITTALS.
- B. SHOP DRAWINGS: Submit manufacture and installation details, including fastenings, for review.
- C SAMPLES: If specifically requested.
- D. PRODUCT DATA: Submit manufacturer's specifications, data, and installation instructions for review.
- E. CLOSEOUT:
 - 1. General: Refer to Section 01700 PROJECT CLOSEOUT.
 - 2. Maintenance Data: Manufacturer's instructions.
 - 3. Guarantee: Provide in required form for a period of one (1) year from date of final acceptance by Owner.

1.3 QUALITY REQUIREMENTS

- A. GENERAL: Refer to Section 01400- QUALITY ASSURANCE.
- B. REFERENCE STANDARDS:
 - 1. General: Refer to Section 01420 REFERENCES for reference standards, applicable codes and definitions.
 - 2 Aluminum Association (AA): The Surface Treatment and Finishing of Aluminum and its Alloys.
 - 3. Aluminum Anodizers Council (AAC): Finishing standards.
 - 4 American Institute of Steel Construction (AISC):
 - AISC ASD Manual: Manual of Steel Construction, Volume I and Volume II - Connections; based on Specification for Structural Steel Buildings--Allowable Stress Provisions.

RΟΔ

- b. AISC LRFD: Manual of Steel Construction.
- c. AISC 303: Code of Standard Practice for Steel Buildings and Bridges.
- 5. American Society for Testing and Materials (ASTM): Materials and testing standards as identified throughout this Section or within referenced manufacturers' standard specifications.
- 6. American Welding Society (AWS):
 - a. AWS A2.1: Structural Welding Symbols.
 - b. AW S D 1.1: Structural Welding Code Steel.
 - c. AWS D1.3: Structural Welding Code- Sheet Steel.
- 7 National Association of Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual for Architectural and Metal Products.
- 8. Steel Structures Painting Council (SSPC): Painting Manual Volume 1.

C. QUALIFICATIONS:

- 1. General: Fabricator and installer specializing in the work of this Section with minimum three (3) years documented experience.
- 2. Welding: Performed by certified welders per AW S and CBC Section 2204A.1.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. GENERAL: Refer to Section 01600 PRODUCT REQUIREMENTS.
 - B. STEEL:
 - 1. General: ASTM A36.
 - 2. Pipe (Round Hollow Structural Sections [HSS]): ASTM A53, Type E or S, Grade B.

C. FASTENINGS:

- 1. General: Bolts, nuts, screws, washers, and other various fastenings necessary for proper erection of work. Galvanized steel fastenings or other non-rusting types for exterior steel work.
- 2. Exposed in Finished Surfaces: Tamper proof countersunk Phillips flat head screws, unless otherwise shown; finish to match adjacent surfaces.
- 3. Plastic Screw Anchors:
 - a. General: Screw Anchors Manufactured by Hilti, Inc.



- b. Alternate Manufacturers: Comparable products manufactured by U.S. Anchor Corp., or accepted equal.
- c. Plastic: Type HUD.
- d. Self-drilling: Type HFP.
- e. Impact: Type HPS.
- 4. Drilled-in Concrete Anchors:
 - a. General: Kwik Bolt TZ manufactured by Hilti, Inc.; stainless steel or galvanized for exterior work.
 - b. Alternate Manufacturers: Comparable products with current ICBO approval and equal or greater rated load capacity, manufactured by U.S. Anchor Corp., or accepted equal.

D. GALVANIZING:

- 1. General: Hot-dip process per ASTM A 123 or ASTII/I A153, as applicable. Minimun coating: 2 oz. per square foot.
- 2. Repair Treatment:
 - a. Rod: Per ASTM A780.
 - b. Coating: Per MIL-P-46105.
- E. PROTECTIVE COATINGS:
 - 1. General: FS TT-C-494, Type II; bituminous.
 - 2. Backing Paint: Zinc chromate, alkyd.
- F. PLASTIC CEMENT: FS SS-C-153, Type 1.
- G. NON-SHRINK GROUT:
 - 1. General: "MasterFlow 555" manufactured by Degussa Building Systems.
 - 2. Alternate Manufacturers: Comparable products manufactured by Euclid Chemical Co., or accepted equal.
- H. PRIMER: Per Section 09900 PAINTING.

2.2 FABRICATION

- A WORKMANSHIP:
 - 1. General: Shop assemble work in largest practical sections; minimize field connections. Grind smooth parts exposed to view; remove weld marks and leave free of fabrication marks. Miter corners and edges unless otherwise shown. Make members true to



length so assembling may be done without fillers. Bends, twists, open joints in finished members, or projecting edges or corners at connections will not be permitted. Miter, cope, and block carefully to produce tight hairline joints. Provide lugs, clips, connections, bolts, and fastenings necessary to complete fabrication.

- 2. Exposed Steel: Comply with AISC Architecturally Exposed Structural Steel fabrication requirements.
- 3. Galvanizing: Galvanize steel in exposed exterior locations and in areas where moisture may be present at interior locations. Treat all areas burned off or damaged during fabrication with specified repair compound.
- 4. Reinforcement: Provide proper reinforcement for hardware, and other fabricated metal work, as required.
- 5. Welding: Use sequence welding to minimize distortion and heat stresses. Weld by shielded electric arc process per AWS. Use continuous welding along entire area of contact, except where spot welding is permitted. Grind all welds smooth on exposed surfaces. Spot welding not permitted on exposed surfaces.
- 6. Shop Painting and Priming of Surfaces to be painted: Per SSPC standards.
- B. FABRICATIONS:
 - 1. General: Fabricate the following items, complete as shown.
 - 2 Bollards: Steel pipe sections with open ends capped, welded and ground smooth.

PART 3 - EXECUTION

- 3.1 PERFORMANCE
 - A. GENERAL: Refer to Section 01750 EXECUTION REQUIREMENTS.

3.2 PREPARATION

- A. EXAMINATION: Examine conditions of work in place before beginning work; report defects.
- B. MEASUREMENTS: Take field measurements; report variance between plan and field dimensions.

3.3 INSTALLATION

- A. PERFORMANCE:
 - 1. General: Install with workers skilled in the particular type of work required.
 - 2. Coordination: Deliver miscellaneous metal items to be installed in concrete or masonry, complete with all clips, anchors or bolts necessary to secure them in place.



- 3. Workmanship: Set work plumb and true; properly assemble and erect in a rigid and workmanlike manner. Do cutting, punching, drilling and tapping for attachment of other work coming into contact with fabricated metal work where indicated *or* as directed. Do necessary cutting, drilling, and fitting for installation of fabricated metal work. Execute drilling, cutting, and fitting carefully; when required, fit work at job before finishing. No burning in field permitted. Replace, or repair parts damaged or injured during erection in an acceptable manner. Drill holes for fasteners to exact diameter as recommended by fastener manufacturer. Oversized holes or holes not properly located that produce misalignment of fastener will be rejected.
- 4. Exposed Steel: Comply with AISC Architecturally Exposed Structural Steel installation requirements.
- 5. Galvanizing: Treat areas burned off or damaged during fabrication or erection with specified repair compound.
- 6. Field Touch-up: Touch-up damaged surfaces and field welds of steel, scheduled to be painted, per SSPC standards.
- 7. Protection: After erection, provide proper protection for fabricated metal items from other construction operations.
- B. INSTALLATION:
 - 1. General: Install the metal items, complete as shown.
 - 2. Bollards: Set in concrete and fill, as shown.

END OF SECTION

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SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. DESCRIPTION: Provide Rough Carpentry, as shown and specified per Contract Documents.
- 1.2 SUBMITTALS
 - A. GENERAL: Refer to Section 01300- SUBMITTALS.
 - B. SAMPLES: If specifically requested.
 - C. PRODUCT DATA: Submit manufacturer's specifications, data, and installation instructions for review.
 - D. CERTIFICATES:
 - 1. Pressure Treatment: Submit mill certificate verifying compliance as specified, for each shipment received, in addition to a stamp on each piece of lumber, from an approved independent inspecting agency operating under the overview of the ALSC.
 - 2. Lumber Grades: Where lumber and plywood is exposed to view and clear finished, provide Certificates in lieu of grade stamping and trademarks.

1.3 QUALITY ASSURANCE

- A GENERAL: Refer to Section 01400- QUALITY ASSURANCE.
- B. REFERENCE STANDARDS:
 - 1. General: Refer to Section 01420- REFERENCES for reference standards, applicable codes and definitions.
 - 2. American Forest and Paper Association (AFPA) : National Design Specification for Wood Construction.
 - 3. American Lumber Standards Committee, Inc. (ALSC): Grading Standards.
 - 4. The Engineered Wood Association (APA): Standard Grading Rules.
 - 5. American Society for Testing and Materials (ASTM): Materials and testing standards as identified throughout this Section or within referenced manufacturers standard-specifications.
 - 6. American Wood Preservers Association (AWPA):
 - a. AWPA C1: All Timber Products- Preservative Treatment by Pressure Processes.
 - b. AWPA C2: Wood Preservative Treatment by Pressure Process.
 - c. AWPA C20: Fire Retardant Treatment by Pressure Process.
 - d. AWPA M4: Standard for the Care of Pressure Treated Wood Products.
 - 7. National Institute of Standards and Technology (NIST):
 - a. PS 1: Construction and Industrial Plywood.



- b. PS-20: American Softwood Lumber Standard.
- 8. Redwood Inspection Service (RIS) Division of the California Redwood Association (CRA): Standard Specifications for Grades of California Redwood Lumber.
- 9. West Coast Lumber Inspection Bureau (WCLIB): Standard Grading Rules No. 17.
- 10. Western Wood Products Association (WWPA): Western Lumber Grading Rules.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. GENERAL: Refer to Section 01600- PRODUCT REQUIREMENTS.
 - B. GRADING:
 - 1. General: NIST PS-20 and applicable lumberman's association rules, as approved by DSA, under which each lumber species is produced.
 - 2. Grade Marking:
 - a. Lumber.: CBC Standard 23-1; each piece of lumber, factory marked with official grade mark of grading agency or independent agency operating under the overview of ALSC.
 - b. Plywood: CBC Standard 23-2 and PS 1-95; each panel legibly identified for type, grade and species by APA grade mark.

C. LUMBER:

- 1. General: Sizes dressed as shown, surfaced four (4) sides; 19 percent maximum moisture content; air or kiln dried. Boxed heart will not be permitted in lumber 3x or thicker.
- 2. Lumber Grades:

a. General: Douglas fir-larch; to 4 inch thickness- No. 1; 6 inch thickness and larger- No. 1.

- b. Sills:
 - 1. General: Pressure treated Douglas fir-larch No. 1 or better; AWPB marked.
 - 2. Non-bearing Stud Walls: Douglas fir-larch No. 2.
- c. Posts. Beams and Stringers: Douglas fir-larch No. 1.
- d. Miscellaneous Framing:
 - 1. Douglas Fir-Larch: Blocking, nailers, furring, bridging and stripping;
 - No.2 grade.
 - 2. Redwood: Where specifically shown; Foundation Grade, unless otherwise noted.
- D. SHEET MATERIALS:
 - 1. Plywood: APA Structural 1, with exterior glue; sizes as shown.
 - 2. Oriented Strand-Board (OSB): Exposure 1, Structural 1; span rating of not less than 16/0; thickness not less than Y2 inch.

E. WOOD TREATMENT:

- 1. General: Manufactured by J. H. Baxter Co.; factory applied treatment, unless otherwise noted.
- 2. Alternate Manufacturers: Comparable products manufactured by the California Cascade Industries, or accepted equal.
- 3. Fire Retardant: AWPA C20, Exterior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25.
 - 4. Wood Preservative
 - a. Pressure Treatment: AWPA C1 using water borne preservative.
 - b. Surface Application: Clear type.
- F. ROU GH HARDWARE:
 - 1. Hangers, Clamps, Straps and Anchors:
 - a. General: Manufactured by Simpson Strong Tie Co., Inc.; types as shown.
 - b. Alternate Manufacturers: Comparable products with current ICC ES approval and equal or greater rated load capacity, manufactured by USP Lumber Connectors, or accepted equal. Submit ICC ES approval for review for all alternate products.
 - c. Special Fabrications: Refer Section 05501 MISCELLANEOUSMETAL FABRICATIONS.
 - 2. Fasteners:
 - a. Nails: ASTM F1667, common wire; hot-dipped galvanized for pressure preservative treated and exterior work; electro galvanized for other work. Box and sinker nails not permitted.
 - b. Bolts and Nuts: ASTM A307, Grade A, including supplementary requirement S1; galvanized for exterior work.
 - c. Screws: Wood and lag screws per AISI/ASME B 18.2.1; galvanized for exterior work.
 - d. Washers: Malleable iron or standard cut steel; galvanized for exterior work.
 - e. Specialty Fasteners:
 - 1. General: Manufactured by Hilti, Inc.; galvanized for exterior work.
 - 2. Alternate Manufacturers: Comparable products with current ICC ES approval and equal or greater rated load capacity, manufactured by the US Anchor Corp., or accepted equal.
 - 3. Expansion Bolts: Kwik Bolt TZ, type as shown.
 - 4. Concrete Screws: Kwik Con II, type as shown.
 - 5. Powder Actuated Fasteners: Type as shown.
- G. BUILDING PAPER: ASTM 0226, 15 lb. asphalt saturated felt.
- H. CAULKING: Provided under Section 07901 -JOINT SEALERS.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. GENERAL: Refer to Section 01750- EXECUTION REQUIREMENTS.

3.2 PREPARATION

- A. SCHEDULING: Coordinate work specified elsewhere that affects the work of this Section.
- B. EXAMINATION: Examine conditions of work in place before beginning work; report defects.
- C. MEASUREMENTS: Take field measurements; report variance between plan and field dimensions.
- D. PROTECTION:
 - 1. General: Per Section 01400- QUALITY ASSURANCE.
 - 2. Security and Safety: Provide temporary protection and enclosures as required.
 - 3. Temporary Bracing: Provide bracing adequate to keep structure stable, plumb and in line; keep in place until permanent framing is completed. Provide bracing capable of supporting loads imposed by stockpiled material, erection equipment and other loads, during construction.

3.3 ERECTION

- A. GENERAL:
 - 1. Coordination: Coordinate placement of anchors, inserts, etc., in concrete and masonry. Establish locations, lines, levels and provide cutting, patching and fitting as required to accommodate built-in Work specified in other Sections.
 - Lumber: Use new lumber; re-use not permitted unless authorized in writing by the Architect. Select lumber in a manner that allowable knots and obvious minor defects not interfere with placement of bolts, nailing or structural connections.
 - 3. Layout: As shown; set plates, nailing blocks, anchors, grounds, etc., as required.
 - 4. Site Applied Wood Treatment: Brush apply two (2) coats of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashing, and framing within 18 inches of finish grade. Treat site-sawn cuts. Allow preservative to dry prior to erecting members.
 - 5. Fasteners:
 - a. Nails: Per CBC Table 2304.9.1 unless otherwise noted. Space groups of nails no closer together than required penetration and not closer than required penetration from cut ends or edges of lumber. Prevent splitting due to nailing drill holes for nails no more than .75 diameter of nail. Where nails of normal length may penetrate through exposed work, use nail of specified diameter and shorter length. Use of nailing gun is subject to written approval of the Architect and DSA.
 - Bolts and Nuts: Use steel pieces as template for location of holes; drill holes 1/32 inch larger than diameter of bolts; tighten nuts or rods and bolts at time of installation. Re- tighten before covering up and just before final inspection and acceptance of the work; at exposed work, cut protruding bolt ends off to within



1/8 inch of nut and file off burrs.

- c. Washers: Install at bolts, nuts or lag screws bearing on wood; not required under heads of carriage bolts.
- d. Screws:
 - 1. General: Hammering or driving in place not permitted. Use soap to lubricate screw threads, if required.
 - 2. Lag Screws: Drill holes of same diameter and depth as shank: drill holes threaded portion of screw no larger than 3/4 shank diameter.
 - 3. Wood Screws: Drill lead holes for shank and threaded portions, hole diameter
- e. Powder Actuated Fasteners:
 - 1. General: Install where shown or required; DO NOT install in structural connections required to carry computed stresses.
 - 2. Application: Per Article 28, Powder-Actuated Tools, Paragraph 1685, of Title 8, CCR.

B. INSTALLATION:

- 1. General:
 - a. Structural Members:
 - 1. General: Set level and plumb, in correct position; place horizontal members level, with crown side up.
 - 2. Glue Laminated Beams: Provided under Section 06181- GLUE-LAMINATED BEAMS; do not erect until fabrication inspector's certificates have been reviewed by the Architect. Cut to length. No other cutting or notching is permitted, except as shown, or with written approval of the Architect.
 - 3. Fabricated Wood Joists: Provided under Section 06174 FABRICATED WOOD JOISTS. No cutting of flanges permitted; holes in web shall conform to manufacturer's requirements.
 - b. Framing Members: Construct full length without splices; notching permitted only with approval of the Architect.
 - c. Blocking:
 - 1. General: Provide as shown and where necessary to obtain required lines and levels in finished surface and to provide solid nailing. Secure blocking plumb and rigid; use wood shims wherever necessary to form true and even plane for finish materials.
 - 2. Fire-blocking: Provide per CBC at interior and exterior walls at intersection with floor, ceiling and roof, and at all hollow concealed spaces. Install minimum 2x material by width of enclosed spaces within partition in continuous row to prevent vertical and horizontal draft. Maximum concealed air space of 10'-0" in any direction.
 - 3. Backing: Provide blocking within walls where anchorage is required for equipment and accessories shown.
- 2. Wall Framing:
 - a. General: Wood studs as shown; frame openings with multiple studs at sides and headers as shown.
 - b. Plates: Provide continuous sole plates, pressure treated when in contact with



concrete, and double top plates. Lap top plate splices 4'-0" minimum; lap at wall corners and intersections.

- c. Studs: Continuous lengths without splices; provide solid blocking at plywood joints.
- d. Framing for Piping: Provide proper clearances; furr partitions as required. At pipe 1-1/2 inch diameter, or less, set pipe in center of plate using neat holes; no notching allowed. Holes in plates less than 5-1/2 inches in width, not allowed.
- e. Headers: Continuous members as shown.
- f. Corner Bracing: Continuous members as shown.
- g. Sheathing:
 - 1. Orientation: Secure with long dimension parallel to studs, with joints located over studs or solid blocking and end joints staggered; nailing as shown.
 - 2. Joints: Minimum 1/16 inch space at end joints and 1/8 inch at edge joints.
 - 3. Penetrations: Penetration of structurally required sheathing to accommodate electrical or mechanical requirements must be approved in writing by the Architect.
- 3. Posts and Columns: As shown, straight, plumb and level; brace as required.
- 4. Roof Framing:
 - a. General: Provide minimum bearing as shown at both ends of each member and anchor as shown. Provide solid blocking at plywood joints.
 - b. Beams and Girders: As shown; splices not permitted except where centered over columns.
 - c. Joist Framing: As shown.
 - d. Sheathing: Secure with long dimension perpendicular to joists, with joints located over joists or solid blocking and end joints staggered; nailing as shown. Minimum 1/16 inch space at end joints and 1/8 inch at edge joints.
- 5. Miscellaneous Framing:
 - a. General: Provide nailers, backing, and stripping as necessary to obtain required lines and levels in finished surface. Secure plumb and rigid; use wood shims where required. Provide backing required for wall or ceiling hung fixtures and equipment.
 - b. Building Paper:
 - 1. General: Apply where shown, with 2 inch horizontal laps and 6 inch vertical laps at joints and corners. Repair damaged paper before installation of finish material.
 - 2. Paper: Use 3/8 inch head galvanized nails spaced adequately to hold paper in place, without buckling.
 - c. Caulking:
 - 1. General: Per Section 07901- JOINT SEALERS.
 - 2. Energy Compliance: Apply during framing operations as required by CBC.



- 3. Thresholds: Set in full bed.
- d. Ventilating Holes: Provide in indicated sizes where shown.
- e. Mechanical and Electrical: Provide curbs, backing and blocking, as required for mechanical and electrical fixtures and equipment.
- C. TOLERANCES: Per Section 01400 QUALITY ASSURANCE. Install to allow application of subsequent finish materials within specified tolerances.
- D. PROTECTION: During inclement weather, protect exposed roof sheathing and wood decking with protective waterproof covering until roofing has been installed.

3.4 CLEANING

A. GENERAL: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish, and debris.

** END OF SECTION**

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SECTION 06181

GLUE – LAMINATED BEAMS

PART 1 - GENERAL

1.1 SUMMARY

A. <u>DESCRIPTION:</u> Provide Glue-laminated Beams, as shown and specified per Contract Documents.

1.2 SUBMITTALS

- A. <u>GENERAL</u>: Refer to Section 01300 -SUBMITTALS.
- B. <u>SHOP DRAWINGS</u>: Submit manufacture and installation details, including fastenings, for review.
- C. <u>SAMPLES</u>: If specifically requested.
- D. <u>PRODUCT DATA</u>: Submit manufacturer's specifications, data, and installation instructions for review.
- E. <u>CERTIFICATES</u>: Submit certificate stating that beams provided conform to ANSI A190.1.

F. <u>CLOSEOUT:</u>

- 1. <u>General</u>: Refer to Section 01700 CLOSEOUT PROCEDURES.
- 2. <u>Guarantee:</u> Provide in <u>required form</u> for a period of one (1) year from date of final acceptance by Owner.

1.3 QUALITY REQUIREMENTS

A. <u>GENERAL</u>: Refer to Section 01400 - QUALITY ASSURANCE.

B. <u>REFERENCE STANDARDS:</u>

- 1. <u>General</u>: Refer to Section 01420 REFERENCES for reference standards, applicable codes and definitions.
- 2. <u>American Society for Testing and Materials (ASTM)</u>: Materials and testing standards as identified throughout this Section or within referenced manufacturers standard specifications.
- 3. <u>American Institute of Timber Construction {AITC}</u>:
 - a. <u>AITC 110:</u> Standard Appearance Grades for Structural Glued Laminated Timber.

- b. <u>AITC 111</u>: Recommended .Practice for Protection of Structural Glued Laminated Timber During Transit, Storage, and Erection.
- c. <u>AITC_113</u>: Standard for Dimensions of Structural Glued Laminated Lumber.
- d. <u>AITC "117</u>: Standard Specifications for Structural Glued Laminated Timber Softwood Species, Design Requirements.
- 4. <u>American National Standards Institute (ANSI)</u>: ANSI A190.1 -Structural Glued Laminated Timber.
- 5. <u>American Welding Society (AWS)</u>: D11 Structural Welding Code.
- 6. <u>West Coast Lumber inspection Bureau (WCLIB)</u>: Standard Grading Rules No. 17.
- 7. <u>Western Wood Products Association {WWPA}</u>: Western Lumber Grading Rules.
- C. <u>QUALIFICATIONS</u>: Company specializing in manufacture of glue laminated structural units, certified by the AITC, with five (5) years of experience.
- D. <u>SUPERVISION AND INSPECTION:</u>
 - 1. Identification and Certification:
 - a. <u>General</u>: Stamp each structural glued laminated unit with an identifying mark corresponding to data given in Verified Report.
 - b. <u>Verified Report</u>: Per CBC; state that work performed conforms to the requirements of these specifications and identify species and grade of lumber, extremes of moisture content, type of glue, and other information as required, certified by the Inspector. Verify presence of official grading marks or that lumber grade certificates were provided.

PART 2- PRODUCTS

2.1 MATERIALS

- A. <u>GENERAL</u>: Refer to Section 01600 PRODUCT REQUIREMENTS.
- B. <u>GLUE-LAMINATED BEAMS:</u>
 - 1. <u>General:</u> Glued Laminated Beams manufactured by Standard Structures, Inc.
 - 2. <u>Alternate Manufacturers:</u> Comparable Products manufactured by the Structure wood Division of the Weyerhaeuser Corporation, or accepted equal.
 - 3. <u>Size:</u> As shown.
- C. <u>LUMBER:</u>
 - 1. <u>General:</u> Coast Region Douglas Fir per WCLIB or WWPA.



- 2. <u>Moisture Content:</u> Between 7 and 12 percent at the time of gluing; range in assembled member not to exceed 5 percent.
- D. <u>ADHESIVE</u>: Wet use adhesive per referenced standards.
- E. <u>SEALER</u>: Recommended by manufacturer.
- F. <u>WOOD TREATMENTS:</u> Per Section 06100- ROUGH CARPENTRY.

G. <u>ROUGH HARDWARE:</u>

- 1. <u>Bolts and Nuts:</u> ASTM A307, Grade A, including supplementary requirement S1.
- 2. <u>Anchor Bolts:</u> ASTIVI A325 steel; galvanized.
- 3. Lag Screws: FS FF-B-561.
- 4. <u>Bearing Plate Anchors:</u> As shown.
- 5. <u>Washers</u>: Malleable iron or steel plate.
- H. <u>STEEL</u>: ASTM A36.

2.2 FABRICATION

- A. <u>GLUE-LAMINATED BEAMS:</u>
 - 1. <u>General:</u> Fabricate glue-laminated structural members per ANSI A190.1 and CBC 2303.1.3.
 - 2. <u>Grading:</u>
 - a. <u>General:</u> Appearance per AITC 110.
 - b. <u>Concealed</u>: Industrial Grade.
 - c. <u>Exposed:</u> Architectural Grade, for transparent finish.
 - 3. <u>Adhesive</u>: ASTM 02559 exterior type, unless specifically noted otherwise; dry use adhesives not permitted. No field laminating permitted.
 - 4. <u>Manufacture:</u>
 - a. <u>Shape and Camber</u>: As shown.
 - b. Laminations:
 - 1. <u>General:</u> 1-1/2 inches thick, stress graded for dry conditions of use. Curved members must be metal dowel reinforced.
 - 2. <u>Stress Grade</u>: As shown.
 - c. Joints: Per ANSI A190.1 and ASTM D3737.



- Sealer: After end trimming, apply to all exposed surfaces, per AITC requirements.
- 6. <u>Wood Preservative:</u> Apply where specifically shown as specified in Section 06100 ROUGH CARPENTRY.

B. <u>CONNECTING HARDWARE:</u>

- 1. <u>General:</u> As shown, provided by fabricator of glue-laminated work. Fabricate with joints neatly fitted, welded and ground smooth.
- 2. <u>Welding:</u> Per AWS D1.1 standards.
- 3. Bolt Holes: As shown; 1/16 inch larger diameter than the bolt.
- 4. <u>Galvanizing:</u> ASTM A123, 1.25 ounces/per square foot, after fabrication.
- 5. <u>Priming</u>: Per Section 09901 PAINTING.
- C. <u>SPECIAL METAL FABRICATIONS:</u> Refer to Section 05501 MISCELLANEOUS METAL FABRICATIONS.

PART 3- EXECUTION

3.1 PERFORMANCE

A. <u>GENERAL</u>: Refer to Section 01750 - EXECUTION REQUIREMENTS.

3.2 PREPARATION

- A. EXAMINATION: Examine conditions of work in place before beginning work; report defects.
- B. <u>MEASUREMENTS:</u> Take field measurements; report variance between plan and field dimensions.
- C. STORAGE: Per AITC 111.
- D. <u>PROTECTION:</u> Protect members to AITC requirements for individually wrapped beams; leave wrapping in place until finishing occurs.

3.3 INSTALLATION

- A. <u>GENERAL</u>: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. <u>ERECTION EQUIPMENT:</u> Use handling and erection equipment and methods that will protect the appearance of units; sharp instruments, unprotected wire rope or chain slings not permitted.
- C. BEARING AND SUPPORT ITEMS: Coordinate placement.


D. <u>ERECTION:</u>

- 1. <u>General:</u> Set structural members level and plumb, in correct positions or sloped, as shown.
- 2. <u>Site Applied Wood Treatment:</u> Brush apply two (2) coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings. Treat site-sawn cuts. Allow preservative to dry prior to erecting members.
- 3. <u>Temporary Bracing</u>: Provide bracing and anchorage to hold members in place until permanently secured.
- 4. <u>Fitting</u>: Fit members together accurately; do not splice or join members in locations other than as shown.
- 5. <u>Repairs:</u> Repair defects or damage to members as a result of the erection. Restore exposed members to the finish appearance specified.
- E. <u>FINISH:</u> Per Section 09900- PAINTING.

3.4 CLEANING

A. <u>GENERAL</u>: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish, and debris.

END OF SECTION



BUILDING INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

1.02 WORK INCLUDED

- A. Furnish all materials and labor required to complete all Building Insulation Work as indicated, specified herein, or both. The Work of this Section includes, but is not necessarily limited to the following:
 - 1 Ceiling insulation.
 - 2 Wall insulation.

1.03 WORK EXCLUDED

- A. The work of this Section excludes the following:
 - 1. Metal Building Insulation specified in Section 13122 -Metal Building Systems.

1.04 RELATED WORK

- A. The work of this Section shall be closely coordinated with that of:
 - 1 Section 05400 -Cold Formed Metal Framing.
 - 2 Section 09250 -Gypsum Drywall Systems.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Take special care to keep insulation dry during delivery and storage. Do not install materials that are wet or show evidence of having been wet.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Established Standard: Certainteed. Other approved manufacturers: Manville or Owens Corning Fiberglass. Use types to match those listed below. Use widths to completely fill framing spaces.
- B. Insulation:
 - a. Ceiling: 6 inches thick, R-19 faced thermal insulation.
 - b. 3 5/8" Walls: 3-112 inches thick, R-11 Kraft faced thermal insulation.

c. 6" Walls: 6 inches thick, R -19 Kraft faced thermal insulation.

PART 3 EXECUTION

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3.01 INSTALLATION

- A. Installation shall be in strict accordance with manufacturers printed instructions using specified fasteners.
- B. Fill all voids in areas shown to be insulated. Butt batts snugly.

3.02 CLEAN UP

A. Clean Up -At completion, remove all unused material, scraps, etc., and legally dispose of off the site.

END OF SECTION

METAL ROOF PANELS

PART 1 – GENERAL

1.1 SUMMARY

A. DESCRIPTION: Provide Metal Roof Panels, as shown and specified per Contract Documents.

1.2 SUBMITTALS

- A. GENERAL: Refer to Section 01300 SUBMITTALS.
- B. SHOP DRAWINGS: Submit manufacture and installation details, including fastenings, for review.
- C. SAMPLES: Submit manufacturer's standard colors.

D. PRODUCT DATA: Submit manufacturer's specifications, data, and installation instructions for review.

- E. CLOSEOUT:
 - 1. General: Refer to Section 01700 CLOSEOUT PROCEDURES.
 - 2. Maintenance Data: Manufacturer's instructions.
 - 3. Guarantee: Provide in required form for a period of two (2) years from date of final acceptance by Owner.

1.3 QUALITY REQUIREMENTS

- A. GENERAL: Refer to Section 01400 QUALITY ASSURANCE.
- B. REFERENCE STANDARDS:
 - 1. General: Refer to Section 01420 REFERENCES for reference standards, applicable codes and definitions. See to IBC Standards for requirements for ferrous and nonferrous metal sheets or sections.
 - 2. American Society for Testing and Materials (ASTM): Materials and testing standards as identified throughout this Section or within referenced manufacturers standard specifications.
 - 3. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
 - 4. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual.
 - 5. Steel Structures Painting Council (SSPC): Standards.
 - 6. Underwriters' Laboratories, Inc,(UL): UL 997- Wind Uplift Standards.
- C. QUALIFICATIONS: Installer specializing in the work of this Section with minimum three (3) years documented experience.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. GENERAL: Refer to Section 01600 PRODUCT REQUIREMENTS.
- B. METAL ROOF PANELS:
 - 1. General: Design Span hp System manufactured by AEP-Span, Inc., Division of ACS Profiles.
 - 2. Alternate Manufacturers: Comparable products manufactured by Metal Building Components, Inc. (MBCI), or accepted equal.
 - 3. Fire Rating: UL Class "A" fire retardant.
 - 4. Panels: 24 gage steel; width as required for batten spacing; longest practical length.
 - 5. Battens: Manufacturer's standard, spaced at 12 inches on center.
 - 6. Accessories: Manufacturer's standard, as shown.
 - 7. Finish: Factory applied fluoropolymer paint system; color as selected by Architect.
 - 8. Fasteners: Corrosion resistant per CBC Standard No. 25-17; exposed fasteners finished to match panel finish.

C. UNDERLAYMENT:

- 1. General: ASTM D2626; 30 lb. asphalt saturated felt.
- 2. Self-Sealing Underlayment:
 - a. General: Ice and Water Guard manufactured by Protecto Wrap Co.
 - b. Alternate Manufacturers: Comparable products manufactured by Grace Construction Products, or accepted equal.
- 3. Fasteners: Galvanized roofing type, as recommended by manufacturer.
- D. FLASHINGS:
 - 1. General: As shown, same gage and finish as roofing material.
 - 2. Penetration Flashings: As recommended by roofing manufacturer.
- E. SEALANT: Refer to Section 07901 JOINT SEALERS.
- F. ASPHALTIC PAINT: Cold-applied asphalt mastic per SSPC requirements.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. GENERAL: Refer to Section 01750 - EXECUTION REQUIREMENTS.

3.2 PREPARATION

- A. EXAMINATION: Examine conditions of work in place before beginning work; report defects.
- B. PROTECTION: Protect panels from contact with lime, cement or chemicals. Do not allow traffic or material storage on completed roof surface.

3.3 INSTALLATION

- A. GENERAL: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. UNDERLAYMENT:
 - 1. General: Lay dry with 6 inch minimum lap horizontally and 12 inch minimum end lap.
 - 2. Self Sealing Underlayment: Install where shown.
 - 3. Ice Dam Protection: Place eave edge and gable edge metal flashings tight with facia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails spaced 8 inches on center. Apply 4 inch wide band of plastic cement over deck flange of eave edge flashings, and embed an 18 inch wide strip of underlayment. Place underlayment starter strip with eave edge flush with face of flashings. Secure in place. Lap ends minimum 6 inches. Apply lap cement at rate of approximately 1-1/4 gallon per 100 square feet, over underlayment starter strip. Starting from lower edge of starter strip, lay additional 36 inch wide strips of underlayment in lap cement, to produce a two (2) ply membrane. Weather lap plies minimum 19 inches and nail in place. Lap ends minimum 6 inches. Stagger end joints of each consecutive ply. Extend eave protection membrane minimum 4 feet up slope beyond interior face of exterior wall.
- C. ROOF VENTILATION: Install as shown.
- D. FLASHINGS: Install as shown.
- E. PANELS:
 - 1. General: Install plumb, straight, square and level; at proper elevations, locations and in alignment with adjacent work. Attach panels with fully concealed galvanized steel anchor clips. No perforation of panels by anchoring fasteners is allowed, except as shown or necessary for flashing and trims members. Tightly close interlocking seam between panels. Finish panels clean, securely fastened to structure, and weathertight. Work showing dents, creases, deformations, weathering or other defects affecting use or appearance will not be accepted.
 - 2. Accessories: Install where required and as shown.
 - 3. Penetrations: Seal pipes, vents, etc., penetrating the roofing material with sleeves and flanges of the type and size to provide a waterproof installation.
 - 4. Dissimilar Metals: Coat with asphaltic paint; 7-1/2 mil thickness, minimum, each surface.
- F. EXPANSION AND CONTRACTION: Allow for expansion and contraction over an ambient temperature range up to 150 degrees F; distortions resulting from fastening or expansion and contraction stresses not acceptable



G. SEALANT: Apply as required to provide watertight installation per Section 07901 · JOINT SEALERS.

3.4 CLEANING

A. GENERAL: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish, and debris and thoroughly clean exposed surfaces per manufacturer's instructions.

END OF SECTION



METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. DESCRIPTION: Provide Metal Wall Panels, as shown and specified per Contract Documents.

1.2 SUBMITTALS

- A. GENERAL: Refer to Section 01300 SUBMITTALS.
- B. SHOP DRAWINGS: Submit manufacture and installation details, including fastenings, for review.
- C. SAMPLES: Submit manufacturer's standard colors.
- D. PRODUCT DATA: Submit manufacturer's specifications, data, and installation instructions for review.
- E. CLOSEOUT:
 - 1. General: Refer to Section 01700 CLOSEOUT PROCEDURES.
 - 2. Maintenance Data: Manufacturer's instructions.
 - 3. Guarantee: Provide in required form for a period of two (2) years from date of final acceptance by Owner.

1.3 QUALITY REQUIREMENTS

- A. GENERAL: Refer to Section 014 00 · QUALITY ASSURAI\ICE.
- B. REFERENCE STANDARDS:
 - 1. General: Refer to Section 01420 ··· REFERENCES for reference standards, applicable codes and definitions. See to IBC Standards for requirements for ferrous and nonferrous metal sheets or sections.
 - 2. American Society for Testing and Materials (ASTM): Materials and testing standards as identified throughout this Section or within referenced manufacturers standard specifications.
 - 3. Sheet Metal and Air Conditioning Contractors National Association (SMACI\IA): Architectural Sheet Metal Manual.
 - 4. Steel Structures Painting Council (SSPC): Standards.
 - 5. Underwriter's Laboratories, Inc. (UL): Fire Resistance Directory and Building Material Directory.
- C. QUALIFICATIONS: Installer specializing in the work of this Section with minimum three (3) years documented experience.



PART 2- PRODUCTS

2.1 MATERIALS

- A. GENERAL: Refer to Section 01600 PRODUCT REQUIREMENTS.
- B. METAL WALL PANELS:
 - 1. General: HR- 36 Wall Panels, 24 gage, manufactured by AEP Span, Inc., Division of ACS Profiles.
 - 2. Alternate Manufacturers: Comparable products manufactured by Metal Building Components, Inc. (MBCI), or accepted equal.
 - 3. Accessories: Manufacturer's standard, as shown.
 - 4. Finish: Factory applied DuraTech 5000; color as selected by Architect.
 - 5. Fasteners: Corrosion resistant; exposed fasteners finished to match panel finish.
 - 6. Metal Soffit Panels: Prestige Series, 24 gage, 12" flat pan profile; perforated where shown; DuraTech 5000 finish.
- C. SEALANT: Refer to Section 07901 -JOINT SEALERS.
- D. ASPHALTIC PAINT: Cold-applied asphalt mastic per SSPC requirements.

PART 3 - EXECUTION

- 3.1 PERFORMANCE
 - A. GENERAL: Refer to Section 01750 EXECUTION REQUIREMENTS.
- 3.2 PREPARATION
 - A. EXAMINATION: Examine conditions of work in place before beginning work; report defects.
 - B. PROTECTION: Protect panels from contact with lime, cement or chemicals. Do not allow traffic or material storage on completed roof surface.

3.3 INSTALLATION

- A. GENERAL: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. PANELS:
 - 1. General: Install plumb, straight, square and level; at proper elevations, locations and in alignment with adjacent work. Attach panels as shown. No perforation of panels by anchoring fasteners is allowed, except as shown or necessary for flashing and trims



members. Tightly close interlocking seam between panels. Finish panels clean, securely fastened to structure, and weathertight. Work showing dents, creases, deformations, weathering or other defects affecting use or appearance will not be accepted.

- 2. Accessories: Install where required and as shown.
- C. EXPANSION AND CONTRACTION: Allow for expansion and contraction over an ambient temperature range up to 150 degrees F; distortions resulting from fastening or expansion and contraction stresses not acceptable
- D. SEALANT: Apply as required to provide watertight installation per Section 07901 JOINT SEALERS.

3.4 CLEANING

A. GENERAL: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish, and debris and thoroughly clean exposed surfaces per manufacturer's instructions.

** END OF SECTION**

FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SUMMARY

A. DESCRIPTION: Provide Flashing and Sheet Metal, as shown and specified per Contract Documents.

1.2 SUBMITTALS

- A. GENERAL: Refer to Section 01300- SUBMITTALS.
- B. SHOP DRAWINGS: Submit manufacture and installation details, including fastenings, for review.
- C. SAMPLES: If specifically requested.
- D. PRODUCT DATA: Submit manufacturer's specifications, data, and installation instructions for review.
- E. CLOSEOUT:
 - 1. General: Refer to Section 01700 ·CLOSEOUT PROCEDURES.
 - 2 Guarantee: Provide in required form for a period of two (2) years from date of final acceptance by Owner.

1.3 QUALITY REQUIREMENTS

- A. GENERAL: Refer to Section 01400 QUALITY ASSURANECE
- B. REFERENCE STANDARDS:
 - 1. General: Refer to Section 01420 REFERENCES: for reference standards, applicable codes and definitions.
 - 2 American Society for Testing and Materials (ASTM): Materials and testing standards as identified throughout this Section or within referenced manufacturers standard specifications.
 - 3. National Association of Architectural Metal Manufactures (NAAMM): Metal Finishes Manual for Architectural and Metal Products.
 - 4 National Roofing Contractors Association (NRCA.): Roofing and Waterproofing Manual.
 - 5. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Architectural Sheet Metal Manual.



C. QUALIFICATIONS: Installer specializing in the work of this Section with minimum three (3) years documented experience; manufacturer approved.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. GENERAL: Refer to Section 01600 PRODUCT REQUIREMENTS.
 - B. GALVANIZED SHEET METAL: ASTM A653; 24 gage minimum, core steel.
 - C. UNDERLAYMENT: ASTM 02626, 15 lb. asphalt saturated roofing felt, un-perforated.

D. FASTENERS:

- 1. General: Same metal as sheet metal flashing or other non-corrosive metal as recommended by sheet metal manufacturer, designed to withstand design loads. Match finish of exposed heads with material being fastened.
- 2. Nails:
 - a. General: FS FF-N-105; same material and finish as flashing metal.
 - b. Steel: Hot-dipped galvanized, annular thread, size as required.
 - c. Concrete: Flat head, size as required.
- 3. Screws: Stainless steel self-tapping type, size as required.
- 4. Rivets: 1/8 inch diameter, solid type; rust resistive.
- 5. Washers: Neoprene, where required.

E. SOLDER:

- 1. General: ASTI\11 832; 50/50 type; lead free.
- 2. Flux: FS 0-F-506.

F. FINISHES:

- 1. Galvanizing Repair Treatment:
 - a. Rod: Per P.STM A780.
 - b. Coating: Per MIL-P-46105.
- 2. Protective Coatings:
 - a. General: FS TT-C-494, Type II; bituminous.
 - b. Backing Paint: Zinc chromate, alkyd.
- G. PLASTIC CEMENT: ASTM 02822, asphalt type.
- H. SEALING TAPE: Refer to Section 07901 JOINT SEALERS.
 - 1. General: No. 606 Architectural Sealant Tape manufactured by Protective Treatments, Inc.



- 2. Alternate Manufacturers: No known equal.
- I. SEALANTS: FS TT-S-230, non-hardening, non-sagging; refer to Section 07901 JOINT SEALERS.

2.2 FABRICATION

- A. MANUFACTURE:
 - 1. General: Fabricate and assemble sheet metal work in shop; field fabricate only when required by restrictive field conditions. Form sections, per referenced standards, true to shape, accurate in size, square, and free from distortion or defects. Form pieces in single length sheets, not to exceed 10'-0" in length. Hem exposed edges on underside 1/2 inch; miter and seam corners.
 - 2. Seams: Flat lock.
 - 3. Corners: One piece with minimum 18 inch long legs; solder for rigidity, seal with sealant.
 - 4. Cleats: Minimum 2 inches wide, interlockable with sheet.
 - 5. Vertical Faces: Bottom edge formed outward 1/4 inch and hemmed to form drip.
 - 6. Flashing Toe: Extend toe 2 inches over roofing; return and brake edges.
 - 7. Soldering: Solder shop formed metal joints. After soldering, remove flux; wipe and wash solder joints clean. Weather seal joints.
 - 8. Back Painting: Paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.
- B. ASSEMBLIES:
 - 1. General: Fabricate with galvanized sheet metal, unless otherwise shown.
 - 2 Flashing:
 - a. General: 20 gage; as shown.
 - b. Exterior Hollow Metal Frame Flashing: 18 gage, as shown.

PART 3 - EXECUTION

- 3.1 PERFORMANCE
 - A. GENERAL: Refer to Section 01750 · EXECUTION REQUIREMENTS.
- 3.2 PREPARATION



- A. EXAMINATION: Examine conditions of work in place before beginning work; report defects.
- B. MEASUREMENTS: Take field measurements; report variance between plan and field dimensions.
- C. STORAGE: Stack preformed material to prevent twisting, bending or abrasion; slope to ensure drainage.
- 3.3 INSTALLATION
 - A. GENERAL: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
 - B. UNDERLAYMENT: Apply one (1) layer of felt underlayment over surfaces as shown; lap all edges 6 inches minimum, in direction of slope.
 - C. APPLICATION:
 - 1. General: Make corners square, surfaces true and straight in planes, and lines accurate to profiles. Fit sheet metal tight in place; secure using concealed fasteners. Apply plastic cement compound between metal flashings and felt flashings. Seal metal joints watertight.
 - 2. Expansion and Contraction: Allow for expansion and contraction over an ambient temperature range up to 150 degrees F; distortions resulting from fastening or expansion and contraction stresses not acceptable
 - 3. Dissimilar Metals: Isolate with heavy coat of bituminous paint. Coat all sheet metal in contact with roofing felts.

D. ASSEMBLIES:

- 1. Flashing:
 - a. General: Install flashings where shown; miter and solder joints at corners. Lap joints in counterflashing at least 6 inches and make watertight with sealing tape. Extend counterflashing down not less than 6 inches.
 - b. Exterior Hollow Metal Frame Flashing: Provide at frame heads, as shown.
- E. SEALANTS: As shown; set pan and base flashings in full bed of sealant.
- F. GALVANIZING REPAIR TREATMENT: Repair damaged zinc coating with specified repair compound, as required.

3.4 FIELD QUALITY CONTROL

A. GENERAL: Leaking, failure to stay in place, undue expansion, lifting deformation, loosening, buckling, tearing and splitting of seams will be considered defective work; make



necessary corrections.

3.5 CLEANING

A. GENERAL: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish, and debris and thoroughly clean exposed surfaces.

END OF SECTION

JOINT SEALERS

PART 1 - GENERAL

1.1 SUMMARY

A. DESCRIPTION: Provide Joint Sealers, as shown and specified per Contract Documents.

1.2 SUBMITTALS

- A. GENERAL: Refer to Section 01300- SUBMITTALS.
- B. SAMPLES: Submit manufacturer's standard colors.
- C. PRODUCT DATA: Submit manufacturer's specifications, data, and installation instructions for review.
- D. CERTIFICATES: Submit certification that sealants proposed for use comply with the Contract Documents.
- E. CLOSEOUT:
 - 1. General: Refer to Section 01700 CLOSEOUT PROCEDURES.
 - 2 Guarantee: Provide in required form for a period of ten (10) years from date of final acceptance by Owner.

1.3 QUALITY ASSURANCE

- A. GENERAL: Refer to Section 01400- OUALITY ASSURANCE.
- B. REFERENCE STANDARDS:
 - 1. General: Refer to Section 01420 REFERENCES for reference standards, applicable codes and definitions.
 - 2 American Society for Testing and Materials (ASTM): Materials and testing standards as identified throughout this Section .or within referenced manufacturers standard specifications.
 - 3 Sealant, Waterproofing and Restoration Institute (SWRI): Sealant and Caulking Guide Specification.
 - 4 Underwriter's Laboratories, Inc. (UL): Fire Hazard Classifications.
- C. QUALIFICATIONS:
 - 1. General: The manufacturer of the sealant used shall have been in the business of manufacturing the specified types of such sealants for not less than 10 years.



- Applicator: Installer specializing in the work of this Section with minimum five
 (5) years documented experience.
- 3. Volatile Organic Compounds (VOC): Use only products in compliance with VOC content limits required by Federal and State EPA regulations.
- D. COMPATIBILITY WITH SUBSTRATE: Verify that caulking and sealants used are compatible with joint materials.
- E. JOINT TOLERANCES: Comply with manufacturer's joint width/depth ratio limitations.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. GENERAL: Refer to Section 01600 PRODUCT REQUIREMENTS.
 - B JOINT SEALERS:
 - 1. General: Manufactured by Tremco, Inc.
 - 2. Alternate Manufacturers: Comparable products manufactured by the Pecora Chemical Corp., or accepted equal.
 - 3. Color:
 - a. Concealed Joints: Manufacturer's standard color having best overall performance characteristics for indicated application.
 - b. Exposed Joints: Custom color to be selected by Architect.
 - C. EXTERIOR JOINTS:
 - 1. Vertical Surfaces: Non-sag polyurethane; Dymonic.
 - 2. Sealing Tape: TremGlaze GT800.
 - 3. Horizontal Paving Joints: Self-levelling polyurethane; THC 900; interior and exterior.
 - D. INTERIOR JOINTS:
 - 1. General: Acrylic Latex, TremGlaze SA ·11 00.
 - 2. Firestop Caulking: TremStop Firestopping System..
 - E JOINT CLEANER: Provide cleaner recommended by sealant manufacturer for specific joint surface and condition.
 - F JOINT PRIMER AND SEALER: Non-corrosive and non-staining type as recommended by sealant manufacturer for each condition.
 - G JOINT BACKING: Round, open cell non-gassing polyurethane foam rod or closed cell



polyethylene foam as recommended by the manufacturer, oversized 30 percent larger than joint width.

- H BOND BREAKER: Pressure sensitive tape as recommended by sealant manufacturer to suit application.
- I. MASKING TAPE: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
- J. OTHER MATERIALS: Manufacturer's standard for items required or type best suited for proper execution of the work.

PART 3 - EXECUTION

- 3.1 PERFORMANCE
 - A. GENERAL: Refer to Section 01750 · EXECUTION REQUIREMENTS.

3.2 PREPARATION

- A. ENVIRONMENTAL REQUIREMENTS: Do not apply materials when temperature is below 40 degrees F, or under extreme temperature conditions when joint width is expanded or contracted beyond normal conditions.
- B. EXAMINATION:
 - 1. General: Carefully examine before beginning work; report defects.
 - 2. Substrate: Inspect surfaces to insure that no previously installed bond-breaker materials contaminate the surface to which the sealant is to adhere. Require repair of unsound substrates. Commencement of work constitutes acceptance of substrate.
- C. STORAGE: Per manufacturer's recommendations for proper precautions for shelf life, temperature, humidity and similar storage factors to ensure the fitness of the material when installed.
- D. SURFACE PREPARATION:
 - 1. General: Prepare joints in accordance with manufacturer's instructions to ensure maximum adhesion. Remove loose materials and foreign matter that might impair adhesion of sealant.
 - 2 Masking: Tape as required to prevent contact of sealant with adjoining surfaces to prevent permanent staining, damage by contact or by cleaning methods required to remove sealant smears.
 - 3 Sealants: Prepare as required, including proper mixing of multi-component sealants.
- E. PROTECTION: Protect surfaces adjacent to joints to receive sealant. Cover joints in



walking surfaces with heavy duty, non-staining tape, until material has dried.

3.3 APPLICATION

- A. GENERAL: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. INSTALLATION:
 - 1. General: Install per manufacturer's instructions, within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within recommended ranges.
 - 2. Joint Cleaner: Apply per manufacturer's instructions.
 - 3. Primer: Apply as required; protect adjacent exposed surfaces.
 - 4. Backing: Install to achieve a neck dimension no greater than 1/3 of the joint width, unless otherwise shown. Use blunt or rounded tools to insure uniform (+or- 1/8 inch) depth without puncturing material. Use oversize backer rod; minimum of 33% for closed cell type; minimum of 50 percent for open cell type, unless otherwise required by the manufacturer.
 - 5. Bond Breaker: Install where joint backing is not used.
 - 6. Sealant: Install free of air pockets, foreign embedded matter, ridges, and sags; prevent three sided adhesion. Measure joint dimensions and size materials to achieve required 2:1 width/depth ratios, unless otherwise noted. Provide sealant depth of one half (1/2) joint width; minimum depth of 1/4 inch; maximum of 1/2 inch, unless otherwise required by the manufacturer.
 - 7. Firestopping: Install as required to comply with fire ratings shown.
 - 8. Masking: Remove tape immediately after tooling without disturbing joint seal.

3.4 CLEANING

A. GENERAL: Upon completion, thoroughly clean exposed surfaces per manufacturer's instructions. Perform cleaning in a manner that will not affect the appearance of the sealant or the adjacent finish material.

** END OF SECTION**

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

1.02 WORK INCLUDED

A. Furnish all materials and labor required to complete all Steel Doors & Frames Work as indicated, specified herein, or both. The Work of this section includes, but is not necessarily limited to the following:

- 1. Steel doors and frames.
- 2. Drywall Frames.

1.03 RELATED WORK

- A. Work under this Section shall be closely coordinated with:
 - 1. Section 03300 -Cast-In-Place Concrete.
 - 2. Section 05400 -Cold Formed Metal Framing.
 - 3. Section 08710 -Door Hardware.
 - 4. Section 09250 -Gypsum Drywall Systems.
 - 5. Section 09900 -Painting.
 - 6. Section 13122 Metal Building Systems.

1.04 REFERENCED SPECIFICATIONS

A. DHI -Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames, and Builder's Hardware.

- B. SDI-I00 -Standard Steel Doors and Frames.
- C. SDI-I05 -Recommended Erection Instructions for Steel Frames.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of SDI-100.
- B. Coordinate window frame fabrication with window and glazing.

1.06 SUBMITTALS



A. Submit five copies of shop drawings, product data, and manufacturer's installation instructions.

B. Indicate frame configuration, anchor types and spacing, location of cutouts for hardware, reinforcement, and finish.

C. Indicate door elevations and internal reinforcement.

1.07 PRODUCT DELNERY

- A. Store products under cover in a dry, weatherproof enclosure.
- B. Protect doors and frames with resilient packaging.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers -CECO Corporation is the recognized standard, or equal products are acceptable.

2.02 MATERIALS

A. Doors and Frames

- 1. Exterior and Interior Doors: CECO "Versa door" 18 gauge polyurethane core ANSIISDI-100 Grade Full Flush.
- 2. Exterior Frames: 14 gauge.
- 3. Interior Drywall Frames: 16 gauge.
- 4. Steel: ASTM A 366, commercial quality, stretcher level sheet.
- B. Door Core -Core: Polyurethane insulation.
- C. Accessories -Rubber Silencers: Resilient rubber.
- D. Protective Coatings
 - 1. Bituminous Coating: Fibered asphalt emulsion.
 - 2. Primer: Zinc chromate.
- E. Finish -Primer: Baked on.

2.03 FABRICATION

- A. Fabrication -Doors
 - 1. Construction: Flush and seamless, 18 gage face sheets reinforced internally and fully



bonded to polyurethane core. Close top and bottom edges with continuous l6-gage channel. Finish top of exterior doors with flush channel filler, sealed.

- 2. Provide integral louvers where shown on the Drawings.
- Hardware reinforcement shall be factory drilled and tapped for template hardware:
 a. Hinges: 7 gage.
 - b. All other: 12 gage.
- 4. Provide metal Z or T shaped astragals for double doors. Coordinate with weatherstripping -see Hardware Schedule.
- B. Fabrication -Welded Frames
 - 1. Construction: 14 or 16 gauge welded steel units, comers mitered, continuous welded and ground smooth. Form as detailed.
 - 2. Door frames shall be Series SF 6-3/4 x 2" x 14 gauge.
 - 3. Hardware reinforcement shall be factory drilled and tapped for template hardware:
 - a. Hinges: 7 gage.
 - b. All Other: 12 gage.
 - c. Mortar Guards for Grouted Frames: 26 gage.
 - 4. Punch for and provide three rubber silencers at singe doors, two at pairs.
 - 5. Anchors: Provide floor clips welded to door frames. Provide three suitable wall anchors per jamb for door openings to 7 feet. Provide additional anchors for frames over 7 feet.
 - 6. For frames to be anchored through face, punch and dimple frame, and provide flat head bolts or screws.
- C. Fabrication -Drywall Frames
 - 1. Construction: 16 gauge 5-3/4 x 2" Series DS with mitered corners and lock-tab comer connections. Form as detailed.
 - 2. Hardware reinforcement, factory drilled and tapped for template hardware:
 - a. Hinges: 7 gage.
 - b. All other: 12 gage.
 - 3. Punch for and provide three rubber silencers at single doors.
 - 4. Anchors: Manufacturer's standard.
 - 5. For frames to be anchored through face, punch and dimple frame, and provide flat head bolts or screws.
- D. Finish -Pre-finished, baked, and cured. Color to be selected by Owner.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation shall conform to the following:



- 1. Install frames in accordance with SDI-10S.
- 2. Install doors in accordance with DHI.
- 3. Install all frames plumb, neatly and securely as detailed.
- 4. Install all doors square, neatly, and to operate freely without binding.
- B. Tolerances -Maximum Diagonal Distortion: 1/16 inch measured with straight edge, comer to corner.
- C. Adjusting and Cleaning -Adjust hardware for smooth and balanced door movement.

END OF SECTION -08100

SECTION 08361

ROLLING OVERHEAD DOORS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

1.02 SUMMARY OF WORK

- A. This Section includes the following types of rolling overhead doors:
 - 1. Doors with steel-framed steel insulated panels.

1.03 DEFINITIONS

A. Operation Cycle: One complete cycle of a door begins with the door in the closed position. The door is then moved to the open position and back to the closed position.

1.04 PERFORMANCE REQUIREMENTS

- A. Performance requirements are as follows:
 - 1. Structural Performance -Provide rolling overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
 - a. Wind Load: ANSIIDASMA 10-1996 standards and as required by code (Minimum Wind Force of 20 psf).
 - 2. Operation-Cycle Requirements -Design rolling overhead door components and operator to operate a minimum of 25 cycles per day for not less than an overall maximum 50,000 cycles.

1.05 SUBMITTALS

- A. Submittals shall be as follows:
 - 1. Product Data: For each type and size of rolling overhead door an accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
 - a. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
 - 2. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

1.06 QUALITY ASSURANCE

- A. Quality Assurance shall be as follows:
 - 1. Installer Qualifications: Engage an experienced installer who is an authorized representative of the rolling overhead door manufacturer for both installation and maintenance of units required for this Project.
 - 2. Manufacturer Qualifications: Engage a firm experienced in manufacturing rolling overhead doors similar to those indicated for this Project and with a record of successful in service performance.
 - 3. Source Limitations: Obtain rolling overhead doors through one source from a single manufacturer.
 - 4. Product Options: Drawings indicate size, profiles, and dimensional requirements of rolling overhead doors and accessories and are based on the specific system indicated. Other manufacturers' systems with equal performance and dimensional characteristics may be considered. Refer to Division 1 Section" Substitutions".

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:

a. Type FCWI -Chain Operated Insulated Service Door.

2.02 MATERIALS

A. The door curtain shall be constructed of interconnected strip steel slats conforming to ASTM A-526. The slats shall be designated by The Cookson Company as No. 44 (measuring 3" high by 7/8" deep) consisting of a 22 gauge exterior slat and a 24 gauge interior slat separated by 13/16" of rigid insulation (Type FCWI). The curtain insulation shall not produce a flame spread greater than 25 and a smoke generation greater than 50.

- B. The finish on the door curtain shall be Cookson Final Coat consisting of the following:
 - 1. Hot dipped galvanized G-90 coating consistent with ASTM A-525
 - 2. Bonderized coating for prime coat adhesion
 - 3. Corrosion inhibiting primer -.2 mils per side
 - 4. Thermo-setting tan polyester top coat with a minimum thickness of .6 mils each side.
 - 5. Color to be Tan Final Cote.

C. The bottom bar shall consist of two 118" angles mechanically joined together with a I" diameter vinyl covered foam edge astragal continuous along the bottom. The finish on the bottom

^{1.} The Cookson Company



bar shall be one (1) coat of bronze rust-inhibiting prime paint.

D. The guides shall consist of 3 steel angles bolted together with 3/8" fasteners to form a channel for the curtain to travel. Extruded vinyl snap-on weather-stripping shall be furnished continuously along the exterior leg of each guide. The wall angle portion shall be continuous and fastened to the surrounding structure with either minimum 112" fasteners or welds, both on 36" centers. The finish on the guide angles shall be one (1) coat of bronze rust-inhibiting prime paint.

E. The brackets shall be constructed of steel not less than 114" thick and shall be bolted to the wall angle with fasteners not less than 112" in diameter. The finish on the brackets shall be one (1) coat of bronze rust-inhibiting prime paint.

F. All gears shall be cast iron with teeth cast from machine cut patterns. The pinion gear shall not be less than a 3" pitch diameter. The gear ratio shall be designed for a maximum effort of not more than 30 pounds.

G. The barrel shall be steel tubing of not less than 6" (Type FCW!) in diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the width of the curtain. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel. The finish on the barrel shall be one (1) coat of bronze rust-inhibiting prime paint.

H. The hood shall be fabricated from 24 gauge galvanized steel and shall be formed to fit the curvature of the brackets. The hood shall be corrugated every 1" along the curvature for the entire length of the hood. The hood shall contain a waterproof canvas baffle to control air infiltration. The finish on the hood shall be the Cookson Final Coat finish as indicated in the current section.

2.03 OPERATION

A. Chain operated doors shall be open and close with a maximum of 30 pounds of effort utilizing an endless chain and cast iron reduction gears.

2.04 LOCKING MECHANISMS

A. The chain door shall be secured by means of a chain lock.

PART 3 EXECUTION

3.01 EXAMINATION OF CONDITIONS

- A. Examination shall be as follows:
 - 1. Examine wall and overhead areas, including opening framing and blocking, with Installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of work of this Section.
 - a. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Installation shall be as follows:



- 1. General: Install door, track, and opening equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.
- B. Adjusting -Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion, and fitting weather tight for entire perimeter.
- C. Warranty:
 - 1. Provide twelve (12) month warranty against defects in workmanship and materials.

END OF SECTION -08361

SECTION 08710

DOOR HARDWARE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

1.02 WORK INCLUDED

- A. Furnish and install all finish door hardware as shown and specified.
 - 1. Refer to "Door Schedule" on the Drawings.

1.03 RELATED WORK

- A. Related Work Specified Elsewhere is as follows
 - 1. Section 08100 Steel Doors & Frames

1.04 SUBMITTALS

- A. Submittals shall be provided as follows:
 - 1. Submit five copies of complete hardware schedule. Include manufacturer's names with model numbers. Organize schedule to incorporate Group Numbers scheduled in Paragraph 3.02, A.
 - 2. Submit five copies of catalog cuts, for each item listed in schedule. Submit samples when requested by Owner.
 - 3. Submit template information as required to door and frame suppliers.
 - 4. Provide keys as required in Paragraph 2.08, A.
 - 5. Submit five copies of operating and maintenance instructions for closers and all other adjustable items.

1.05 PRODUCT HANDLING

- A. Delivery and Storage shall be provided as follows:
 - 1. Deliver all hardware to jobsite neatly and carefully packaged and clearly labeled by item number for each opening.
 - 2. Schedule deliveries to avoid construction delay.
 - 3. Store all hardware in a locked room, until installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers -The following manufacturers have been used for the items listed in the hardware sets in Paragraph 3.0-B. Or equal manufacturers except for locksets, are acceptable provided they furnish items comparable or superior to those listed below:

- 1. Schlage: Locksets.
- 2. LCN: Closers.
- 3. Trimco: Door Stops.
- 4. Pemko: Weather-stripping, thresholds, astragals, and door sweeps.
- 5. Hager: Hinges.
- 6. Trimco: Flush Bolts.

2.02 FINISHES

- A. Finishes -Unless noted otherwise, use the following finishes:
 - 1. All Items, Unless Otherwise Noted: US26D (626) satin chrome.

2.03 LOCKSETS

A. Locksets -Schlage A Series with corrosion resistant interior parts. Locksets shall have access to the cylinder without removing the lockset from the door.

- 1. Backset for Locks and Latches: 2-3/4 inches.
- 2. Trim Design: Levon Series.

2.04 DOOR CLOSERS

- A. Exposed Closers shall comply with the following:
 - 1. Closers: Rack and pinion type with separate spring power adjustment and adjustable back check, non-handed, with rectangular finish cover. If multiple size closers are not specified, provide closers of size recommended by manufacturer for door size and conditions of use.
 - a. Indicate regular or parallel aim (and size) in submitted hardware schedule for each door according to the following order of precedence: (Engineer may revise location on returned hardware schedule.)
 - i. Locate exterior door closers on inside.
 - 2. Provide appropriate brackets wherever necessary to allow proper installation of closers.
 - 3. Unless prevented by adjacent construction, install closers to allow 180 degree opening

of doors.

2.05 HINGES

- A. Hinges shall comply with the following:
 - 1. Number of hinges per door leaf: Three
 - Butt hinge size by door leaf width:
 a. To 36 Inches: 4-1/2 inches x 4-1/2 inches.
 - 3. Furnish butt hinges to comply with the following requirements:
 - a. Exterior Doors: Non-removable pins when door is closed, solid brass or bronze.
 - b. Doors With Closers: Oil bearing or ball bearing.

2.06 STRIKES

A. Strikes -Use strikes with extended lips to protect frame or door from latch bolts, but which do not project more than 1/8 inch beyond frame or door leaf. Include box.

2.07 FASTENING SYSTEMS

- A. Fastenings shall be as follows:
 - 1. Furnish finish hardware with all necessary screws, bolts, or other fastenings of suitable size and type to anchor the hardware in position for heavy use and long life, finished to harmonize with the hardware material and finish.
 - 2. Furnish these fastenings where necessary with expansion shields, sex bolts, toggle bolts, or other approved anchors according to the materials to which it is applied, and as recommended by the manufacturer.

2.08 KEYING

- A. Key and Keying shall be as follows:
 - 1. Construction Keying: Provide a method independent of the final keying system for securing the building during construction.
 - 2. Final Keying System:
 - a. Stamp all keys "DO NOT DUPLICATE".
 - b. Master key all locks in accordance with the Owner's instructions.
 - c. Deliver two keys for each lock plus six master keys to the Owner.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation shall comply with the following:
 - 1. Install all finish hardware in coordination with installation of all doors so that all doors



operate freely, without binding, and so that all hardware functions as indicated.

- 2. Furnish hardware to comply with all applicable building codes. All exit doors shall be operable from the inside without the use of a key.
- 3. Notify Engineer of all conditions that prevent functional operation, or guarantee requirements for doors at the time of shop drawing submittal. Failure to notify of such conditions at this time indicates acceptance by Contractor of conditions. Make subsequent changes required because of this failure to notify at no additional cost to the Owner.
- 4. Protect all installed hardware until completion. Remove and replace damaged hardware.

3.02 DOOR HARDWARE

- A. Door Hardware Schedule:
 - GROUP 1 Hinge -BBI191 4.5X4.5 US26D NRP (Hager) Lockset -A53PD -LEV (Sch1age) Gasket PK55D18 (Pemko) Door Sweep -lB062CNB (Pemko) Threshold -272A (Pemko) Closer -4041 (LCN)
 - GROUP 2 Hinges -BB 1191 4.5X4.5 US26D NRP (Hager) Lockset -A53PD -LEV (Sch1age) Gasket -PK55D 1 B (Pemko) Door Sweep -18062CNB (Pemko) Flush Bolts -3917-12"x3917-12" (Trimco) Astraga1-355CS (Pemko) Tln'esho1d -272A (Pemko) Closer -4041 Series (LCN)
 - 3. GROUP 3 Hinges -BB1191 4.5X4.5 US26D NRP (Hager) Lockset -A80PD -LEV (Sch1age) Threshold -272A (Pemko)
 - 4. GROUP 4 Hinges -BB1191 4.5X4.5 US26D NRP (Hager) Lockset -A40S -LEV (Sch1age) Threshold -272A (Pemko)

END OF SECTION -08710

GYPSUM DRYWALL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

1.02 WORK INCLUDED

A. Work included -Furnish all materials and labor required to complete all Gypsum Drywall Systems Work as indicated, specified herein, or both. The Work of this Section includes, but is not necessarily limited to the following:

- 1. Gypsum Board.
- 2. Taped and sanded joint treatment.

1.03 RELATED WORK

- A. Work under this Section shall be closely coordinated with:
 - 1. Section 05400 Wood Framing
 - 2. Section 07210 -Building insulation.
 - 3. Section 09900 -Painting.

1.04 QUALITY ASSURANCE

A. Quality Assurance -Perform Gypsum Wallboard Systems Work in accordance with recommendations of ASTM C 754, ASTM D 3273, and GA 216, unless otherwise specified in this Section.

1.05 REFERENCED STANDARDS

A. GA 216 -Recommended Specifications for the Application and Finishing of Gypsum Board.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Gypsum Board
 - 1. Provide gypsum wallboard materials in accordance with recommendations of GA 216.
 - 2. Typical Ceiling installation: 5/8" thick maximum permissible length, tapered edges
 - 3. Typical Wall Installation: 5/8" thick, maximum permissible lengths, tapered edges
 - 4. Provide moisture resistant gypsum board (green board) at eye wash, shower and sink area

wall

- 5. At interior wall of the eye wash, shower, sink and Chemical Room, provide use approved Fiber Reinforced Panels, 8' high
- B. Gypsum Wallboard Accessories
 - 1. Provide gypsum wallboard accessories in accordance with GA 216
 - 2. Corner Beads: Metal and paper combination
 - 3. Edge Trim: L bead at walls abutting CMU
 - 4. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: GA 216,

PART 3 EXECUTION

3.01 INSTALLATION

- A. Gypsum Board Installation
 - 1. Install gypsum board in accordance with recommendations of GA 216
 - 2. Erect single layer standard gypsum board in direction most practical and economical, with
 - a. all ends and edges occurring over film bearings.
 - 3. Use screws when fastening gypsum board to framing, 1-5/8" Type S Screws shall be spaced a maximum of 12" o.c. in field of board, and 7" o.c. at edges, (7" at ceilings) Stagger vertical abutting end joints, All screws shall be power-driven with a clutch controlled power electric screwdriver, and screw heads shall provide a slight depression below the surface of the board, Screws shall not be driven closer than 3/8" from the edges and ends of the board.
 - 4. Place edge trim where gypsum board abuts dissimilar material.
 - 5. Using a three coat system, tape, fill and sand exposed joints, edges, comers, and openings, to produce surface ready to receive surface finishes, Feather coats onto adjoining surfaces so that camber is maximum 1/16", Provide smooth finish,
 - 6. Finish: Sprayed fine finish
 - 7. Remove and re-do defective work.

END OF SECTION

PAINTING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract (General, Supplementary and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

1.02 WORK INCLUDED

A. Furnish all materials and labor required to complete all Painting Work as indicated, specified herein, or both. The Work of this Section includes, but is not necessarily limited to the following:

- 1. Surface preparation.
- 2. Surface finishing.
- 3. Color selection schedule.

1.03 RELATED WORK

- A. The Work of this Section shall be closely coordinated with that of:
 - 1. Section 08100 -Steel Doors & Frames
 - 2. Section 08361 -Rolling Overhead Doors
 - 3. Section 09250 -Gypsum Drywall Systems
 - 4. Division 15 -Mechanical
 - 5. Division 16 -Electrical

1.04 REFERENCED STANDARDS

A. Referenced Standards -ANSVASTM D 16 -Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

1.05 DEFINITIONS

A. Definitions -Conforms to ANSI/ ASTM D 16 for interpretation of terms used in this Section.

1.06 QUALITY ASSURANCE

- A. Quality Assurance shall be as follows:
 - 1. Product Manufacturer: Company specializing in manufacturing quality paints and finish products with five years experience.
 - 2. Applicator: Company specializing in commercial painting and finishing with three years

documented experience.

- 3. Maintain at the job site complete manufacturer's installation instructions for each type of paint to be used. Comply with such instructions and apply all materials to achieve the minimum dry mil thickness recommended by the manufacturer.
- 4. The Project Representative may inspect each coat and operation before succeeding coats are applied to determine that the work meets the requirements of the Specifications in all regards, including uniform color, coverage and texture. He may check completed paint surfaces for dry film thickness as measured by a Tooke's Gauge. Additional coats will be required at no additional cost should uniform color, coverage, and texture not be achieved, or if dry film measures indicate thicknesses substantially less than those recommended by the paint manufacturer. Make a Tooke's Gauge available for use as required.

1.07 SUBMITTALS

- A. Submittals shall be provided as follows:
 - 1. If products other than those specified are proposed, submit five copies of product data on all finishing products.
 - 2. Submit color samples illustrating range of colors available for each surface-finishing product scheduled, for selection.
 - 3. Submit five copies of manufacturer's application instructions.

1.08 PRODUCT HANDLING

- A. Delivery, Storage and Handling shall be provided as follows:
 - 1. Deliver products to site in sealed and labeled containers; inspect to verify acceptance
 - 2. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
 - 3. Store paint materials at minimum ambient temperature of 45 degrees F, and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions. On-site storage shall be only as directed by the General Contractor.
 - 4. Take precautionary measures to prevent fire hazards and spontaneous combustion. Remove rags and waste soiled with paint from the site at the end of each day's work, or store in metal containers with tight metal covers.
- B. Environmental Requirements shall be provided as follows:
 - 1. Use only materials that comply with the local area AQMD Regulations.
 - 2. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finish, unless required otherwise by manufacturer's instructions.
 - 3. Do not apply exterior coatings during wind, rain, or snow, or when relative humidity is

above 50 percent, unless required otherwise by manufacturer's instructions.

- 4. Minimum application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- 5. Provide lighting level of 80-foot candles measured mid-height at substrate surface.

1.09 EXTRA STOCK

- A. Extra Stock shall be as follows:
 - 1. Provide a one-gallon container of each color and surface texture to Owner.
 - 2. Label each container with color, texture, and room locations, in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers -Paint -Paint Schedule specifies Sherwin Williams Products or equal products are acceptable.

2.02 MATERIALS

- A. Materials shall be as follows:
 - 1. Coatings: Ready mixed, except catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating. Good flow and brushing properties; capable of drying or curing free of streaks or sags.
 - 2. Should manufacturer's numbers of specifications change, use their latest equal or better product. Regardless of manufacturer or product used, apply the number of coats required in these Specifications.
 - 3. Use primers and succeeding coats of any given system from the same manufacturer.
 - 4. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified of commercial quality.
 - 5. No thinning, reducing or changing of mix is permitted unless specifically required by paint manufacturer.

2.03 FINISHES

- A. Finishes shall be as follows:
 - 1. Refer to Finish Schedule on Drawings.
 - 2. Refer to schedule at end of Section, for surface finish schedule.

PART 3 EXECUTION
3.01 INSPECTION OF CONDITIONS

- A. Inspection shall be provided as follows:
 - 1. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.
 - 2. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
 - 3. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - a. Gypsum Wallboard: 12 percent.
 - 4. Beginning of installation means acceptance of existing surfaces and substrate.

3.02 SURFACE PREPARATION

- A. Preparation shall be as follows:
 - 1. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
 - 2. Correct minor defects and clean surfaces that affect work of this Section.
 - 3. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
 - 4. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.
 - 5. Un-coated Steel Surfaces: Remove grease, scale, dirt, and rust. Where heavy coating of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
 - 6. Shop Prime Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 - 7. Metal Doors: Seal top and bottom edges with primer.

3.03 PROTECTION

- A. Protection shall be as follows:
 - 1. Protect elements surrounding the Work of this Section from damage or disfiguration.
 - 2. Repair damage to other surfaces caused by Work of this Section.
 - 3. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

3.04 APPLICATION

A. Application shall be as follows:

- 1. Apply products in accordance with manufacturer's instructions.
- 2. Do not apply finishes to surfaces that are not dry.
- 3. Apply each coat to uniform finish.
- 4. Apply each coat of paint slightly darker than preceding.
- 5. Sand lightly between coats to achieve required finish.
- 6. Allow applied coat to dry before next coat is applied.
- 7. The finished work shall show no cloudiness, spotting, holidays, laps, brush marks, runs, curtains, sags, ropiness, or other surface deviations or imperfections not consistent with first-class workmanship.
- 8. Use spray application for metal surfaces for a smooth finish appearance.
- 9. Remove and refinish all work which shows carelessness, lack of skill in the execution, or which is defective due to any other cause.
- B. Finishing Mechanical and Electrical Equipment shall be as follows:
 - 1. Refer to Division 15 & 16 for finish schedule.
 - 2. Paint shop primed equipment.
 - 3. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 - 4. Replace identification markings on mechanical or electrical equipment when painted accidentally.
 - 5. Paint exposed conduit and electrical equipment occurring in finished areas.
 - 6. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

3.05 CLEANUP

- A. Cleaning shall be provided as follows:
 - 1. As Work proceeds, promptly remove paint where spilled, splashed or spattered.
 - 2. During progress of Work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
 - 3. Collect cotton waste, cloths, and materials which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.06 MANUFACTURERS

- A. Schedule shall be as follows:
 - 1. All exterior exposed surfaces, except pre-finished items, are to be painted. See Finish Schedule for interior painting.
 - 2. Sherwin Williams Products are specified below as established standard and have been obtained from the latest information available. Should manufacturer's numbers of

specifications change, use their latest equal or better product.

3.07 PAINTING SCHEDULE

- A. Schedule -Exterior Surfaces as follows:
 - 1. Paint materials shall be the highest grade available from approved manufacturer.
 - 2. All exterior finishes shall have a minimum dry film thickness of 3 mils.
 - 3. Steel -Shop Primed:
 - a. Touch-up: DTM Primer Finish B66W1.
 - b. Two coats: Metalatex Coating, Semi-Gloss B42 Series.
 - 4. Steel -Galvanized:
 - a. One coat: DTM Primer Finish B66Wl.
 - b. Two coats: DTM Acrylic Coating, Semi-Gloss B66-200 Series.
 - 5. Aluminum window frames:
 - a. Two coats: A-IOO Exterior Latex Satin
- B. Schedule -Interior Surfaces as follows:
 - 1. Paint material shall be the highest grade available from approved manufacturer.
 - 2. All interior finishes shall have a minimum dry film thickness of 3 mils, unless otherWise noted.
 - 3. Gypsum Board and Wood Trim (P-I):
 - a. One coat: ProMar 200 Interior Latex Primer B28W200.
 - b. Two coats: ProMar 200 Interior Latex Egg Shell B20W200 Series.
 - 4. Gypsum Board (P-2):
 - a. One coat: ProMar 200 Interior Latex Primer B28W200.
 - b. Two coats: Water Based Catalyzed Epoxy, Semi-Gloss (3 mil thickness each coat).
 - 5. Hollow Metal Casings and Doors and Frames (P-3):
 - a. One coat (touch-up): DTM Acrylic Primer Finish B66WI.
 - b. Two coats: ProMar 200 Interior Latex Semi-Gloss B31 W2200 Series.
- C. Schedule -Colors -Colors to be selected by Owner from manufacturer's standard color samples.

END OF SECTION

SECTION 09901

COATING FOR STEEL WATER STORAGE TANK

PART 1 GENERAL

1.01 DESCRIPTION

A. SCOPE:

This section specifies coating systems, surface preparations, and application requirements for coating of a steel water storage tank The tank shall be coated in accordance with A WWA Standard D10206 "Coating Steel Water-Storage Tanks."

1.02 QUALITY ASSURANCE

A. CONTRACTOR QUALIFICATIONS:

The Contractor shall be required to demonstrate his experience and qualifications by submitting a list of 5 projects wherein he has satisfactorily applied high build epoxy coatings similar to those specified herein. The list shall include project name, type coating applied, regional location and name of a reference with telephone number that may be used for performance verification.

B. STANDARDIZATION:

Materials and supplies provided shall be the standard products of manufacturers. Materials in each coating system shall be the products of a single manufacturer.

C. INSPECTION:

The Contractor will provide, or arrange to have provided, all coating inspections. The Contractor will perform inspection on all on-site and off-site phases of the surface preparation, abrasive blast cleaning, and application of the coating systems.

1.03 DELIVERY AND STORAGE

Materials shall be delivered to the job site in their original, unopened containers. Each container shall bear the manufacturer's name, coating type, batch number, date of manufacture, storage life, and special directions. Materials shall be stored in enclosed structures and shall be protected from weather and excessive heat or cold. Flammable materials shall be stored in accordance with state and local codes. Materials exceeding storage life recommended by the manufacturer shall be remove d from the site.

PART 2 PRODUCTS

2.01 COATING SYSTEMS

A. GENERAL:

All materials of a specified coating system, including primer, intermediate, and finish coats, shall be produced by the same manufacturer. Thinners, cleaners, driers, and other additives shall be as

recommended by the coating manufacturer for the particular coating system.

- B. OUTSIDE COATING:
 - 1. The general A WWA classification for the outside coating system shall be System No.5, designation OCS-5-S (three coat, first coat and intermediate coat two component epoxy, and a polyurethane finish coat).
 - 2. The color of the finish coat shall be as provided by the Engineer.
- C. INSIDE COATING:
 - 1. CERTIFICATION: All inside coatings shall be cellified in accordance with NSF 61.
 - 2. The general A WWA classification for the interior coating system shall be System No.5, designation ICS-5 (three coat, zinc rich primer, and two component epoxy coating system).

2.02 PRODUCT DATA

Before materials are delivered to the job site, the Contractor shall provide the following information in accordance with Section 01300:

- 1. Manufacturer's standard product data and material safety data sheet for each primer and finish coating.
- 2. List of materials proposed to be used under this section.
- 3. Manufacturer's literature and written instructions for surface preparation, mixing, and application of each primer and finish coating.
- 4. Paint chip sample for outside coating color.

PART 3 EXECUTION

3.01 COATINGS

Coating products shall not be used until the Engineer has inspected the materials and the coating manufacturer's technical representative has instructed the Contractor and Engineer in the surface preparation, mixing and application of each coating.

3.02 PREPARATION

Tank surface preparation and painting shall be in accordance with A WWA DI02-06. The initial preparation shall include removal of all oil, grease, soil and other soluble contaminant in accordance with SSPC-SPI. Weld slag, weld splatter, rough edges and sharp edges of weld seems shall be ground smooth. The prepared surfaces shall be coated immediately.

The exterior surfaces shall be cleaned by SSPC-SP6, "Commercial Blast Cleaning." The interior surfaces shall be cleaned by SSPC-SPIO, "Near White Blast Cleaning." The abrasive shall be new, clean and free of contaminants. The unused portion and all mill scale and rust shall be

removed from interior and exterior. The blast cleaned and coated surfaces shall be blown down with clean air prior to the coating application. All surfaces shall be free of dust prior to the paint application.

3.03 APPLICATION

Prior to surface preparation and coating operations, completely mask, remove or otherwise protect all hardware, accessories, plates, and similar items not scheduled to receive paint.

The requirements of SSPC-PAI shall be followed with regard to storage of paint and thinner, mixing, thinning, painting contact surfaces, application of paint, and drying of painted surfaces. Paint materials shall be applied immediately after surface preparation and before any rusting occurs, or any dust or oil has accumulated.

The Contractor shall be responsible for all safety precautions including ventilation, electrical grounding, and handling paint solvents, and equipment.

All exterior surfaces shall be coated, including, but not limited to: shell manhole covers, overflow piping, ladder, roof hatches, vents and tank.

3.04 CURING

The tank shall be cured in accordance with AWWA D I 02-06 and with manufacturer's recommendations. If necessary, the Contractor shall provide heat and dehumidification in order to maintain adequate environmental conditions for curing.

3.05 INSPECTION

A. INSPECTION AND CHECKING:

The Contractor will perform such tests as are required to demonstrate substantial compliance with all phases of the surface preparation, abrasive blast cleaning, and application of the coating systems in accordance with A WWA DI02-06. Testing equipment will be calibrated by the Contractor to verify its accuracy prior to use. The Contractor shall provide the test equipment.

The Engineer shall be notified 5 working days in advance of shop and field operations involving abrasive blast cleaning and coating applications. The Contractor will determine the degree and surface profile of the shop and field blast cleaned surface. Additional blast cleaning shall be performed over areas not conforming to the specified surface preparation.

The Contractor will inspect each coat of primer, touch-up, intermediate, and finish coating to determine thickness and integrity. Each coating application will be checked and deficiencies marked. After observing specified recoat time, additional coating materials shall be applied over area not having the specified minimum dry-film thickness and areas having any holidays or pinholes. After correction of deficiencies, the Contractor will re-inspect those areas to determine the acceptability of additional coating. Each coating application shall be 100 percent to the satisfaction of the Engineer prior to succeeding coating applications.

3.06 DISINFECTION

Upon completion of reservoir painting, and after the final coat has dried and cured, the reservoir shall be cleaned and disinfected in accordance with A WWA C652 unless otherwise specified. Prior to disinfection, all interior surfaces shall be washed with clean water using a high-pressure water blaster. All water, dirt, and foreign material accumulated in this cleaning operation shall be

discharged from the tame

The disposal of any heavily chlorinated water that results from the process of disinfection must be coordinated with the State of Nevada, Division of Environmental Protection.

After filling tank but prior to placing tank in service, two samples shall be collected and delivered to a certified laboratory within 6 hours to obtain a bacteriological quality test to demonstrate the absence of coliform organisms. If the initial disinfection fails, water in reservoir shall be chlorinated and retested until satisfactory results are obtained. Retesting shall be at the Contractor's expense. The Contractor shall provide Engineer with written test results for submission to the State of Nevada, Bureau of Health Protection Services.

3.06 TESTING FOR VOLATILE ORGANIC CONSTITUENTS

Following disinfection of the tank, but prior to filling the tank for bacteriological testing a 5-day soak test shall be completed to determine the presence of any volatile organic chemicals. The water shall be analyzed by a certified laboratory approved by the State of Nevada, and the test reports shall be provided to the Owner and to the State of Nevada, Bureau of Health Protection Services for approval. The reservoir shall then be drained, filled to capacity with potable water, and bacteriological testing completed as specified in paragraph 09901-3.06.

Testing for volatile organic constituents shall be as follows:

- 1. Contractor shall fill the tank to the overflow level.
- 2. Water shall be allowed to stand for a 5-day soaking period.
- 3. The Contractor will obtain a water sample from the tank in accordance with the latest procedures and forward the sample to the laboratory for analysis.
- 4. If levels of the volatile organic contaminants exceed the action levels recommended by the State of Nevada, Bureau of Health Protection Services Contractor shall provide a plan to correct the problem, which shall be approved by the Engineer

3.08 WARRANTY

A first-anniversary warranty inspection of the interior and exterior surfaces of the tank will be conducted during the eleventh month following final acceptance of the work by the Owner to determine whether any repair work is necessary. Inspection shall comply with Section 5 of A WW AD 102-06 except as specified. The Owner will establish the inspection date and notify the Contractor. The Owner will drain and wash down the tank. The Contractor shall provide lighting and scaffolding for the final inspection. Where coatings have peeled off, bubbled, or cracked, and any location where rusting is evident shall be considered to be a failure of the coating system. Repairs at failures shall be performed by removing the deteriorated coating; preparing the surface by abrasive blast cleaning and applying the same coating systems as specified in this section. Inspection and repairs shall be performed at no cost to the Owner.

END OF SECTION



SECTION 10400 - UTILITY IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic ribbon tape for placement above direct-buried utility.
 - 2. Trace wire for placement above direct-buried utility.
- B. Related Requirements:
 - 1. Section 02400 Trenching: Backfilling considerations for installation of underground pipe markers.
 - 2. Section 02150 Fill: Backfilling considerations for installation of underground pipe markers.
 - 3. Section 15064 Sanitary Utility Sewerage Piping: Piping, valves, and appurtenances requiring identification marking.

1.2 SUBMITTALS

- A. Section 01330 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's catalog information for each product required.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Qualifications Statement:1. Submit qualifications for manufacturer.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01700 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of tagged valves.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Section 01700 - Execution and Closeout Requirements: Requirements for maintenance materials.

1.5 QUALITY ASSURANCE

A. Perform Work according to 2015 State Standard Specifications for Public Works (Green Book) standards.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.

PART 2 PRODUCTS

2.1 UTILITY MARKERS

- A. Furnish materials according to 2015 State Standard Specifications for Public Works (Green Book) standards.
- 2.2 RIBBON TAPE
 - A. Furnish materials according to 2015 State Standard Specifications for Public Works (Green Book) standards.
 - B. Description:
 - 1. Material: Polyethylene.
 - 2. Brightly colored, continuously printed.
 - 3. Minimum Size: 6 inches wide by 4 mils thick.
 - 4. Manufactured for direct burial service.
 - 5. Imprint: Utility type in large letters.

2.3 TRACE WIRE

- A. Furnish materials according to 2015 State Standard Specifications for Public Works (Green Book) standards.
 - 1. Description:
 - a. Conductor: Magnetically detectable.
 - b. Covering: Brightly colored plastic, imprinted with Utility type in large letters.

PART 3 EXECUTION

- 3.1 INSTALLATION
 - A. Ribbon Tape and Trace Wire:
 - 1. Place wire continuous on top of pipe, tape shall be buried 6 inches above piping.
 - 2. If multiple pipes occur in common trench, locate tape and wire above centerline of each pipe or conduit.
 - 3. Coordinate with trench Work as specified in Section 02400 Trenching and 02150 Fill.
 - B. Installation Standards: Install Work according to 2015 State Standard Specifications for Public Works (Green Book) standards.

END OF SECTION

SECTION 13530

ARSENIC REMOVAL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY OF WORK INCLUDED:

A. This section covers the scope of work (Work) to be required by the Arsenic Removal System (ARS) Supplier. The Work includes performing a successful pilot test, supplying a complete ARS necessary to achieve target water quality standards to be validated by the pilot study, startup and commissioning of the ARS for operation of an on-site arsenic removal system utilizing the adsorption process. The ARS includes, but is not limited to, a complete, pre-fabricated, skid mounted system, containing at a sufficient number of adsorption vessels to treat up to peak daily flows with the largest vessel out of service, all necessary system piping, joints and fittings, valves, in-line flow meters, attached PLC-based control panel, as well as ancillary equipment as specified herein, related testing, start-up, commissioning, and training services

B. Pilot Study:

- 1. The ARS Supplier shall include in its bid a written performance guarantee for a maximum effluent total arsenic concentration in $\mu g/L$, and the minimum media life in days, necessary to reach the guaranteed maximum effluent total arsenic concentration.
- 2. The ARS Supplier shall perform a bench scale pilot study using the site's existing Source Wells' raw water to demonstrate conformance with the guaranteed maximum effluent total arsenic concentration and minimum media life.
 - a. The ARS Supplier shall provide calculations for the Pilot Study to demonstrate similitude of all process components to insure that the results of Pilot Study may successfully be scaled up for the actual intended ARS service conditions described in this Section.
 - b. The results of the pilot study shall conform to the ARS Supplier's written performance guarantee for both maximum effluent total arsenic concentrations and minimum media life within $\pm 5\%$.
- 3. The Pilot Study shall be limited to a maximum of 5% of the ARS Supplier's total bid value, and shall consist of all costs associated with providing the Pilot Study including the bench scale ARS, set-up, training, water quality samples, evaluation and reporting of test results, travel, incidentals and per diem costs necessary to perform the Pilot Study.
- C. Post Pilot Study Work:
 - 1. The ARS Supplier shall, upon completion of a successful Pilot Study:
 - a. Prepare a Process and Instrumentation Diagram (P&ID) drawing to represent the general process, instrumentation and valves that will be used to control and monitor the arsenic removal system.
 - b. Prepare a General Arrangement (GA) drawing showing connections, elevations, and overall system configuration.
 - c. Prepare electrical schematics as applicable for the system control panel.
 - d. Supply the skid mounted, prefabricated, and tested ARS to the project work site.
 - e. Other submittals as requested.



- f. The ARS Supplier shall submit the P&ID and GA Shop Drawings and other submittals identified above depicting the fabrication of the Arsenic Removal Treatment System equipment for review by the Engineer within 2 weeks of order
- 2. The General Contractor shall install the ARS skid(s), as specified herein and as shown on the drawings. The General Contractor shall be responsible for
 - a. Offloading the skid(s).
 - b. Anchoring the skid(s) to the structural pad.
 - c. Building the facility housing and foundation.
 - d. All electrical power connections.
 - e. Distribution pipeline tie-ins
 - f. Tie-in the conveyance piping to the raw water, pipe supports, backwash water, and finished water connections on the ARS skid(s), as shown on the drawings to provide a complete and fully operational arsenic removal treatment system.
- 3. The ARS Supplier shall provide a detailed pre-installation checklist or System Commissioning Plan (SCP) as a communication tool for proper installation and work closely with the General Contractor to ensure the system is installed in accordance with the manufacturer's recommendations. The General Contractor shall correct installation-related problems if they occur and shall provide a Certification of Proper Installation for the System.
- 4. The ARS Supplier shall be responsible for delivering the system pre-wired and pre-tested and/or programmed (as applicable). The Engineer will provide criteria or appropriate specs and drawings to the Contractor for the interconnection of the Arsenic Removal Treatment System.
- 5. Following the completion of installation by the General Contractor, the ARS Supplier shall perform functional, performance and start-up testing of the System to demonstrate that performance criteria (i.e., consistent arsenic removal to < 10 ppb) are being achieved.
- 6. The ARS Supplier shall submit an Operation and Maintenance Manual and Maintenance Summary Forms for the Treatment System.
- 7. The ARS Supplier shall train Owner's personnel and provide detailed instructions in the operation of the Treatment Equipment. This training shall be provided at the time of startup and coordinated closely with the Owner's operator.

1.2 GENERAL

- A. Section Includes:
 - 1. Package Arsenic Removal System (ARS) to be provided complete by ARS Supplier with the following components:
 - a. Support Skid(s)
 - b. Tanks/pressure vessels, internals
 - c. Adsorption media
 - d. Interconnect piping, valves, control valves, pipe supports and accessories
 - e. Flow meters and totalizers
 - f. Pressure transmitters and gauges for inlet and outlet pressure readings
- B. All civil, electrical, mechanical, metal, painting and instrumentation work included herein shall conform to the applicable Sections or Divisions of this project except as otherwise shown or specified. The ARS shall be shipped as a complete and fully operational system pre-tested by the ARS supplier. All tie in piping to the existing waterline system and wiring shall be completed by the Contractor on site.



- C. The Drawings show details of the components and their overall relationships. Not all items incidental to the ARS are shown or specified. It is the intent of these Contract Documents that the ARS Supplier is to provide a complete workable system whether or not any specific component is shown or specified.
- D. Power shall be provided by the General Contractor to the system control panels as shown on the Arsenic Removal Treatment System equipment drawings. A 120 VAC, 20 amp, single phase circuit should be sufficient for the ARS system. The General Contractor shall be responsible for providing all necessary conduit and wiring necessary for a complete electrical service to this location. All wiring shall comply with the National Electrical Code, 2014 (NFPA70) or latest edition.
- E. Sodium hypochlorite (chlorine), will continue to be injected into the raw source water by an existing chemical metering system in order to oxidize and convert any Arsenic (III), if present, to Arsenic (V), and provide residual disinfection.
- F. Related Requirements
 - 1. Section 02660 Water Pipeline Testing And Disinfection
 - 2. Section 11200 Water Supply Equipment
 - 3. Section 15010 Common Work Results For Plumbing
 - 4. Section 15073 Vibration And Seismic Controls For Plumbing Piping And Equipment
 - 5. Section 15111 General-Duty Valves for Plumbing Piping
 - 6. Section 15140 Domestic Water Piping
 - 7. Section 16000 General Requirements for Electrical Work

1.3 DEFINITIONS

- A. NRS: Non-rising stem.
- B. OS&Y: Outside screw and yoke.

1.4 REFERENCE STANDARDS

- A. American Society of Mechanical Engineers:
 - 1. ASME B31.9 Building Services Piping.
- B. ASTM International:
 - 1. ASTM D1785 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 - 2. ASTM D2241 Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
 - 3. ASTM D2466 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- C. American Water Works Association:
 - 1. AWWA C509 Resilient-Seated Gate Valves for Water Supply Service.
 - 2. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.

- D. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP-58 Pipe Hangers and Supports Materials, Design, Manufacture, Selection, Application, and Installation.

1.5 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Bid Submittal:

- 1. Submittal Documents Accompanying Contractor's Bid Proposal: Submit with bid the following information:
 - a. ARS Supplier's literature, illustrations, specifications, and engineering data, including dimensions, materials, size, weight, and performance data.
 - b. ARS Supplier's written performance guarantee that shall include a guarantee of maximum effluent arsenic concentrations and the minimum duration of the media life for which the effluent arsenic concentration will be less than or equal to the maximum guaranteed effluent arsenic concentration.
 - c. ARS Supplier's qualifications as described in 1.9 QUALITY ASSURANCE.
 - d. Complete Equipment Scope of Supply
 - e. Adsorptive filtration media Supplier's technical information, including physical and chemical characteristics, volume and weight to be provided in each contactor vessel, and empty bed contact time at service conditions.
 - f. Spent media disposal methods, procedures and costs, including analytical methods used to assure disposal in accordance with the Resource Conservation and Recovery Act for hazardous wastes.
- C. Shop Drawings: Within two (2) weeks of award, Contractor shall submit the ARS Supplier's comprehensive shop drawing package for review and approval by Engineer and Owner:
 - 1. Shop drawings showing the fabrication, assembly, installation, and wiring diagrams of ARS. Shop drawings shall include, but not be limited to the following:
 - a. A title page, drawing index, and legend/symbols/abbreviation sheet.
 - b. A general arrangement drawing of the ARS system.
 - c. A process and instrumentation diagram (PID) of the ARS system.
 - d. An electrical one-line diagram, electrical control schematics and system wiring diagram.
 - e. Equipment cut sheets and specifications for major equipment, including equipment elevations, dimensions, and setbacks, as necessary.
 - f. Control panel drawings (including annotated panel front view and internal layout/wiring diagrams).
 - 2. Chemical feed module info, drawings, calculations and P&ID
- D. Product Data: Within two (2) weeks of award, Contractor shall submit the following information:
 - 1. Data on adsorptive media.
 - 2. Pressure Vessels: Submit data on vessel material, construction, pressure and temperature ratings, connections, capacities and accessories.
 - 3. Piping: Submit data on pipe materials, fittings, and accessories.
 - 4. Valves: Submit manufacturers catalog information with valve data and ratings for each service.

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- 5. Supports: Submit manufacturers catalog information including load capacity.
- 6. Manufacturer's list of recommended spare parts.
- E. ARS and Original Equipment Manufacturers' (OEM) Certificate: Certify that all products and individual system components meet or exceed specified requirements as shown on the Drawings and contained in this and other individual specifications.
- F. Manufacturer Instructions: Submit installation instructions for ARS system, complete with valves, piping and accessories.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections, including:
 - 1. Factory Acceptance Test (FAT)
 - a. The ARS supplier shall test each and every component prior to shipment, and a fully functional test shall be performed on the system to certify the following:
 - 1) Verifies that all mechanical and hydraulic components operate properly.
 - 2) Ensures that the control panel operates and controls the correct components in the manner intended.
 - 3) Confirmation of the control panel settings and any provided safety alarm features.
 - 4) All system alarms and faults shall be confirmed and documented.
 - 5) Verify that system dimensions match submittal drawings.
- H. Qualifications Statements:
 - 1. Submit qualifications for manufacturer and installer.
 - 2. Submit manufacturer's approval of installer.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of water utility distribution piping connections, actual equipment locations and setbacks, etc.
- C. Operation and Maintenance Data: Submit spare parts list, exploded assembly views, and recommended maintenance intervals for all ARS process components.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Section 01700 Execution and Closeout Requirements:
- B. Requirements for maintenance materials.
- C. Operation and Maintenance (O&M) Manuals:
 - 1. Provide 2 complete and bound hard copies and one electronic version in PDF format of the ARS O&M Manual upon project completion before application for final payment.
 - 2. Manuals shall include:
 - a. Complete installation instructions
 - b. Copies of all approved shop drawings





- c. Operation procedures (including start-up and shut-down procedures for all modes of operation);
- d. Preventative maintenance procedures and schedules
- e. Lubrication charts and schedules
- f. Spare parts list;
- g. Troubleshooting instructions
- h. Safety considerations
- i. Names, addresses, and telephone numbers of:
 - 1) Contractor
 - 2) ARS Supplier
 - 3) System Component OEM(s)
- 3. Format Requirements:
 - a. Use 8-1/2 inch by 11-inch paper and provide in a PDF format on compact disk or drive. Larger drawings or illustrations shall be folded neatly to the specified size in a manner which will permit easy unfolding without removal from the O&M binder. Provide all sheets in a reinforced punched binder tab.
 - b. Each page shall have a binding margin of 1-1/2 inches and be punched for placement in a triple post binder. Identify each binder with the following: BRIDGEPORT PUBLIC UTILITES DISTRICT ARSENIC REMOVAL SYSTEM OPERATION AND MAINTENANCE INSTRUCTIONS.
 - c. Use dividers and indexed tabs between major categories of information. Provide a table of contents for each binder.
- D. Extra Stock Materials:
 - 1. Furnish necessary pre-filter cartridges for one (1) complete pre-filter replacement.

1.8 QUALITY ASSURANCE

A. Perform Work according to BPUD standards.

1.9 QUALIFICATIONS

- A. ARS Supplier's Qualifications:
 - 1. The ARS Supplier shall have experience in manufacturing and furnishing equipment of similar capacity and service capability to the equipment described herein. As part of their bid submittal package (to be submitted with the bid), the system Supplier shall provide the following:
 - a. A list of at least ten (10) installations, where similar equipment by the Supplier is currently in comparable service. For each installation listed, include:
 - 1) Contact name, telephone number, mailing address of the installation, engineer, owner, and date of installation.
 - b. If ten installations do not exist, the list shall include all existing installations.
 - c. Documentation of successful implementation of arsenic treatment systems for Public Community Water systems for at least 5 years
 - d. Permitted installations of the specified technology in the state of California
 - e. Current NSF Standard 61 Certification for the media and system components being offered.



- f. Evidence of successful participation in one of EPA's Arsenic Demonstration Projects using this same technology or certification by the Environmental Technology Verification Drinking Water Treatment Systems program, conducted by the EPA & NSF to verify the performance claims of the system Supplier.
- g. The ARS equipment shall be pre-assembled and tested to assure compliance with pressure and operational requirements.
- B. Installer: California licensed and bonded Contractor specializing in performing Work of this Section with minimum five years' documented experience and approved by ARS Supplier.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Shipping & Delivery:
 - 1. Equipment and materials shall not be fabricated, shipped or delivered to the project site until related shop drawings have been approved in writing by the Engineer.
 - 2. ARS Supplier shall coordinate with the Contractor and arrange for and include costs of transportation and delivery of the Supplier's skid mounted unit(s) and media. Shipment of the skid(s) shall be delivered to the site on Monday through Friday only (excluding holidays) during the hours between 8 AM and 3 PM Pacific Standard Time, and consigned to the proper party giving name of the project and the full address of Owner's project site. Notify Contractor's representative by telephone 48 hours prior to the anticipated arrival at the project site.
- C. Inspection: Accept materials on Site in manufacturer's original packaging. Inventory and inspect all equipment upon delivery to the site. Repair or replace all equipment discovered missing or damaged.
- D. Furnish temporary protective coating for cast iron and steel valves.
- E. Furnish temporary end caps and closures for pipe and fittings; maintain caps and closures in place until installation.
- F. Protection:
 - 1. Throughout shipment, all contactor ports and pipe ends shall remain sealed with watertight caps or blind flanges/plates that remain in place until installation of the equipment and completion of all piping connections.
 - 2. Contractor shall make provisions to protect materials on-site from theft, damage, or vandalism. Contractor is responsible for replacement of all damaged or stolen materials at the work site until final acceptance by Owner.

1.11 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

1.12 WARRANTY

- A. Section 01700 Execution and Closeout Requirements: Requirements for warranties.
- B. Prior to acceptance of the arsenic removal system, the ARS Supplier shall provide a written warranty that includes the following statements:
 - 1. ARS Supplier has inspected the installation and the arsenic removal system is free from faults and defects and is in conformance with the Contract Documents.
 - 2. ARS Supplier must provide the following after sales services:
 - a. Availability of technician to timely respond to and address any warranty issues that arise with the system during the warranty period.
 - b. Must maintain an inventory of spare parts on this system such as valves, actuators, media, pressure gauges, metering and controlling valves.
 - 3. ARS is warranted for a period of 12 months after start-up.
 - 4. The filtration vessels are warranted for a 2 year warranty period that begins the date of startup. Should the vessel experience a structural failure or defect during the first 2 years, the vessel will be replaced free of charge, exclusive of labor, replacement media and shipping costs assuming operation of the system per O&M procedures with documentation log.

PART 2 - PRODUCTS

2.1 ARSENIC REMOVAL SYSTEM (ARS)

- A. A complete packaged water treatment system for the remediation of arsenic contamination in domestic water.
 - 1. The ARS shall consist of filter vessel(s) containing adsorptive media whereby arsenic is either physically or chemically removed from water during a flow through process.
 - 2. The ARS shall be capable of treating up to 650 ± 50 gallons per minute (GPM) during peak flows, or up to 500 GPM with the largest vessel out of service.
 - 3. Media shall be disposable as a solid waste in a RCRA subtitle D (non-hazardous) landfill when spent. Media shall be durable, attrition-resistant, and suitable for backwashing and removal of arsenic, iron, and manganese.
 - 4. The site's existing sodium hypochlorite injection module shall be used with the ARS.
 - 5. Capable of treating variations in the influent arsenic concentration up to as high as 32 micrograms per liter ($\mu g/l$) while maintaining an effluent arsenic concentrations consistently below 10 $\mu g/l$.
 - 6. Design operating pressures of up to 150 psi.
 - 7. Stainless steel NEMA 4X panel enclosure with Allen Bradley PLC and HMI mounted and prewired on the skid.
 - 8. Mounted on an epoxy-coated-painted steel tubular skid(s)
 - 9. Stainless steel hydraulic panel with sample ports for operator monitoring and optionally system inlet and outlet pressure gauges.
 - 10. Magnetic flow meters on each vessel for measuring individual instantaneous gallons per minute and total gallons through the system in service and in backwash/rinse cycles.
 - 11. Pressure transmitters on the inlet and outlet with a 4-20 mA signal to the control panel to monitor differential pressure on the HMI.

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- B. Manufacturers:
 - 1. Isolux MELsorb by MEL Chemicals, Inc.
 - a. 500 Point Breeze Road, Flemington, NJ 08822.
 - b. 1 (908) 782-1280
 - c. <u>www.zrpure.com</u>
 - 2. Evoqua Water Technologies by Siemens Corp.
 - a. 1 (719) 622-5320
 - b. <u>www.siemens.com/water</u>
 - 3. Engineer Approved Equal

2.2 MATERIALS

- A. Wet Side Materials:
 - 1. All materials and equipment in contact with process water shall be NSF61 Rated and compatible with drinking water applications.
- B. Dry Side Materials:
 - 1. All materials not in contact with water shall be generally comprised of corrosion resistant materials or coated with corrosion resistant coatings.

2.3 FUNCTIONAL REQUIREMENTS

- A. Sufficient instruments, control panel, gauges, and valves shall be provided by the Supplier as part of the packaged unit for the system to operate as described below.
- B. Flanged connections for ease of connection by Contractor for installation; fittings and piping to be supplied by the Contractor.
- C. General arrangement, piping sizes and accessories are shown on the Contract Drawings.

2.4 GENERAL

A. Provide to Owner and install an integrated, skid mounted Arsenic Removal System consisting of adsorptive media, pressure vessels in parallel, inlet and discharge assemblies, piping, valves, and other appurtenances as necessary to provide a complete and operational system.

2.5 SERVICE CONDITIONS

- A. The skid-mounted package Arsenic Removal System shall be designed and constructed for installation indoors and continuous operation with the following service conditions:
 - 1. Site Electrical Service: 125 volts AC, single phase, 60 Hz and 460 volts AC, three phase, 4 wire, 60 Hz with backup power provided from an emergency generator after an adjustable delay of 2 minutes to 30 minutes.
 - a. NOTE: Flow may continue during the delay
 - 2. Elevation 6,480 feet
 - 3. Ambient Outside Air Temperature: -30° F to 105° F
 - 4. Inside Air Temperature: 45° F to 90° F
 - 5. Well Pump Flow Rate: $650 (\pm 50)$ gallons per minute (GPM)
 - 6. Back flushing flow rate to be determined by manufacturer



- 7. Design treatment rate: Pump flow rate ±50 GPM
- 8. Design Pressure: 150 pounds per square inch (psi)
- 9. Upstream operating Pressure: 115 to 140 pounds per square inch (psi)
- 10. Downstream operating pressure 95 to 100 pounds per square inch (psi)
- 11. Treat water from either the Twin Lakes Well or the Cain well but not water from both wells at the same time
- 12. Approximately 86% of the water treated will be from the Cain Well and approximately 14% of the water treated will be from the Twin Lakes Well (Cain well will be in lead and the Twin Lakes well will be in backup approximately 6 days a week under normal conditions)
- 13. Average annual percent of time that raw water is supplied 30.4% or approximately 7.3 hours per day.
- 14. Maximum total duration of backwash is 1.5 hours in a 48 hour period
- 15. Backwash water is to be from the Bridgeport distribution system that is continuously available at 95 to 100 pounds per square inch (psi)
- 16. Service filtration rates of < 5 gpm/sq foot of surface area
- 17. Backwashing rates not to exceed 500 gpm
- 18. Backwash volume not to exceed 24,000 gallons per backwash of all filters
- 19. Location of existing sodium chlorite injection points: at well heads (see drawings)
- 20. Raw water flow rate measurement signal: from existing SCADA via 4 20 mA signal (1 signal from each well)
- 21. Layout of treatment units; piping; chemical feed lines; backwash water, raw water, treated water and recycle water connections: see Drawings
- 22. Raw water temperature 48° F to 52° F
- B. Representative water chemistry data for the each source well is attached to the end of this Specification Section 13530.

2.6 MINIMUM PERFORMANCE REQUIREMENTS

- A. Under the Service Conditions set forth in Paragraph 2.5, the ARS shall reduce total arsenic from a maximum concentration of $32 \mu g/L$ to less than $10 \mu g/L$ consistently.
- B. The system shall be configured to operate with all treatment units in parallel or in such a manner as to provide optimal media capacity utilization.
- C. The ARS Supplier shall provide a system performance guarantee with the bid to ensure that the system and media perform to expectations of the Owner based upon the Supplier's predicted performance. Samples for determining ARS performance will be the responsibility of the Owner or Owner's operator and reported to the Supplier on a minimum quarterly basis. The system must attain the treatment requirement of less than $10 \ \mu g/L$ for the entire first year of operation. Media life shall achieve a duration of within $\pm 5\%$ of that determined during the Pilot Study.
 - 1. If the minimum media life under normal service conditions is found to be less than 95% of that determined during the Pilot Study the ARS Supplier shall, at its sole expense, replace or repair those portions of the system found to be adversely impacting the media life.
 - 2. If modifications cannot be made to improve media life to within the specified amounts the contract value will similarly be reduced by the equivalent percentage by which the media life fails to meet the guaranteed duration less the 5% tolerance. For example, if the actual media life under normal service conditions is found to be 90% of that demonstrated by the pilot study, the contract value will be reduced 5% which shall accrue to the Owner as a credit.



2.7 SYSTEM DESCRIPTION

- A. General:
 - 1. The arsenic removal system shall employ an adsorptive media for the removal of arsenic from raw source water.
 - 2. The arsenic removal system shall be sized to in accordance with 2.5 above and per the Drawings and shall include sufficient dispersion and media to treat the entire flow rate from the Source Wells in a parallel fashion under the specified service conditions. The system, which must fit in the specified building treatment system footprint, shall include tees, piping, and valving for a system bypass line for emergency situations where the unit is being serviced, worked on or similarly out of operation.
 - 3. The complete arsenic removal system shall be assembled in skid mounted units and delivered to the site.
- B. Mechanical System Components:
 - 1. Vessels:
 - 2. Components:
 - a. Shell and Heads: carbon steel SA516Gr70
 - b. Exterior Liner: 3 mils Tnemec Hi-Build Epoxoline II, N69F epoxy; SSPC-SP-6 blast
 - c. Inner Liner: 5-7 mils Devoe high performance coatings #BAR-TUST 233H, multipurpose epoxy, SSPC-SP-10 blast
 - d. 12 x 16 Manway opening on top head
 - e. Flange Supports: Coated to protect the alloy from external corrosion
 - 3. Maximum operating pressure: 150 psi with a safety factor of 6:1.
 - 4. Maximum operating temperature: 135°F.
 - 5. Designed to pass a 0-to-rated operating pressure cycle test of 250,000 cycles without failure.
 - 6. Capable of withstanding negative pressure up to 5" Hg.
 - 7. Employ quick-connect or threaded fittings which shall be easily removable.
 - 8. Threaded pressure vessel openings shall all be an NPSM or UN thread specification with a positive O-ring seal.
 - 9. Connections to pressure vessel openings shall accommodate vertical expansion between side, top, and bottom openings and between openings and hard piping.
- C. Piping and Flanges:
 - 1. Piping: 304 Stainless Steel SCH 10, ASTM A312, ANSI B36.19
 - 2. Pipe threads: ANSI B1.20.1
 - 3. Flanges: 304 SS, ASTM A105
 - a. Bolt hole pattern: ANSI B16.5
 - b. ANSI Class 150, pressure rated to 150 psi @ 730 F
- D. Valves
 - 1. Resilient-wedge gate valve:
 - a. AWWA C515, NSF 61
 - b. Pressure Class: Class 125
 - c. Rising stem valve with hand wheel operator
 - d. Stem: Copper alloy with integral thrust collar. Two piece collars are not acceptable.
 - 2. Wedge: ASTM A536 Ductile iron or bronze symmetrically and fully encapsulated with EPDM molded rubber (minimum thickness 1/8-inch)
 - a. Flanged connections.



- b. Body, Bonnet, Stuffing Box: ASTM A536 Ductile Iron.
- c. Rubber Items: Buna-N or other suitable synthetic rubber
- d. All Internal External Bolting and Other Hardware, Including Pins, Set Screws, Plug, Studs, Bolts, Nuts, and Washers: Type 316 stainless steel, with strength requirements conforming to ASTM A307
- e. Surfaces, except machined surfaces, shall be epoxy coated in accordance with AWWA C550.
- f. Manufacturer: Bray or Engineer approved equal.
- 3. Forged Brass Ball Valves:
 - a. Type: Quarter turn, full port ball valve.
 - b. Ball: Chrome plated brass
 - c. Rating: 150psi. Water, Oil, Gas (WOG)
 - d. Manufacturer: Jomar or Engineer approved equal
- 4. Silent Check Valves:
 - a. Type: Swing, regrinding bronze disc, screw-in cap.
 - b. Materials:
 - 1) Body: Cast Iron
 - 2) Seat, plug, bushing: bronze
 - 3) Spring, Screw: Stainless steel
 - c. Rating: ANSI Class 125
 - d. End Connection: Flanged
 - e. Manufacturer: Valmatic or Engineer approved equal
- 5. Pressure Relief Valves:
 - a. Class: 150 ANSI (100 psi set point)
 - b. Body: Bronze
 - c. Seat: Non-metallic disc-to-metal seating
 - d. Connection: Female inlet and outlet
 - e. Manufacturer: APCO or Watts Regulators Series 174A or Engineer approved equal
- 6. Angle Valves:
 - a. Type: MIPT x compression
 - b. Materials: Brass
 - c. Manufacturer: Lasco or approved equal
- 7. Anchor Bolts, Nuts, and Washers
 - a. Type 316 stainless steel
- E. Arsenic Removal Media:
 - 1. General: Product shall be a media product certified as compliant with ANSI / NSF Standard 61 for Drinking Water and proven to be effective at adsorption of arsenic from water.

2.8 AUTOMATIC SYSTEM VALVES

- A. Actuated butterfly valves shall be in accordance with AWWA C504. Body and disc shall be cast or ductile iron, shaft shall be stainless steel and operator shall be lever.
- B. Actuated butterfly valves shall be equipped with an AWWA C504 compliant electric motor or pneumatic actuator. Preference is for pneumatic actuation. The actuator shall be quarter turn or equivalent with manual override and two (2) limit switches and two (2) dry contacts. Enclosure shall be NEMA 4 & 6 and IP67 with aluminum alloy construction.



- C. For Electric actuated valves, RCEL electric actuators 5L series.
- D. For Pneumatic actuated valves, Bray or Engineer approved equal shall be acceptable.

2.9 SYSTEM INSTRUMENTATION

- A. Flow Meters:
 - 1. One per vessel.
 - 2. General:
 - a. Type: Seametrics Series EX-80 Magnetic Meter conforming to NSF 61
 - b. Materials:
 - 1) Main Body: PVC sensor body or Stainless steel
 - 2) Lining: not applicable
 - 3) Electronics Housing: powder coated aluminum
 - 4) Electrodes: hastelloy electrodes
 - c. Flow rate display indication in gpm and totalized flow in gallons.
 - d. Accuracy: $\pm 1.0\%$ of flow rate or better
 - e. End Connection: Flanged
 - f. Manufacturer: Seametrics EX-80 or Engineer approved equal
- B. Pressure Sensors:
 - 1. Two pressure transducers/sensors, one on system inlet and one on system outlet, for measuring differential pressure (to be displayed on HMI screen)
 - 2. General:
 - a. Type: quick-disconnect, ¹/₄-inch NPT connection
 - b. Output: 4-20 mA analog output
 - c. Range: 0-150 psi
 - d. Manufacturer: IFM Efector or Engineer approved equal
- C. Pressure Gauges:
 - 1. Two gauges on each vessel, one on vessel inlet and one on vessel outlet for measuring local pressure.
 - 2. General:
 - a. Type: 2.5" dial, stainless steel case, ¹/₄-inch NPT connection
 - b. Accuracy: ASME B40.1 Grade A, 2-1-2%
 - c. Range: 0-200 psi
 - d. Manufacturer: SPAN, McDaniel or approved equal
- D. Sample Ports:
 - 1. Two ports on each vessel, one on vessel inlet and one on vessel outlet for local water sampling. One additional port on system inlet and one on system outlet (located on hydraulic panel)
 - 2. General:
 - a. Type: full-port, 2 piece ball valve, ¹/₄-inch NPT connection
 - b. Material: 316 SS body, EPDM seals,
 - c. Operator: locking-lever handle
 - d. Manufacturer: Flowtek or approved equal

2.10 SYSTEM CONTROL

R

- A. The ARS Supplier shall provide an Arsenic Removal Treatment System Control Panel, which shall house the necessary logic controller, instruments, power supply, relays, terminal blocks and other ancillary components for operating the system. All wiring to field devices shall be terminated at a numbered terminal strip mounted directly in the panel. A separate stainless steel hydraulic panel shall be provided in addition to the control panel to monitor pressures and to obtain samples for compliance.
- B. Controller:
 - 1. Main Control Panel shall be a Stainless steel NEMA 4X enclosure pre-wired and skid mounted. The panel shall contain the necessary equipment, instruments, ancillary control devices, hardware and logic to perform the automation functions of the system. All wiring to field devices shall be terminated at a numbered terminal strip mounted directly in the panel. The panel shall include:
 - a. Programmable Logic Controller (PLC), including a Central Processing Unit (CPU), Input/Output (racks with I/O cards), and auxiliary equipment and cables for PLC internal data transfer. (Allen Bradley Micrologix 1500 PLC).
 - b. HMI touch screen (Allen-Bradley PanelView Plus 600).
 - 2. PLC shall be fully programmed, staged and debugged at the manufacturer's facility.
 - 3. Software documentation shall be provided consisting of a fully annotated Ladder Logic Listing with cross-reference of internal coil and contact usage and location.
 - 4. The local panel system alarm outputs shall include:
 - a. System high differential pressure
 - b. System automatic control valve failure
 - c. System High Flow

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01700 Execution and Closeout Requirements: Requirements for installation examination.
- B. The Contractor shall inspect all equipment and materials against approved Shop Drawings at time of delivery. Equipment and materials damaged or not conforming to the approved Shop Drawings shall be noted. The ARS supplier shall be notified immediately and steps taken to rectify, repair, or correct the deficiencies.
- C. Equipment and materials received are under the care and responsibility of the Contractor. These items shall be stored by the Contractor in a dry location and protected from the elements according to the ARS Supplier's instructions.
- D. Equipment and materials shall be handled in an approved manner according to the ARS Supplier's instructions.
- E. Verify that piping connections to existing piping system, sizes, locations, and inverts are as indicated on Drawings.



3.2 PREPARATION

- A. Section 01700 Execution and Closeout Requirements: Requirements for installation preparation.
- B. Remove scale, grease, oil and dirt on inside and outside before assembly.

3.3 INSTALLATION

- A. Offloading and Installation of the ARS and appurtenances shall be performed by the General Contractor and shall be in accordance with the Engineer's Drawings and with the ARS Supplier's drawings, instructions and recommendations. Conflicts of information shall be called to the attention of the Engineer.
- B. ARS shall be delivered by the Supplier on a skid and offloaded, placed appropriately, and secured by the Contractor with anchor bolts to the building concrete foundation in accordance with the ARS Supplier's recommendations. The skid shall be accurately leveled on the ground support surface.
- C. General Contractor shall support piping independent of equipment. Equipment shall be free from all loads and stresses induced by the piping.
- D. The General Contractor shall inspect all equipment as it arrives and is offloaded, before installation, and if damaged the carrier and ARS Supplier shall be notified promptly. Do not install damaged equipment until the Contractor makes repairs in accordance with ARS Supplier's written instruction and approval.

3.4 START-UP SERVICES AND TESTING

- A. General Contractor and ARS Supplier shall verify that structures, equipment, media and vessels are compatible for an efficient system.
- B. General Contractor and ARS Supplier shall make equipment adjustments required to place system in proper operating condition.
- C. General Contractor or ARS Supplier shall test the arsenic removal system for proper operation in the presence of the Owner and Engineer.
- D. The ARS Supplier shall furnish all testing equipment and devices required to demonstrate arsenic treatment compliance. The Contractor may utilize the existing chlorination equipment to provide disinfection of the system and piping prior to startup. Sodium Hypochlorite will be provided by the Owner.
- E. General Contractor shall be responsible for first compliance sample. Costs for this analysis should be included in the Supplier or Contractor's bid. If any sample indicates non-compliance, that sample will be re-run. Results shall be provided to the Engineer and Owner. Additional future sampling shall be the responsibility of the Owner.



- F. If the arsenic removal system fails to meet any of the specified performance requirements, General Contractor and/or ARS Supplier shall modify and/or replace defective equipment until it meets specified requirements and re-sample and analyze to verify satisfactory operation.
- G. The ARS Supplier's field services shall be retained for a period of not less than three (3) 8-hr days for installation and startup assistance of the treatment system factory-trained representatives of the manufacturer of each component with demonstrated ability and experience in the installation and operation of the equipment. The representative shall perform the services listed below:
 - 1. Inspect the completed installation and prepare an inspection report.
 - 2. Test, calibrate and adjust all components for optimum performance.
 - 3. Assist in initial media loading, start-up, and field-testing.
 - 4. Supervise the correction of any defective or faulty work before and after acceptance by Owner.
 - 5. Instruct Owner's personnel in the operation and maintenance of all components and conduct a training seminar at the site.
 - 6. Field service representative shall be responsible for ensuring that all operator-training is completed.
- H. The ARS Supplier shall provide three (3) bound hard copies and one (1) CD or Drive of an Operation and Maintenance (O&M) Manual. Electronic files shall be provided in PDF format.
- I. Spare Parts:
 - 1. Any special tools required for operation and maintenance of the system shall be identified and listed in the O&M Manual.

3.5 CLEANING

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for cleaning.
 - 1. Disinfect as specified in Section 02660 Water Pipeline Testing And Disinfection.

END OF SECTION

SECTION 15030 HVAC SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. The Contractor shall provide all labor, materials, tools, and equipment necessary to furnish and install an HVAC system specified herein and as shown on the drawings. The HVAC system will automatically ventilate the treatment building with fresh outside air while maintaining a minimum consistent temperature of 50± °F in the building. The design system flow rate for the building is 650 CFM with the intent of providing for two (2) air changes per hour, and the temperature of the room should not fall below 50±° F. Additional ventilation requirements for the chemical storage rooms include providing one air change per minute, at a design rate of 300 CFM total (150 CFM per room), and ventilation of the bathroom at a design rate of 200 CFM. All exhaust fans shall be ducted to the exterior of the building, with the exception of the bathroom fan which may be ducted to the building attic.

B. System Characteristics:

- 1. 6,470 feet elevation.
- 2. Design Dry-bulb (0.2%) Temperature of -15° F
- 3. Building Air Volume: Approx. 19,000 Cubic Feet
- 4. Chemical Storage Room Air Volume: Approx. 145 Cubic Feet Each
 - a. Chemical storage may include corrosive gas and liquid. All materials used to ventilate these rooms shall be designed for service in corrosive environments.
- 5. Bathroom Air Volume: Approx. 330 Cubic Feet

C. Section Includes:

- 1. Exhaust Fan s and Ducting
- 2. Louvers
- 3. Propane Unit Heater
- 4. Testing and Balance

1.2 REFERENCES

- A. California Building Code (CBC):
 - 1. <u>Electrical Code:</u> Title 24, Part 3
 - 2. <u>Mechanical Code:</u> Title 24, Part 4
 - 3. <u>Energy Code:</u> Title 24, Part 6

1.3 SUBMITTALS

A. Section 01300 - Submittal Procedures: Requirements for submittals.



- B. Shop Drawings: The CONTRACTOR shall provide Shop drawings, brochures and samples shall be submitted for all items to be finished in accordance with the provisions Section 01300 Submittals.
- C. Submittals shall include at least the following:
 - 1. Provide product sheet, including product description and use, for each product proposed for use including operating principals and fundamentals, design considerations, especially including derating for elevation.
 - 2. Shop Drawings showing elevation and plan views with dimensions, method of construction, and connections.
 - 3. Process and Instrumentation Schematic for HVAC equipment control.
 - 4. Electrical Schematic.
- D. Test and Balance Firm:
 - 1. Testing and balance of HVAC system shall be provided by AABC accredited firm regularly engaged in the balance of similar HVAC Systems.
 - 2. Testing and Balance services are pre-approved to be provided by Raglen System Balance, Inc., or engineer approved alternate.
 - 3. Alternate Test and Balance firm shall provide evidence of AABC accreditation, CA licensure, and five years minimum experience in providing test and balance services for similar HVAC systems.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01700 Contract Closeout
- B. Provide list of all products provided including:
 - 1. Manufacturer
 - 2. Product Name
 - 3. Model Number
 - 4. Serial Number
- C. The CONTRACTOR shall provide Manufacturer submitted complete Owner's Manual for all HVAC equipment. The manual shall include, at a minimum:
 - 1. Safety precautions during use of equipment.
 - 2. Equipment installation instructions.
 - 3. Equipment startup instructions.
 - 4. Equipment maintenance procedures.
 - 5. Trouble shooting guide.
 - 6. Manufacturer's warranty information.
 - 7. Manufacturer's contact information
- D. Test and Balance Report
 - 1. Contact information for test and balance firm
 - 2. Equipment settings and adjustments made during balance
 - 3. Evidence of equipment performance at specified design points.

- **1.5** QUALITY ASSURANCE
 - A. Section 01400 Quality Control

1.6 COORDINATION

- A. Section 01140 Work Restrictions
- B. Coordinate the Work with building construction.
- C. Coordinate the Work with electrical contractor; ensure that power and control voltage is supplied to equipment in advance of test and balance services. Provide shunt trips for heaters at each building access point refer to Drawings.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - A. Section 01600 Material and Equipment

PART 2 PRODUCTS

- 2.1 EXHAUST FANS
 - A. Schedule:
 - 1. EF1: Cook Model 12XW40D17EC Direct Drive Wall Exhaust Fan or Engineer approved equal, supplied complete with following characteristics and accessories:
 - a. Design air flow of 750 CFM at 0.125" WC max airflow.
 - b. ¹/₄ HP, 115V/1PH 1725 RPM, EC Motor
 - c. Epoxy Powder Coating
 - d. Backdraft Damper
 - e. Wall Collar
 - f. Motor Side Wire Guard
 - g. Weather Hood
 - h. Remote Signal Speed Controller
 - i. Bird screen
 - j. Constant flow rate of 600 CFM with higher air flow available for cooling demand to be controlled by thermostat.
 - 2. EF2: Cook Model 10XW24D133 Direct Drive Wall Exhaust Fan or Engineer approved equal, supplied complete with following characteristics and accessories:
 - a. 300 CFM @ .125" SP Max Airflow
 - b. 1/20HP, 115V/1PH, 1300 RPM Motor
 - c. Pre-Wired Fan Speed Controller
 - d. Backdraft Damper
 - e. Epoxy Powder Coating
 - f. Wall Collar
 - g. Motor Side Wire Guard
 - h. Weather Hood

- i. Two Each Aluminum Grills
- j. EF2 shall be ducted with a common galvanized sheet metal duct manifold that draws air from both chemical storage rooms individually via ceiling mounted intake grills. Refer to the Drawings for duct and grill configuration.
- k. Control shall be continuous operation with operator adjustable fan speeds.
- 3. EF3: Cook Model GC-186 Ceiling Exhaust Fan, or Engineer approved equal, supplied complete with following characteristics and accessories:
 - a. 200 CFM @ .25" SP
 - b. Pre-Wired Fan Speed Controller
 - c. Backdraft Damper
 - d. Aluminum Grille.
 - e. Control shall be fan on with manual operation of bathroom light switch.
- B. Wall mounted exhaust fans shall be mounted 8 ft above the finish floor elevation.

2.2 LOUVERS

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- A. Schedule:
 - 1. LV-1: Nailor Model 1606D Drainable Blade Louver, or Engineer approved equal, supplied complete with the following characteristics:
 - a. Design air flow of 350 CFM.
 - b. Dimensions of 24"x24"
 - c. Birdscreen
 - d. Kynar Finish.
 - DG: Nailor Model 61-DGD Double Flanged Steel Door Louvers, or Engineer approved equal.
 - a. 18"x10"

2.3 UNIT HEATERS

A. Schedule:

- 1. UH1 & UH2: Allied Commercial LF24-45A-P Low Profile Unit Heaters, or Engineer Approved equal, supplied complete with the following characteristics and accessories:
 - a. 45,000 Btuh @ 535 CFM
 - b. 1/20 HP, 1.7amp, 1650 RPM Motors
 - c. High Altitude Burners
 - d. Propane Gas Conversion Kits
 - e. Hanging Kits
 - f. Vertical or Horizontal Vent Kits
 - g. Thermostats
 - h. Control shall be by operator adjustable thermostat set points to maintain minimum building temperature.
 - i. 8 foot minimum mounting above finish floor.
 - j. Provide condensate traps on exhaust and fuel supply lines per manufacturer's recommendations.



- k. Ensure field mounting complies with all manufacturers' required setbacks.
- 1. Provide wall flashing and/or thimbles per manufacture's recommendations.

PART 3 EXECUTION

- **3.1** INSTALLATION HVAC SYSTEM
 - A. The HVAC system shall be installed and tested as shown on the Drawings and specified herein.
- **3.2** FIELD QUALITY CONTROL
 - A. Section 01400 Quality Control
 - B. Provide required testing and balance services to verify HVAC system performance.
 - 1. The Exhaust fans and louvers shall be demonstrated for design air flow capacities.
 - 2. The heater shall be tested to operate via operator adjustable thermostatic control.
 - C. OWNER will accept the HVAC system when the system meets the specified requirements.

END OF SECTION



SECTION 15050 - PUBLIC WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for public line, including potable water line and fire water line.
 - 2. Tapping sleeves and valves.
 - 3. Valves and fire hydrants.
 - 4. Underground pipe markers.
 - 5. Precast concrete vault.
 - 6. Pipe support systems.
 - 7. Bedding and cover materials.
- B. Related Requirements:
 - 1. Section 02200 Soils for Earthwork: Soils for backfill in trenches.
 - 2. Section 02300- Excavation: Product and execution requirements for excavation and backfill required by this Section.
 - 3. Section 02400 Trenching: Execution requirements for trenching required by this Section.
 - 4. Section 15100 Water Utility Distribution Valves.
 - 5. Section 02660 Disinfecting of Water Utility Distribution: Disinfection of water piping.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Section 01200 Price and Payment Procedures: Contract Sum/Price modification procedures.
- B. Pipe and Fittings:
 - 1. Basis of Measurement: By linear foot.
 - 2. Basis of Payment: Includes complete construction, installation, and testing of water piping, including hand-trimming, trenching, excavation, pipe and fittings, marking and identification, bedding, concrete thrust restraints, and connection and tap, including tap materials, to municipal utility water source.
- C. Valves:
 - 1. Basis of Measurement: By unit.
 - 2. Basis of Payment: Includes valve, fittings, and accessories, installation, risers, covers and testing.
- D. Fire Hydrants:
 - 1. Basis of Measurement: By unit.
 - 2. Basis of Payment: Includes installation, hand-trimming, trenching, excavation, gravel sump, hydrant, isolation valve, connection, and accessories, testing.

1.3 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

- 1. AASHTO T 180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. American Society of Mechanical Engineers:
 - 1. ASME B16.1 Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
- C. ASTM International:
 - 1. ASTM A36 Standard Specification for Carbon Structural Steel.
 - 2. ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
 - 4. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).
 - 5. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
 - 6. ASTM D1785 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 - 7. ASTM D2241 Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
 - 8. ASTM D3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
 - 9. ASTM D3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 - 10. ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 - 11. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- D. American Water Works Association:
 - 1. AWWA C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
 - 2. AWWA C105 Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - 3. AWWA C110 Ductile-Iron and Gray-Iron Fittings.
 - 4. AWWA C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 5. AWWA C115 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 - 6. AWWA C151 Ductile-Iron Pipe, Centrifugally Cast.
 - 7. AWWA C153 Ductile-Iron Compact Fittings.
 - 8. AWWA C200 Steel Water Pipe, 6 In. (150 mm) and Larger.
 - 9. AWWA C203 Coal-Tar Protective Coatings and Linings for Steel Water Pipelines -Enamel and Tape - Hot-Applied.
 - 10. AWWA C205 Cement-Mortar Protective Lining and Coating for Steel Water Pipe 4 In. (100 mm) and Larger Shop Applied.
 - 11. AWWA C206 Field Welding of Steel Water Pipe.
 - 12. AWWA C207 Steel Pipe Flanges for Waterworks Service Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm).
 - 13. AWWA C208 Dimensions for Fabricated Steel Water Pipe Fittings.
 - 14. AWWA C213 Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
 - 15. AWWA C300 Reinforced Concrete Pressure Pipe, Steel-Cylinder Type.



- 16. AWWA C301 Prestressed Concrete Pressure Pipe, Steel-Cylinder Type.
- 17. AWWA C500 Metal-Seated Gate Valves for Water Supply Service.
- 18. AWWA C600 Installation of Ductile-Iron Mains and Their Appurtenances.
- 19. AWWA C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
- 20. AWWA C606 Grooved and Shouldered Joints.
- 21. AWWA C700 Cold-Water Meters Displacement Type, Bronze Main Case.
- 22. AWWA C701 Cold-Water Meters Turbine Type, for Customer Service.
- 23. AWWA C702 Cold-Water Meters Compound Type.
- 24. AWWA C706 Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
- 25. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.
- 26. AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In.(76 mm), for Water Service.
- 27. AWWA C905 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 mm) for Water Transmission and Distribution.
- 28. AWWA M6 Water Meters Selection, Installation, Testing, and Maintenance.
- E. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP-60 Connecting Flange Joints between Tapping Sleeves and Tapping Valves.
- F. National Fire Protection Association:
 - 1. NFPA 24 Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.4 SUBMITTALS

- A. Section 01330 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data on pipe materials, pipe fittings, valves, and accessories.
- C. Shop Drawings: Indicate piping layout, including piping specialties.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01700 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

- A. Valves: Mark valve body with manufacturer's name and pressure rating.
- B. Perform Work according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - A. Section 01600 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
 - B. Deliver and store valves in shipping containers with manufacturer's labeling in place and inspect for damage.
 - C. Block individual and stockpiled pipe lengths to prevent moving.
 - D. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
 - E. Store polyethylene and PVC materials out of sunlight.

1.8 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

- 2.1 WATER PIPING
 - A. PVC:
 - 1. Comply with AWWA C900 and AWWA C905, Class 165.
 - 2. Fittings: Comply with AWWA C900 and AWWA C905.
 - 3. Joints:
 - a. Comply with ASTM D3139.
 - b. Seals: PVC flexible elastomeric.
 - c. Solvent-cement couplings are not permitted.

2.2 TAPPING SLEEVES AND VALVES

- A. Tapping Sleeves:
 - a. Furnish materials according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
 - 2. Description:
 - a. Material: Stainless Steel.
 - b. Type: Dual compression.



- c. Outlet Flange Dimensions and Drilling: Comply with ASME B16.1, Class 125 and MSS SP-60.
- B. Tapping Valves
 - 1. Furnish materials according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
 - 2. Description:
 - a. Comply with AWWA C500.
 - b. Type: Double disc with non-rising stem.
 - c. Inlet Flanges: Comply with ASME B16.1, Class 125 and MSS SP-60.
 - d. Mechanical Joint Outlets: Comply with AWWA C111.
 - 3. Mark manufacturer's name and pressure rating on valve body.

2.3 VALVES

A. Valves: As specified in Section 15100 - Water Utility Distribution Valves.

2.4 AIR RELEASE VALVES

- A. <u>Manufacturers</u>:
 - 1. Furnish materials according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- B. Description: Cast-iron body, stainless-steel float.

2.5 UNDERGROUND PIPE MARKERS

- A. Plastic Ribbon Tape:
 - 1. Brightly blue colored, continuously printed.
 - 2. Minimum 6 inches wide by 4 mil thick.
 - 3. Manufactured for direct burial service.
- B. Trace Wire:
 - 1. Electronic detection materials for nonconductive piping products.
 - 2. Unshielded, 10 AWG, Blue THWN-insulated copper wire.
 - 3. Conductive tape.

2.6 PRECAST CONCRETE VALVE VAULTS AND METER BOXES

A. Precast Concrete Valve Vaults and Meter Boxes: As specified in Section 15100 - Water Utility Distribution Valves.

2.7 VALVE BOXES

A. <u>Manufacturers</u>:

- 1. Jensen Precast
- 2. Substitutions: As specified in Section 01600 Product Requirements.
- 3. Furnish materials according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.

B. Covers: Marked to indicate utility.

2.8 CONCRETE ENCASEMENT AND CRADLES

- A. Concrete:
 - 1. Type: reinforced, air entrained.
 - 2. Compressive Strength: 4,000 psi at 28 days.
 - 3. Finish: Rough troweled.
- B. Concrete Reinforcement: As specified in 2015 State Standard Specifications for Public Works Projects (Green Book) standards.

2.9 MATERIALS

- A. Bedding and Cover:
 - 1. Bedding: Fill Type S1, as specified in Section 02200.
 - 2. Cover: Fill Type S1, as specified in Section 02200.
 - 3. Soil Backfill from above Pipe to Finish Grade:
 - a. Soil Type S2, as specified in Section 02200 Soils for Earthwork.
 - b. Subsoil with no rocks over 6 inches in diameter, frozen earth, or foreign matter.

2.10 FINISHES

A. Steel: Hot-dip galvanized after fabrication, according to ASTM A123.

2.11 ACCESSORIES

- A. Concrete for Thrust Restraints: As specified in 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- B. Steel Rods, Bolt, Lugs, and Brackets:
 - 1. Comply with ASTM A36 or ASTM A307.
 - 2. Grade A carbon steel.
- C. Protective Coating: Bituminous.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01700 Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that existing utility water main size, location, and invert are as indicated on Drawings.

3.2 PREPARATION

A. Section 01700 - Execution and Closeout Requirements: Requirements for installation preparation.


- B. Pipe Cutting:
 - 1. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.
 - 2. Use only equipment specifically designed for pipe cutting; use of chisels or hand saws is not permitted.
 - 3. Grind edges smooth with beveled end for push-on connections.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Bedding:
 - 1. Excavation:
 - a. Excavate pipe trench as specified in Section 02400 Trenching for Work of this Section.
 - b. Hand trim excavation for accurate placement of pipe to elevations as indicated on Drawings.
 - 2. Dewater excavations to maintain dry conditions and to preserve final grades at bottom of excavation.
 - 3. Provide sheeting and shoring as specified in Section 02400 Trenching.
 - 4. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth, and compact to 95 percent of maximum density.

B. Piping:

- 1. Install pipe according to AWWA C900.
- 2. Handle and assemble pipe according to manufacturer instructions and as indicated on Drawings.
- 3. Steel Rods, Bolt, Lugs, and Brackets: Coat buried steel with one coat of coal tar coating before backfilling.
- 4. Maintain 10 feet horizontal separation of water main from sewer piping according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards and Nevada Administrative Code.
- 5. Flanged Joints: Not to be used in underground installations except within structures.
- 6. Route pipe in straight line; re-lay pipe that is out of alignment or grade.
- 7. High Points:
 - a. Install pipe with no high points except where shown on Drawings with hydrant.
 - b. If unforeseen field conditions arise that necessitate high points, install air release valves as directed by Engineer.
- 8. Bearing:
 - a. Install pipe to have bearing along entire length of pipe.
 - b. Excavate bell holes to permit proper joint installation.
 - c. Do not lay pipe in wet or frozen trench.
- 9. Prevent foreign material from entering pipe during placement.
- 10. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- 11. Close pipe openings with watertight plugs during Work stoppages.
- 12. Install access fittings to permit disinfection of water system performed under Section 02660-Disinfecting of Water Utility Distribution.
- 13. Cover:

- a. Establish elevations of buried piping with not less than 42 inches of cover.
- b. Measure depth of cover from final surface grade to top of pipe barrel.
- 14. Pipe Markers:

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- a. Install plastic ribbon tape trace wire continuous over top of pipe buried minimum 6 inches above piping.
- b. Coordinate with trench Work as specified in Section 02400 Trenching.
- 15. Installation Standards: Install Work according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- C. Valves and Hydrants:
 - 1. Install valves as specified in Section 15100 Water Utility Distribution Valves.
- D. Tapping Sleeves and Valves:
 - 1. As indicated on Drawings and according to manufacturer instructions.
- E. Thrust Restraints:
 - 1. Provide valves, tees, bends, caps, and plugs with concrete thrust blocks.
 - 2. Pour concrete thrust blocks against undisturbed earth.
 - 3. Locate thrust blocks at each elbow or change of pipe direction to resist resultant force and to ensure that pipe and fitting joints will be accessible for repair.
 - 4. Provide maximum required sq. ft. of thrust restraint bearing on subsoil per Drawings.
 - 5. Install tie rods, clamps, setscrew retainer glands, or restrained joints.
 - 6. Protect metal-restrained joint components against corrosion by applying a bituminous coating or encasing metal area using concrete mortar.
 - 7. Do not encase pipe and fitting joints to flanges.
 - 8. Install thrust blocks, tie rods, and joint restraint at dead ends of water main.
- F. Backfilling:
 - 1. Backfill around sides and to top of pipe with cover fill in minimum lifts of 6 inches, tamp in place, and compact to 95 percent of maximum density.
 - 2. Place and compact material immediately adjacent to pipes to avoid damage to pipe and prevent pipe misalignment.
 - 3. Maintain optimum moisture content of bedding material to attain required compaction density.
- G. Disinfection of Potable Water Piping System:
 - 1. As specified in Section 02660 Disinfecting of Water Utility Distribution.

3.4 TOLERANCES

- A. Section 01400 Quality Requirements: Requirements for tolerances.
- B. Install pipe to indicated elevation within tolerance of 5/8 inch.

3.5 FIELD QUALITY CONTROL

- A. Section 01400 Quality Requirements: Requirements for inspecting and testing.
- B. Pressure test system according to AWWA C600 and following:



- 1. Test Pressure: Not less than 200 psig or 50 psi in excess of maximum static pressure, whichever is greater.
- 2. Conduct hydrostatic test for at least two hours.
- 3. Slowly fill section to be tested with water; expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled. Raise pressure to specified test pressure.
- 4. Observe joints, fittings, and valves under test. Remove and renew cracked pipes, joints, fittings, and valves showing visible leakage. Retest.
- 5. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate. Maintain pressure within plus or minus 5 psi of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
- 6. Compute maximum allowable leakage using following formula:

L = SD x sqrt(P)/C
L = testing allowance, gph
S = length of pipe tested, feet
D = nominal diameter of pipe, inches
P = average test pressure during hydrostatic test, psig
C = 148,000
When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

- 7. Leakage:
 - a. If test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
 - b. Correct visible leaks regardless of quantity of leakage.
- C. Compaction Testing for Bedding: Comply with ASTM D1557.
- D. If tests indicate Work does not meet specified requirements, remove Work, replace, and retest.
- E. Frequency of Compaction Tests: Once per lift.

END OF SECTION



SECTION 15064 - SANITARY UTILITY SEWERAGE PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sanitary sewerage piping.
 - 2. Pipe markers.
 - 3. Bedding and cover materials.
- B. Related Requirements:
 - 1. Section 03300 Cast-In-Place Concrete: Concrete type for manhole base pad construction.
 - 2. Section 02200 Soils for Earthwork: Soils for backfill in trenches.
 - 3. Section 02300 Excavation: Product and execution requirements for excavation and backfill required by this Section.
 - 4. Section 02400 Trenching: Execution requirements for trenching required by this Section.
 - 5. Section 02150 Fill: Requirements for backfill to be placed by this Section.
 - 6. Section 10400 Utility Identification: Pipe markers.

1.2 **DEFINITIONS**

- A. Bedding: Fill placed under, beside, and directly over pipe, prior to subsequent backfill operations.
- 1.3 UNIT PRICE MEASUREMENT AND PAYMENT NOT USED

1.4 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T 180 Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
 - 1. ASTM A74 Standard Specification for Cast Iron Soil Pipe and Fittings.
 - ASTM C14 Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
 - 3. ASTM C443 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
 - 4. ASTM C564 Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
 - 5. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
 - 6. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
 - 7. ASTM D1785 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

- 8. ASTM D2235 Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
- 9. ASTM D2321 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
- 10. ASTM D2466 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- 11. ASTM D2564 Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
- 12. ASTM D2729 Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- 13. ASTM D2855 Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
- 14. ASTM D3034 Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- 15. ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- 16. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- C. American Water Works Association:
 - 1. AWWA C111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 2. AWWA C150 Thickness Design of Ductile-Iron Pipe.
 - 3. AWWA C151 Ductile-Iron Pipe, Centrifugally Cast.

1.5 COORDINATION

- A. Section 01300 Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with termination of sanitary sewer to existing sanitary sewer, manhole, and trenching.
- 1.6 PREINSTALLATION MEETINGS
 - A. Section 01300 Administrative Requirements: Requirements for preinstallation meeting.
 - B. Convene minimum one week prior to commencing Work of this Section.

1.7 SUBMITTALS

- A. Section 01330 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information indicating pipe material to be used, pipe accessories, and markings.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer Instructions: Indicate special procedures required to install specified products.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.



1.8 CLOSEOUT SUBMITTALS

- A. Section 01700 Execution and Closeout Requirements: Requirements for closeout procedures.
- B. Project Record Documents: Record locations of pipe runs, connections, and manholes, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
- 1.9 QUALITY ASSURANCE
 - A. Perform Work according to 2015 State Standard Specifications for Public Works (Green Book) standards.

1.10 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 SANITARY SEWERAGE PIPING

- A. Plastic Pipe:
 - 1. Material: Polyvinyl chloride (PVC).
 - 2. Comply with ASTM D3034, SDR-35.
 - 3. Inside Nominal Diameter: per the Drawings,
 - 4. End Connections: Bell and spigot style, with rubber-ring-sealed gasket joint.
 - 5. Fittings: PVC.
 - 6. Joints:
 - a. Elastomeric gaskets.
 - b. Comply with ASTM F477.

2.2 MATERIALS

- A. Bedding and Cover:
 - 1. Bedding: Fill Type S1 as specified in Section 02200 soils for earthwork.
 - 2. Cover: Fill Type S2 as specified in Section 02200 soils for earthwork.
 - 3. Soil Backfill from Above Pipe to Finish Grade:
 - a. Soil Type S2 as specified in Section 02200 Soils for Earthwork.
 - b. Subsoil with no rocks over 6 inches in diameter, frozen earth, or foreign matter.

2.3 ACCESSORIES

A. Pipe Markers: As specified in Section 10400 - Utility Identification.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01700 Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that trench cut or excavation base is ready to receive Work.
- C. Verify that excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

- A. Section 01700 Execution and Closeout Requirements: Requirements for installation preparation.
- B. Correct over-excavation with fine aggregate or lean concrete.
- C. Remove large stones or other hard materials that could damage pipe or impede consistent backfilling or compaction.
- D. Protect and support existing sewer lines, utilities, and appurtenances.

E. Utilities:

- 1. Maintain profiles of utilities.
- 2. Coordinate with other utilities to eliminate interference.
- 3. Notify Engineer if crossing conflicts occur.

3.3 INSTALLATION:

- A. Bedding:
 - 1. Excavate pipe trench as specified in Section 02400 Trenching.
 - 2. Place bedding material at trench bottom.
 - 3. Level materials in continuous layer not exceeding 6 inches.
 - 4. Maintain optimum moisture content of bedding material to attain required compaction density.

B. Piping:

- 1. Install pipe, fittings, and accessories according to ASTM D2321, and seal joints watertight.
- 2. Lay pipe to slope gradients as indicated on Drawings.
- 3. Install bedding at sides and over top of pipe, to minimum compacted thickness of 12 inches.
- 4. Backfill and compact as specified in Section 02400 Trenching.
- 5. Do not displace or damage pipe when compacting.
- 6. Pipe Markers: As specified in Section 10400 Utility Identification.
- 7. Installation Standards: Install Work according to 2015 State Standard Specifications for Public Works (Green Book) standards.

3.4 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Requirements for inspecting and testing.



B. Request inspection by Engineer prior to and immediately after placing bedding.

C. Testing:

- 1. If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.
- 2. Pipe Testing:
 - a. Pressure Test: As specified in Section 330130.61 Sewer and Pipe Joint Sealing.
 - b. Deflection Test: Mandrel
- 3. Compaction Testing:
 - a. Comply with ASTM D1557.
 - b. Testing Frequency: Once per lift.

3.5 **PROTECTION**

- A. Section 01700 Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 15073

VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

PART 1- GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Seismic restraint devices.

1.02 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Delegated-Design Submittal: For vibration isolation and seismic-restraint calculations and details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a qualified professional engineer registered in the state of California responsible for their preparation.
- C. Welding certificates.
- D. Field quality-control test reports.
- E. See Section 01300 for submittal requirements.

1.03 DESIGN DATA

- A. Site Coordinates: 38.2517°N, 119.23138°W
- B. Risk Category: III
- C. $S_S = 1.528$, $S_{MS} = 1.528$, $S_{DS} = 1.019$, $S_1 = 0.499$, $S_{M1} = 0.749$, $S_{D1} = 0.500$

1.04 QUALITY ASSURANCE

- A. Comply with seismic-restraint requirements in the 2012 IBC unless requirements in this Section are more stringent.
- B. Welding: Qualify procedures and personnel according to AWS Dl.1/Dl.1M, "Structural Welding Code- Steel."
- 1.04 SEISMIC RESTRAINTS
 - A. All equipment, piping, and conduit shall be seismically braced per the 2012 IBC.
 - B. References: International Building Code (IBC) section 1613, American Society of Civil Engineers (ASCE 7) section 13.6, Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) seismic restraint manual, and American Society of Plumbing Engineers (ASPE) Databook 4 -plumbing components and equipment.

PART 2- PRODUCTS

2.01 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2. Kinetics Noise Control.
 - 3. Mason Industries.
 - 4. TOLCO Incorporated; a brand of NIBCO INC.
 - 5. Unistrut; Tyco International, Ltd.
 - 6. Or approved Equal.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
 - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- D. Restraint Cables: ASTM A 603 galvanized-steel cables with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.
- F. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.
- G. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and waterresistant neoprene, with a flat washer face.
- H. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinccoated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

PART 3 - EXECUTION

3.01 APPLICATIONS



- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.
- 3.02 VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION
 - A. Equipment Restraints:
 - 1. Install seismic-restraint devices on all mechanical equipment, using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.
 - B. Piping Restraints:
 - 1. Comply with requirements in MSS SP-127.
 - 2. Space lateral supports a maximum of 10 feet O.C., and longitudinal supports a minimum of 10 feet O.C.
 - 3. Brace a change of direction longer than 6 feet.
 - C. Install cables so they do not bend across edges of adjacent equipment or building structure.
 - D. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.
 - E. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolts and mounting hole in concrete base.
 - F. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
 - G. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre-stressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.



- 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
- 5. Install zinc-coated steel anchors for interior and stainless steel anchors for exterior applications.

3.03 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION

SECTION 15100 - WATER UTILITY DISTRIBUTION VALVES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Valves.
 - 2. Valve boxes.

B. Related Requirements:

- 1. Section 15050 Public Water Utility Distribution Piping: Piping trenching, backfilling, and compaction requirements.
- 2. Section 02660 Disinfecting of Water Utility Distribution: Flushing and disinfection requirements.

1.2 REFERENCE STANDARDS

- A. American Water Works Association:
 - 1. AWWA C500 Metal-Seated Gate Valves for Water Supply Service.
 - 2. AWWA C509 Resilient-Seated Gate Valves for Water Supply Service.
 - 3. AWWA C550 Protecting Interior Coatings for Valves and Hydrants.
 - 4. AWWA C600 Installation of Ductile-Iron Mains and Their Appurtenances.
- B. NSF International:
 - 1. NSF 61 Drinking Water System Components Health Effects.
 - 2. NSF 372 Drinking Water System Components Lead Content.

1.3 COORDINATION

- A. Section 01300 Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with 2015 State Standard Specifications for Public Works Projects (Green Book) standards and utilities within construction area.

1.4 PREINSTALLATION MEETINGS

- A. Section 01300 Administrative Requirements: Requirements for preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this Section.

1.5 SUBMITTALS

- A. Section 01330 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer's latest published literature. Include illustrations, installation and maintenance instructions, and parts lists.



- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- F. Qualifications Statements:
 - 1. Submit qualifications for manufacturer and installer.
 - 2. Submit manufacturer's approval of installer.

1.6 CLOSEOUT SUBMITTALS

- A. Section 01700 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of valves.
- C. Operation and Maintenance Data: Submit information for valves.
- 1.7 MAINTENANCE MATERIAL SUBMITTALS
 - A. Section 01700 Execution and Closeout Requirements: Requirements for maintenance materials.
 - B. Tools: Furnish 2 tee wrenches of required lengths to Owner.

1.8 QUALITY ASSURANCE

- A. Cast manufacturer's name, pressure rating, and year of fabrication into valve body.
- B. Perform Work according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.

1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.
- B. Installer: Company specializing in performing Work of this Section with minimum three years' experience.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Prepare valves and accessories for shipment according to applicable AWWA standards.
- C. Seal valve and ends to prevent entry of foreign matter.
- D. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.



- E. Storage:
 - 1. Store materials in areas protected from weather, moisture, or other potential damage.
 - 2. Do not store materials directly on ground.
- F. Handle products carefully to prevent damage to interior or exterior surfaces.

PART 2 PRODUCTS

2.1 DOUBLE-DISC GATE VALVES

- A. <u>Manufacturers</u>:
 - 1. AVK Valve Company, or Engineer approved equal.
 - 2. Substitutions: As specified in Section 01600 Product Requirements.
 - 3. Furnish materials according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- B. Description:
 - 1. Comply with AWWA C500 and NSF 61 and 372.
 - 2. Materials:
 - a. Body: Iron.
 - b. Trim: Bronze.
 - 3. Gate: Double-disc parallel seat.
 - 4. Stem: Non-rising.
 - 5. Stem Seals: O-ring.
 - 6. Operation:
 - a. Square operating nut.
 - b. Open counterclockwise unless otherwise indicated.
 - 7. End Connections: Flanged or Mechanical Joint.
 - 8. Coatings:
 - a. Comply with AWWA C550.
 - b. Interior and exterior.
 - 9. Furnish 16-inch diameter valves and larger with bypass valves and gear operators.
 - 10. Pressure Rating:
 - a. 12-inch Diameter and Smaller: 200 psig.
 - b. 14-inch Diameter and Larger: 150 psig.

2.2 RESILIENT WEDGE GATE VALVES

- A. <u>Manufacturers</u>:
 - 1. AVK Valve Company, or Engineer approved equal.
 - 2. Substitutions: As specified in Section 01600 Product Requirements.
 - 3. Furnish materials according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- B. Description:
 - 1. Comply with AWWA C509.
 - 2. Materials:
 - a. Body: Ductile iron.

- 3. Seats: Resilient.
- 4. Stem:

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- a. Type: Non-rising.
- b. Material: Bronze.
- 5. Operation:
 - a. Square operating nut.
 - b. Open counterclockwise unless otherwise indicated.
- 6. End Connections: Flanged, or mechanical joint.
- 7. Coatings:
 - a. Comply with AWWA C550.
 - b. Interior and exterior.
- 8. Pressure Rating:
 - a. 12-inch Diameter and Smaller: 200 psig.
 - b. 16-inch Diameter and Larger: 150 psig.

2.3 VALVE BOXES

A. <u>Manufacturers</u>:

- 1. Jensen Precast, or Engineer approved equal.
- 2. Substitutions: As specified in Section 01600 Product Requirements.
- 3. Furnish materials according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.

B. Description:

- 1. 12-inch Diameter Valves and Smaller:
 - a. Material: Cast iron.
 - b. Type: Two-piece, screw.
- 2. Valves Larger than 12-inch Diameter:
 - a. Material: Cast iron.
 - b. Type: Three-piece, screw.
 - c. Base: Round.
- 3. Lid Inscription: WATER.

2.4 ACCESSORIES

- A. Concrete for Thrust Restraints: Concrete type as specified in 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- B. Valve Box Aligner: High-strength plastic device designed to automatically center valve box base and to prevent it from shifting off center during backfilling.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01700 - Execution and Closeout Requirements: Requirements for installation examination.



- B. Determine exact location and size of valves from Drawings.
- C. Verify that invert elevations of existing work prior to excavation and installation of valves are as indicated on Drawings.

3.2 PREPARATION

- A. Section 01700 Execution and Closeout Requirements: Requirements for installation preparation.
- B. Conduct operations to not interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures, utilities, and landscape in immediate or adjacent areas.
- C. Identify required lines, levels, contours, and datum locations.
- D. Locate, identify, and protect from damage utilities to remain.
- E. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
 - 1. Notify Engineer not less than 2 days in advance of proposed utility interruption.
 - 2. Do not proceed without written permission from Engineer.

3.3 INSTALLATION

- A. Perform trench excavation, backfilling, and compaction as specified in Section 15050 Public Water Utility Distribution Piping.
- B. Install valves in conjunction with pipe laying.
- C. Set valves plumb.
- D. Provide buried valves with valve boxes installed flush with finished grade.
- E. Installation Standards: Install Work according to 2015 State Standard Specifications for Public Works Projects (Green Book) standards.
- F. Disinfection of Water Piping System:
 - 1. Flush and disinfect system as specified in Section 02660 Disinfecting of Water Utility Distribution.

3.4 FIELD QUALITY CONTROL

- A. Section 01400 Quality Requirements: Requirements for inspecting and testing.
- B. Pressure test system according to AWWA C600 and following:
 - 1. Test Pressure: Not less than 200 psig or 50 psi in excess of maximum static pressure, whichever is greater.
 - 2. Conduct hydrostatic test for at least two hours.
 - 3. Slowly fill section to be tested with water and expel air from piping at high points.
 - 4. Install corporation cocks at high points.



- 5. Close air vents and corporation cocks after air is expelled.
- 6. Raise pressure to specified test pressure.
- 7. Observe joints, fittings, and valves under test.
- 8. Remove and replace cracked pipes, joints, fittings, and valves that show visible leakage and retest.
- 9. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate, maintaining test pressure within plus or minus 5.0 psi.
- 10. Leakage is defined as quantity of water supplied to piping as necessary to maintain test pressure during testing period.
- 11. Compute maximum allowable leakage using following formula:

L = [SD x sqrt(P)]/C
L = testing allowance, gph
S = length of pipe tested, feet
D = nominal diameter of pipe, inches
P = average test pressure during hydrostatic test, psig
C = 148,000
If pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

- 12. If test of pipe indicates leakage greater than that allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits.
- 13. Correct visible leaks regardless of quantity of leakage.

END OF SECTION



SECTION 15150

SANITARY WASTE AND VENT PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe, tube, and fittings.
 - 2. Specialty pipe fittings.
- B. Related Section:
 - 1. Division 2 Section "Sanitary Sewerage" for sanitary sewerage piping and structures outside the building.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.
- C. See section 01300 for submittal requirements.
- 1.3 QUALITY ASSURANCE
 - A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
 - B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

PART 2 PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- 2.2 ABS PIPE AND FITTINGS
 - A. Solid-Wall ABS Pipe: ASTM D 2661, Schedule 40.
 - B. ABS Socket Fittings: ASTM D 2661, made to ASTM D 3311, drain, waste, and vent patterns.
 - C. Solvent Cement: ASTM D 2235.

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- 1. ABS solvent cement shall have a VOC content of 325 giL or less when calculated according to 40 CPR 59, Subpart D (EPA Method 24).
- 2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Division 2 Section "Earthwork."

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Division 15 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- I. Make changes in direction for soil and waste drainage and vent p1pmg using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-tum, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.



- J. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- K. Install soil and waste drainage and vent p1pmg at the following minimum slopes unless otherwise indicated:
 - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 2 percent downward in direction of flow for piping NPS 4 and larger.
 - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- L. Install aboveground ABS piping according to ASTM D 2661.
- M. Install underground ABS piping according to ASTM D 2321.
- N. Plumbing Specialties:
 - 1. Install backwater valves in sanitary waste gravity-flow piping. Comply with requirements for backwater valves specified in Division 15 Section "Sanitary Waste Piping Specialties."
 - 2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Comply with requirements for cleanouts specified in Division 15 Section "Sanitary Waste Piping Specialties."
 - 3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Division 15 Section "Sanitary Waste Piping Specialties."
- O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 15 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- Q. Install escutcheons for p1pmg penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 15 Section "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Plastic, Non-pressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices specified in Division 15 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Division 15 Section "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
 - 2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
 - 3. Vertical Piping: MSS Type 8 or Type 42, clamps.
 - 4. Install individual, straight, horizontal piping runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 - 5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 6. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
 - 2. NPS 3: 60 inches with 1/2-inch rod.
 - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
 - 4. NPS 6 : 60 inches with 3/4-inch rod.
 - 5. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.
- G. Install supports for vertical copper tubing every 10 feet.
- H. Install hangers for ABS piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-112 and NPS 2: 48 inches with 3/8-inch rod.
 - 2. NPS 3: 48 inches with 112-inch rod.
 - 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
 - 4. NPS 6 : 48 inches with 3/4-inch rod.
 - 5. Install supports for vertical ABS piping every 48 inches.
 - 6. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.
- 3.5 CONNECTION
 - A. Drawings indicate general arrangement of piping, fittings, and specialties.



- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
 - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 - 5. Comply with requirements for backwater valves cleanouts and drains specified in Division 15 Section "Sanitary Waste Piping Specialties."
 - 6. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections according to the following unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

3.6 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Division 15 Section "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for re-inspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

- 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
- 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill withwater to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
- 4. Finished Plumbing Test Procedure: Water plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of l-inch psig. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
- 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
- 6. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed ABS Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

3.9 PIPING SCHEDULE

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
 1. Solid-wall ABS pipe, ABS socket fittings, and solvent-cemented joints.
- C. Aboveground, soil and waste piping NPS 5 and larger shall be the following:
 1. Solid-wall Cellular-core PVC pipe, PVC socket fittings, and solvent-cemented joints.
- D. Aboveground, vent piping NPS 4 and smaller shall be the following:
 1. Solid-wall ABS pipe, ABS socket fittings, and solvent-cemented joints.
- E. Aboveground, vent piping NPS 5 and larger shall be the following:1. Solid-wall ABS pipe, ABS socket fittings, and solvent-cemented joints.
- F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be the following:1. Solid wall ABS pipe, ABS socket fittings, and solvent-cemented joints.



G. Underground, soil and waste piping NPS 5 and larger shall be the following:1. Solid-wall ABS pipe; ABS socket fittings; and solvent-cemented joints.

END OF SECTION



SECTION 15155

SANITARY WASTE PIPING SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following sanitary drainage piping specialties:
 - 1. Cleanouts.
 - 2. Floor drains.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for grease interceptors.
- 1.3 QUALITY ASSURANCE
 - A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

PART 2 PRODUCTS

2.1 CLEANOUTS

- A. Exposed Cast-Iron Cleanouts:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - a. MIFAB, Inc.
 - b. Smith, Jay R. M{g. Co.; Division of Smith Industries, Inc.
 - c. Zurn Plumbing Products Group; Specification Drainage Operation.
 - d. Or approved equal.
 - 2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
 - 3. Size: Same as connected drainage piping
 - 4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
 - 5. Closure: Countersunk, cast-iron plastic plug.
 - 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- B. Cast-Iron Floor Cleanouts:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - a. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - b. Zurn Plumbing Products Group; Specification Drainage Operation.
 - c. MIFAB.

- RΟΔ
 - d. Or approved equal.
 - 2. Standard: ASME A112.36.2M for adjustable housing cleanout.
 - 3. Size: Same as connected branch.
 - 4. Body or Ferrule: Cast iron.
 - 5. Closure: Plastic plug.
 - 6. Adjustable Housing Material: Cast iron with threads.
 - 7. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
 - 8. Frame and Cover Shape: Round.
 - 9. Top Loading Classification: Heavy Duty.
 - 10. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.
 - C. Cast-Iron Wall Cleanouts:
 - 1. Basis-of-Design Product Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - a. MIFAB, Inc.
 - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - c. Zum Plumbing Products Group; Specification Drainage Operation.
 - d. Or approved equal.
 - 2. Standard: ASME A112.36.2M. Include wall access.
 - 3. Size; Same as connected drainage piping.
 - 4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
 - 5. Closure; Countersunk, plug.
 - 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
 - 7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.
 - 8. Wall Access: Round, wall-installation frame and cover.

2.2 FLOOR DRAINS

- A. Cast-Iron Floor Drains:
 - 1. Basis-of-Design Product Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following;
 - a. MIFAB, Inc.
 - b. Prier Products, Inc.
 - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - d. Zum Plumbing Products Group; Specification Drainage Operation
 - e. Or approved equal.
 - 2. Standard: ASME A112.6.3.
 - 3. Pattern: Floor drain.
 - 4. Body Material: Gray iron.
 - 5. Outlet Bottom.
 - 6. Top or Strainer Material: Nickel bronze.
 - 7. Top Shape: Round.
 - 8. Top Loading Classification: Heavy Duty.
 - 9. Trap Material: ABS, PVC, or Cast iron.
 - 10. Trap Pattern: Deep-seal P-trap.
 - 11. Trap Features: Trap-seal primer valve drain connection.
 - 12. Trap Sealer:
 - a. Sure Seal Inline Trap Sealer
 - b. Material: ABS & Neoprene



- B. Plastic Floor Drains
 - 1. Basis-of-Design Product Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following;
 - a. Oatey
 - b. Watts
 - c. Or approved equal.
 - 2. Pattern: Floor Drain
 - 3. Body Material: PVC
 - 4. Outlet: Bottom
 - 5. Top or Strainer Material: PVC
 - 6. Top Shape: Round
 - 7. Trap Material: ABS, PVC, or Cast iron.
 - 8. Trap Pattern: Deep-seal P-trap.
 - 9. Trap Features: Trap-seal primer valve drain connection
 - 10. Trap Sealer:
 - a. Sure Seal Inline Trap Sealer
 - b. Material: ABS & Neoprene

PART 3 EXECUTION

3.1 INSTALLATION

- 1. Refer to Division 15 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 - 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 - 2. Locate at each change in direction of piping greater than 45 degrees.
 - 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 - 4. Locate at base of each vertical soil and waste stack.
- C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- D. For cleanouts located in concealed p1pmg, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
 - 1. Position floor drains for easy access and maintenance.
 - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
 - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 114-inch total depression.
 - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.



- c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than l-inch total depression.
- 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
- 4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- F. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- G. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
 - 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 - 2. Size: Same as floor drain inlet.
- H. Install vent caps on each vent pipe passing through roof.
- I. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

3.3 **PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 15195

PROPANE FUEL PIPING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipes, tubes, and fittings.
 - 2. Piping specialties.
 - 3. Piping and tubing joining materials.
 - 4. Valves.
 - 5. Earthquake Valves

1.2 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
 - 2. Service Regulators: 65 psig minimum unless otherwise indicated.
- B. Delegated Design: Design restraints and anchors for propane piping and equipment, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For facility Propane piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
 - 1. Detail fabrication and assembly of seismic restraints.
 - 2. Design Calculations: Calculate requirements for selecting seismic restraints.
- C. Welding certificates.
- D. Field quality-control reports.
- E. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS Dl.l/Dl.lM, "Structural Welding Code- Steel."



- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or *S*, Grade B.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
 - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 4. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
 - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.

2.2 PIPING SPECIALTIES

- A. Appliance Flexible Connectors:
 - 1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
 - 2. Operating-Pressure Rating: 0.5 psi g.
 - 3. End Fittings: Zinc-coated steel.
 - 4. Threaded Ends: Comply with ASME Bl.20.1.
 - 5. Maximum Length: 72 inches
- B. Y-Pattern Strainers:
 - 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
 - 2. End Connections: Threaded ends for NPS 2 and smaller.
 - 3. Strainer Screen: 40-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
 - 4. CWP Rating: 125 psig.
- C. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for Propane.
- B. Welding Filler Metals: Comply with AWS Dl0.12/Dl0.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.



2.4 MANUAL GAS SHUTOFF VALVES

- A. See "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME Bl6.33.
 - 1. CWP Rating: 125 psig.
 - 2. Threaded Ends: Comply with ASME B1.20.1.
 - 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
 - 4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 - 5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
 - 6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

2.5 DIELECTRIC UNIONS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Capitol Manufacturing Company.
 - 2. Central Plastics Company.
 - 3. Hart Industries International, Inc.
 - 4. McDonald, A. Y. Mfg. Co.
 - 5. Watts Regulator Co.; Division of Watts Water Technologies, Inc.
 - 6. Wilkins; Zurn Plumbing Products Group.
- B. Minimum Operating-Pressure Rating: 150 psig.
- C. Combination fitting of copper alloy and ferrous materials
- D. Insulating materials suitable for Propane.
- E. Combination fitting of copper alloy and ferrous materials with threaded, brazed-joint, plain, or welded end connections that match piping system materials.

2.6 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils _thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 EXECUTION

3.1 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 for installation and purging of Propane piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install Propane piping at uniform grade of 2 percent down toward drip and sediment traps.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Verify final equipment locations for roughing-in.
- L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
 - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.



- O. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
- P. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- Q. Connect branch piping from top or side of horizontal piping.
- R. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment.
- S. Do not use Propane piping as grounding electrode.
- T. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

3.2 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing or copper connector.
- B. Install regulators and ove1pressure protection devices with maintenance access space adequate for servicing and testing.

3.3 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 - 2. Bevel plain ends of steel pipe.
 - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 3. NPS 1-112 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 4. NPS 4 and smaller: Maximum span, 108 inches; minimum rod size, 3/8 inch.

3.5 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install Propane piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.6 LABELING AND IDENTIFYING

A. Comply with requirements in Division 23 Section "Identification for *INAC* Piping and Equipment" for piping and valve identification. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.7 FIELD QUALITY CONTROL

- A. Test, inspect, and purge Propane according to NFPA 54 and authorities having jurisdiction.
- B. Propane piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.8 INDOOR PIPING SCHEDULE

- A. Aboveground, branch piping NPS 1 and smaller shall be the following: Steel pipe with malleable-iron fittings and threaded joints.
- B. Aboveground, distribution piping shall be one of the following:
 - 1. Steel pipe with malleable-iron fittings and threaded joints.
 - 2. Steel pipe with wrought-steel fittings and welded joints.



3.9 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Valves for pipe sizes NPS 2 and smaller at service meter shall be one of the following:
 - 1. One-piece, metallic ball valve.
 - 2. Two-piece, full-port, metallic ball valves.
- B. Distribution piping valves for pipe sizes NPS 2 and smaller shall be one of the following:
 - 1. One-piece, metallic ball valve.
 - 2. Two-piece, full-port, metallic ball valves.
- C. Valves in branch piping for single appliance shall be one of the following:
 - 1. One-piece, metallic ball valve.
 - 2. Two-piece, full-port, metallic ball valves.

END OF SECTION
SECTION 15412

EMERGENCY PLUMBING FIXTURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Eye/face wash equipment.
 - 2. Combination units.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and maintenance data.
- E. See section 01300 for submittal requirements.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ANSI Standard: Comply with ANSI Z358.1, "Emergency Eyewash and Shower Equipment."
- C. NSF Standard: Comply with NSF 61, "Drinking Water System Components -Health Effects," for fixture materials that will be in contact with potable water.
- D. Regulatory Requirements: Comply with requirements in ICC/ANSIA117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

PART 2 PRODUCTS

- 2.1 EYE/FACE WASH EQUIPMENT
 - A. Standard, Wall-Mounted, Plumbed, Eye/Face Wash Units:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Bradley Corporation.

- b. Guardian Equipment Co
- c. Haws Corporation.
- d. Or approved equal.
- 2. Capacity: Not less than 3.0 gpm for at least 15 minutes.
- 3. Supply Piping: NPS 1/2 chrome-plated brass or stainless steel with flow regulator and stay-open control valve.
- 4. Control-Valve Actuator: Paddle.
- 5. Spray-Head Assembly: Two or four receptor-mounted spray heads.
- 6. Receptor: Plastic bowl.
- 7. Drain Piping: NPS 1-1/4 minimum, chrome-plated brass, receptor drain, P-trap, waste to wall, and wall flange complying with ASME Al12.18.2/CSAB125.2.
- 8. Mounting: Wall.

2.2 COMBINATION UNITS

- A. Standard, Plumbed Emergency Shower with Eye/Face Wash Combination Units,:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Bradley Corporation.
 - b. Guardian Equipment Co.
 - c. Haws Corporation.
 - d. Or approved equal.
 - 2. Piping:
 - a. Material: Galvanized steel.
 - b. Unit Supply: NPS 1-114 minimum.
 - c. Unit Drain: Outlet at back or side near bottom.
 - 3. Shower:
 - a. Capacity: Not less than 20 gpm for at least 15 minutes.
 - b. Supply Piping: NPS 1 with flow regulator and stay-open control valve.
 - c. Control-Valve Actuator: Pull rod.
 - d. Shower Head: 8-inch- minimum diameter; plastic.
 - e. Mounting: Pedestal.
 - 4. Eye/Face Wash Unit:
 - a. Capacity: Not less than 3 gpm for at least 15 minutes.
 - b. Supply Piping: NPS 112 with flow regulator and stay-open control valve.
 - c. Control-Valve Actuator: Paddle.
 - d. Spray-Head Assembly: Two or four receptor-mounted spray heads.
 - e. Receptor: Chrome-plated brass or stainless-steel bowl.
 - f. Mounting: Attached shower pedestal.
 - g. Drench-Hose Option: May be provided instead of eye/face wash unit.
 - 1) Capacity: Not less than 3 gpm for at least 15 minutes.
 - 2) Mounting: Bracket on shower pedestal.

PART 3 EXECUTION

3.1 EMERGENCY PLUMBING FIXTURE INSTALLATION

- A. Assemble emergency plumbing fixture piping, fittings, control valves, and other components.
- B. Install fixtures level and plumb.
- C. Fasten fixtures to substrate.
- D. Install shutoff valves in water-supply piping to fixtures. Use ball, gate, or globe valve if specific type valve is not indicated. Install valves chained or locked in open position if permitted. Install valves in locations where they can easily be reached for operation. Comply with requirements for valves specified in Division 15. Section "General-Duty Valves for Plumbing Piping."
 - 1. Exception: Omit shutoff valve on supply to group of plumbing fixtures that includes emergency equipment.
 - 2. Exception: Omit shutoff valve on supply to emergency equipment if prohibited by authorities having jurisdiction.
- E. Install dielectric fitting in supply piping to emergency equipment if piping and equipment connections are made of different metals. Comply with requirements for dielectric fittings specified in Division 15 Section "Domestic Water Piping."
- F. Install trap and waste piping on drain outlet of emergency equipment receptors that are indicated to be directly connected to drainage system. Comply with requirements for waste piping specified in Division 15 Section "Sanitary Waste and Vent Piping."
- G. Install indirect waste piping on drain outlet of emergency equipment receptors that are indicated to be indirectly connected to drainage system. Comply with requirements for waste piping specified in Division 15 Section "Sanitary Waste and Vent Piping."
- H. Install escutcheons on piping wall and ceiling penetrations in exposed, finished locations. Comply with requirements for escutcheons specified in Division 15 Section "Escutcheons for Plumbing Piping."
- I. Fill self-contained fixtures with flushing fluid.

3.2 CONNECTIONS

- A. Directly connect emergency plumbing fixture receptors with trapped drain outlet to sanitary waste and vent piping. Comply with requirements for waste piping specified in Division 15 Section "Sanitary Waste and Vent Piping."
- B. Where installing piping adjacent to emergency plumbing fixtures, allow space for service and maintenance of fixtures.

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3.3 IDENTIFICATION

A. Install equipment nameplates or equipment markers on emergency plumbing fixtures and equipment and equipment signs on water-tempering equipment. Comply with requirements for identification materials specified in Division 15 Section "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Mechanical-Component Testing: After plumbing connections have been made, test for compliance with requirements. Verify ability to achieve indicated capacities.
- B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection.
 - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Emergency plumbing fixtures will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust or replace fixture flow regulators for proper flow.
- B. Adjust equipment temperature settings.

END OF SECTION

SECTION 15416

COMMERCIAL WATER CLOSETS AND FIXTURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Water closets.
 - 2. Toilet seats.
 - 3. Faucets.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. See section 01300 for submittal requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.
 - 1. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
 - a. Servicing and adjustments of automatic faucets.

PART 2 PRODUCTS

2.1 FLOOR-MOUNTED, BOTTOM-OUTLET WATER CLOSETS

- A. Water Closets: Floor mounted, bottom outlet, top spud.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. American Standard America.
 - b. Kohler Co.
 - c. TOTO USA, INC.
 - d. Or approved equal.
 - 2. Bowl:
 - a. Standards: ASME All2.19.2/CSA B45.1 and ASME All2.19.5.
 - b. Material: Vitreous china.
 - c. Type: Siphon jet.
 - d. Style: Flushometer valve.
 - e. Height: Handicapped/elderly, complying with ICC/ANSI A117.1.
 - f. Rim Contour: Elongated.
 - g. Water Consumption: 1.6 gal. per flush.
 - h. Spud Size and Location: NPS 1-112; top.
 - i. Color: White.

2.2 TOILET SEATS

- A. Toilet Seats:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. American Standard America.
 - b. Bemis Manufacturing Company.
 - c. Church Seats.
 - d. Olsonite Seat Co.
 - e. Or approved equal.
 - 2. Standard: IAPMO/ANSI Z124.5.
 - 3. Material: Plastic.
 - 4. Type: Commercial (Standard).
 - 5. Shape: Elongated rim, open front.
 - 6. Hinge: Self-sustaining, check.
 - 7. Hinge Material: Noncorroding metal.
 - 8. Seat Cover: Not required.
 - 9. Color: White.

2.3 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components Health Effects," for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASMEA112.18.1/CSAB125.1.
- C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Wheel handle
- F. Risers:
 - 1. NPS 3/8.

2.4 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS1-114 offset and straight tailpiece.
- C. Trap:
 - 1. Size: NPS 1-112 by NPS 1-1/4.
 - 2. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated, brass or steel wall flange.



3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012inch- thick stainless-steel tube to wall; and stainless-steel wall flange.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.

3.2 INSTALLATION

- A. Water-Closet Installation:
 - 1. Install level and plumb according to roughing-in drawings.
 - 2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
 - 3. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.
- B. Install toilet seats on water closets.
- C. Wall Flange and Escutcheon Installation:
 - 1. Install wall flanges or escutcheons at p1pmg wall penetrations in exposed, finished locations and within cabinets and millwork.
 - 2. Install deep-pattern escutcheons if required to conceal protruding fittings.
 - 3. Comply with escutcheon requirements specified in Division 15 Section "Escutcheons for Plumbing Piping."
- D. Joint Sealing:
 - 1. Seal joints between water closets and walls and floors using sanitary-type, onepart, mildew-resistant silicone sealant.
 - 2. Match sealant color to water-closet color.
 - 3. Comply with sealant requirements specified in Division 7 Section "Joint Sealants."

3.3 CONNECTIONS

- A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.
- B. Comply with water piping requirements specified in Division 15 Section "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Division 15 Section "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to water closets, allow space for service and maintenance.



3.4 ADJUSTING

- A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.
- B. Adjust water pressure at flushometer valves and faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

- A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed water closets and fittings.
- C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

END OF SECTION

SECTION 16051

ELECTRICAL PROVISIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 ELECTRICAL GENERAL PROVISIONS

- A. Electrical Contractor shall coordinate work with all other trades and equipment suppliers.
- B. All work shall be done in accordance with the latest editions of National Electrical Code (NEC), C.E.C., Bridgeport PUD codes, Mono County and ordinances.
- C. All electrical equipment shall be new and UL listed.
- D. Contractor must visit the site to ascertain existing conditions prior to submitting bid.
- E. Contractor shall assure that all electrical devices scheduled to remain, in or adjacent to areas of work, remain energized and shall reconnect any devices isolated by demolition work.

1.03 WORK NOT INCLUDED IN THIS SECTION

- A. Telephone cabling and apparatus.
- B. Data cabling and terminations.
- C. Painting.

1.04 SHOP DRAWINGS

- A. Contractor shall submit 5 copies of data on the following items for approval prior to start of work:
 - 1. Circuit breakers.
 - 2. Receptacles and switches.
 - 3. Service pedestal and control panel enclosure.
 - 4. Disconnect switches.
 - 5. Vaults and pullboxes.
 - 6. RTU & Instrumentation devices.
 - 7. Conductors & Cables
 - 8. Any equipment as requested by Engineer or Owner.

PART 2 PRODUCTS

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2.01 MATERIALS AND EQUIPMENT

A. Branch Circuit Wire: Use copper; 600 volt; Type TW, THHN or THWN; solid to size #8 AWG.

B. Wire Connectors: Use "Scotch-Lok" or equal, insulated spring connectors for wire sizes up to #8 AWG.

- C. Raceways:
 - 1. Use rigid galvanized steel (RGS) in all areas.
 - 2. Use electrical metallic tubing (EMT) indoors, concealed or exposed where protected.
 - 3. Use flexible metallic steel only where approved by Engineer.
 - 4. Use flexible weathertight conduit for connection to motors.
 - 5. Use PVC Schedule 40 under slabs or below ground with RGS elbows and ground wire. RGS elbows shall be PVC coated or wrapped with 30 mil tape below grade in contact with soil.
 - D. Junction and Outlet Boxes: Use 16-gauge stamped, galvanized steel with screw covers, sized per NEC, in concealed locations only. Use cast metallic with screw hubs and gasketed screw covers, sized per NEC in exposed locations.
 - E. Pull Boxes: Shall be code gauge steel with screw covers and gray enamel finish. Size per NEC and use NEMA 1 or NEMA 3R as required.
 - F. Conduit Fittings: RGS fittings shall be galvanized N.P.T. type. Use insulated bushings where terminating in boxes. EMT fittings shall be insulated compression type. PVC fittings shall be one-piece, slip type with approved solvent.
 - G. Duplex Receptacles: NEMA 5-15R, specification grade, Hubbell #5262-I or equal with matching coverplate. See plans for special types.
 - H. Switches: 15 amp, 125/277 volt, SPST, specification grade, Hubbell #1221-I or equal with matching coverplate.
 - I. Molded Case Breakers: Use thermal magnetic molded case breakers of ratings indicated. Breakers shall match interrupting rating, style and manufacturer of existing units.
 - J. Concrete Vaults and Manholes: Provide watertight, precast concrete vaults and manholes in the types and sizes indicated with access knockouts for conduit or cable, cast iron manhole access cover and frame with machined bearing surfaces suitable for street loading, with pulling/lift irons, sump/drainage box and bolting inserts. Vaults and manholes shall be equipped with all required extension rings and bottom as required by grade conditions.

1. Provide 3,000-pound reinforced concrete for vaults and manholes, with lids as indicated.

- 2. Provide vault, manhole and handhole accessories including mastics, sealants, cable support brackets, and manhole/vault ladders as recommended by the fabricator.
- 3. Provide products by one of the following:

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a. Jensen Precast.b. Christy.c. Brooks.d. Forni.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All wiring shall be concealed unless specifically noted or approved by Engineer.
- B. Provide all required supports and hangers for electrical equipment and raceways. Do not support conduits from ductwork.
- C. All fixtures and outlets shall be installed straight and plumb, parallel or at right angles to walls as indicated on drawings.
- D. Install pull wires in all unused raceways.

3.02 TESTING

- A. Contractor shall test all circuiting to assure all circuits are free of shorts or grounds.
- B. Contractor shall test all electrical equipment for the Owner to demonstrate systems work as intended.

3.03 GUARANTEE/WARRANTY

A. The Contractor shall warranty all electrical equipment and workmanship for a period of one year from the date of final acceptance.

END OF SECTION 16100

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SECTION 16060

GROUNDING AND BONDING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.03 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.01 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.02 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.03 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad; 3/4 inch by 10 feet in diameter.

PART 3 EXECUTION

3.01 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.02 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Three-phase motor and appliance branch circuits.
 - 3. Flexible raceway runs.
 - 4. Armored and metal-clad cable runs.
 - 5. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

3.03 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
 - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 2 Section "Underground Ducts and Utility Structures," and shall be at least 12 inches deep, with cover.
 - 1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.

- 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- E. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

3.04 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.

- 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

SECTION 16073

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.03 SUBMITTALS

- A. Product Data: For steel slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.
- C. Welding certificates.

1.04 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."
- B. Comply with NFPA 70.

PART 2 PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 5. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: [Steel] [Steel and malleable-iron] hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 5 Section "Metal Fabrications" for steel shapes and plates.

PART 3 EXECUTION

3.01 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.02 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 5 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.04 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 3 Section "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.05 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

SECTION 16075

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Instruction signs.
 - 6. Equipment identification labels.

1.02 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.03 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 PRODUCTS

2.01 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:

- 1. Black letters on an orange field.
- 2. Legend: Indicate voltage and system or service type.
- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.02 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.03 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.04 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical [and communications]utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- B. Color and Printing:
 - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
 - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.

3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

2.05 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Baked-Enamel Warning Signs:
 - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
 - 2. 1/4-inch grommets in corners for mounting.
 - 3. Nominal size, 7 by 10 inches.
- D. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

2.06 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.07 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
- B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.08 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in Division 9 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainlesssteel machine screws with nuts and flat and lock washers.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.
 - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.

- c. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
- G. Painted Identification: Comply with requirements in Division 9 painting Sections for surface preparation and paint application.

SECTION 16120

CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

1.03 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 PRODUCTS

2.01 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70.
- B. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW.
- C. Multiconductor Cable: Comply with NEMA WC 70 with ground wire.

2.02 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.
 - 3. O-Z/Gedney; EGS Electrical Group LLC.
 - 4. 3M; Electrical Products Division.
 - 5. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.03 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.04 SLEEVE SEALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advance Products & Systems, Inc.
 - 2. Calpico, Inc.
 - 3. Metraflex Co.
 - 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 2. Pressure Plates: Plastic. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- 3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
 - A. Service Entrance: Type XHHW, single conductors in raceway.
 - B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
 - C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.
 - D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
 - E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.
 - F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
 - G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
 - H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
 - I. Class 1 Control Circuits: Type THHN-THWN, in raceway.
 - J. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed

manufacturer's recommended maximum pulling tensions and sidewall pressure values.

- C. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 16 Section "Electrical Supports and Seismic Restraints."
- F. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."
- G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- I. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.04 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- D. Cut sleeves to length for mounting flush with both wall surfaces.
- E. Extend sleeves installed in floors 2 inches above finished floor level.
- F. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.

- G. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 7 Section "Joint Sealants."
- I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 7 Section "Through-Penetration Firestop Systems."
- J. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.
- K. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.05 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground exterior-wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.06 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 7 Section "Through-Penetration Firestop Systems."

3.07 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:

- 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
- 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

SECTION 16130

RACEWAYS AND BOXES

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. See Division 2 Section "Underground Ducts and Utility Structures" for exterior ductbanks and manholes, and underground handholes, boxes, and utility construction.

1.02 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.03 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 PRODUCTS

2.01 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. IMC: ANSI C80.6.
- C. EMT: ANSI C80.3.
- D. FMC: Zinc-coated steel.

- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

2.02 NONMETALLIC CONDUIT AND TUBING

- A. ENT: NEMA TC 13.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- C. LFNC: UL 1660.
- D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- E. Fittings for LFNC: UL 514B.

2.03 METAL WIREWAYS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper B-Line, Inc.
 - 2. Hoffman.
 - 3. Square D; Schneider Electric.
- C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 3R, unless otherwise indicated.
- D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- E. Wireway Covers: Hinged type.
- F. Finish: Manufacturer's standard enamel finish.

2.04 NONMETALLIC WIREWAYS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hoffman.
 - 2. Lamson & Sessions; Carlon Electrical Products.
- B. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.05 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. [Manufacturer's standard enamel finish in color selected by owner.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Thomas & Betts Corporation.
 - b. Walker Systems, Inc.; Wiremold Company (The).
 - c. Wiremold Company (The); Electrical Sales Division.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by owner from manufacturer's standard colors.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Butler Manufacturing Company; Walker Division.
 - b. Enduro Systems, Inc.; Composite Products Division.
 - c. Hubbell Incorporated; Wiring Device-Kellems Division.
 - d. Lamson & Sessions; Carlon Electrical Products.
 - e. Panduit Corp.
 - f. Walker Systems, Inc.; Wiremold Company (The).
 - g. Wiremold Company (The); Electrical Sales Division.

2.06 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
- F. Hinged-Cover Enclosures: NEMA 250, Type 3R, with continuous-hinge cover with flush latch, unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
- G. Cabinets:
 - 1. NEMA 250, Type 3R, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.

PART 3 EXECUTION

3.01 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit: Rigid steel conduit.
 - 2. Concealed Conduit, Aboveground: Rigid steel conduit.
 - 3. Underground Conduit: RNC, Type EPC-40 PVC, direct buried.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Comply with the following indoor applications, unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 - 3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 5. Damp or Wet Locations: Rigid steel conduit.
 - 6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.02 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 16 Section "Electrical Supports and Seismic Restraints."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:

- 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
- 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
- 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- K. Raceways for Optical Fiber and Communications Cable: Install as follows:
 - 1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
 - 2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
 - 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
 - 1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.

- b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
- 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
- 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- N. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

3.03 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 2 Section "Earthwork" for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill as specified in Division 2 Section "Earthwork."
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 2 Section "Earthwork."
 - 4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

5. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

SECTION 16710 ELECTRICAL/INSTRUMENTATION

PART 1 GUIDELINES

1-01 SCOPE OF WORK

- A. Requirements listed in any one section of these specifications shall apply to all sections.
- B. Electrical and instrumentation work shall include all material, equipment, labor, tools, transportation, services, and supervision as may be required for a complete, tested, and operable electrical/instrumentation system as indicated on the plans and as specified herein.
- C. All items not specifically mentioned in these specifications or noted on the plans, or on shop drawings, but which are necessary to make a complete working electrical/instrumentation installation, shall be deemed to be included herein.
- D. The successful bidder shall prepare and submit a flow chart and/or written narrative showing and/or describing normal sequence of events during the operation of the process control systems.

1-02 WORK INCLUDED

- A. The work shall include, but not be limited to, the following:
- 1. Power services.
- 2. A service entrance and utility company required conduits.
- 3. A process control panel and external wiring.
- 4. A premises wiring system.
- 5. An electrical raceway system and wiring.
- 6. Field connections for all equipment including instrumentation.
- 7. Documented testing.
- 8. Final checkout, calibration, and placing the system and all components into operation.
- 9. Training of personnel.

1-03 UTILITY SERVICES AND EQUIPMENT

- A. Temporary power for construction purposes shall be the responsibility of the Contractor.
- B. The Contractor shall be responsible for contacting electric utilities for coordination in achieving the Power services outlined in the plans and specifications. The Contractor shall, per the electric utility's submittal requirements, obtain written approval for the service entrance equipment proposed.

1-04 CODES AND STANDARDS

A. Electrical work, including connection to electrical equipment integral with mechanical equipment described elsewhere in these specifications, shall be performed with the latest published regulations, of the following codes and standards.

State and local codes, ordinances, and authorities The National Board of Fire Underwriters National Electrical Manufacturers Association (NEMA) National Fire Protection Association (NFPA) 2012 American National Standards Institute, Inc. (ANSI) Institute of Electrical and Electronics Engineers (IEEE) Insulated Power Cable Engineers' Association (IPCEA) State Department of Industrial Safety (OSHA) State Corporation Commission National Electrical Code (NEC) 2012 for all items not specifically covered by State and local ordinances. ISA Standards

- B. Nothing in these specifications or on the plans shall be interpreted as permission or direction to violate any governing code or ordinance.
- C. Material and equipment shall be listed and where applicable, labeled by Underwriters Laboratory Inc. (UL) for the use intended.

1-05 SHOP WORK

D. The assembly of process control panels and/or modifications to equipment assemblies shall be done at a UL approved shop. The entire unit shall be completely assembled and tested prior to shipment to the project site. In addition, the Engineer shall be allowed two inspections of the unit(s) prior to job-site shipping. These inspections shall not be construed by anyone as final acceptance of unit(s) by the Engineer.

1-06 EQUIPMENT ASSEMBLIES

A. Equipment assemblies, such as Service Entrance Sections, Control and Distribution Panels, etc., shall bear a UL label as a complete assembly. The UL label on the individual components making up the assembly will not be considered sufficient to meet the present requirement. Whenever a generic UL label does not apply for the assembly, a serialized UL label shall be affixed to the assembly and the serial number shall be submitted with the assembly shop drawings.

1-07 DOCUMENTS

- A. The Contractor shall preserve all manufacturers' paperwork that is shipped with equipment assemblies, process control panel components and field installed components. All literature accompanying each and every item shall be considered a part of that item such as specification sheets, installation instructions, operating, maintenance write-ups, etc.
- B. The Contractor shall, prior to commencement of any work, supply the Engineer with a complete and separate set of plans, electrical drawings, P & ID diagrams. These 'record drawings' shall be used for no other purpose than to record changes to, or deviations from, the contract plans and specifications. All electrical drawings shall be submitted on a CD compact disk for IBM compatibles using AutoCAD 2012 and on 11" x 17" paper copy. The Primary Contractor shall be responsible for and shall provide all documentation and wiring diagrams, regardless of whether the equipment was supplied, wired and/or installed by the Primary Contractor or any Sub-contractor.
- C. Final electronic as-built (drawings with all corrections and field changes after completion of project) wiring diagrams shall be of the highest quality. All electrical drawings shall be submitted on a CD compact disk for IBM compatibles using AutoCAD 2012 and on 11" x 17" paper copy. Poor quality copies will not be accepted.
- D. Wiring diagrams shall include all interconnections, inter-wiring and terminals between all electrical and/or instrumentation units. Wire numbers shall be continuous from start to finish. Wire numbers shall not change when going from one unit, cabinet, enclosure, terminal or device to another.
- E. The Contractor shall assign all wire numbers.
- F. Wiring diagrams shall identify each line of electrical ladder logic by sequentially numbering them directly to the left of each line, and shall continue sequentially from one page to the next.
- G. Wiring diagram conductors that continue from one wiring diagram page or drawing to another shall be cross referenced by the use of line numbers.

- H. Wiring diagrams shall identify the function of each relay coil by having the relay 'function identity' directly to the right of each relay coil symbol.
- I. Wiring diagram relay contacts shall identify their coil location by having the coil line number in parenthesis (xxx) below each contact.
- J. Wiring diagram relay coils shall indicate the location of each of their contacts by having the line number of each contact directly below the relay function identity to the right of each relay coil symbol. Wiring diagrams symbol identification numbers shall be placed directly above each symbol.
 - The Contractor shall furnish operation and maintenance manuals containing:
 - 1) Manufacturer's brochures, bulletins and catalog sheets with catalog numbers highlighted.
 - 2) Component and equipment assembly warranties.
 - 3) Installation, operation and maintenance instructions.
- K. The Contractor shall document all testing and functional checkouts as called for in these specifications.
- L. A complete receipt of all documents called for in these specifications shall be a condition of final acceptance of the project by the Owner.

1-08 CONFLICTS

- A. The plans and specifications shall be reviewed as a whole to determine all components required for a functional system. Any functional requirement shown on one drawing or in a specification section shall be considered a required capacity.
- B. Each bidder or their authorized representatives shall, before preparing a proposal, visit all areas where work under this bid is to be performed and to inspect carefully the existing installation, if any. Submission of bid shall be considered evidence that the bidder has inspected the locations and has noted conditions under which the work will be performed and takes full responsibility for a complete knowledge of such factors governing the work.
- C. Discrepancies indicated on different plans, between plans and actual field conditions, or between plans and contract documents shall be promptly brought to the attention of the Owner Inspector for a decision.

1-09 WORKMANSHIP

A. The Contractor shall perform all work with competent and skilled personnel. All material and equipment shall be installed in accordance with the manufacturer's

installation instructions to conform within the contract documents. Any and all inferior workmanship shall be corrected immediately to the satisfaction of the Owner.

1-10 PRODUCT--QUALITY AND ACCEPTANCE

- A. All material and equipment furnished and installed under this contract shall be new and free from any defects. Material found damaged or defective by the Contractor or the Owner shall be replaced immediately. Materials and equipment shall function per specifications when installed outdoors in an ambient temperature of -18C to +60C exposed to direct sunlight. Materials of the same type shall be cataloged product of the same manufacturer.
- B. Panelboards, enclosures, cabinets, switchboards, and similar equipment shall be factory finished with ANSI 61 baked gray enamel and shall be field touched-up as requested by the Owner Inspector.

1-11 FUNCTIONAL CHECKOUT

A. Testing shall include, but not be limited to, the following: alarm circuits activated by simulated malfunctions, motor start permissive operated to observe execution, excessive/insufficient reservoir levels and system pressures simulated to observe alarm and/or lockout actions. Completed, dated, signed documentation and witnessed by the Owner of these tests shall be part of acceptance requirements (See Section 1-07).

1-12 PRELIMINARY ACCEPTANCE

A. Upon completion of all work; the Owner will conduct an examination of workmanship and materials and the Contractor shall demonstrate to the Owner's satisfaction, a totally operable installation as outlined in the specifications and plans. Contractor shall provide access for visual examination, all items requested by the inspector. This shall include, but not be limited to: Opening or removal of all gutter covers, access panels, conduit body and box covers, motor terminal box covers, instrumentation wiring access covers and such. After examination it shall be the Contractors responsibility too fully close-up all such panels, covers, gutters and the like.

1-13 DEFICIENCIES

A. A "punch list" shall be established enumerating deficiencies found. The Contractor shall promptly correct such defects.

1-14 FINAL ACCEPTANCE

A. At the time of final acceptance of the project by the Owner, the Contractor shall turn over to the Owner Inspector the following:

- 1. Four (4) sets of: as-built drawings (See Section 1-07) on 11" x 17" paper copy, one set of as-built electrical drawings on a CD compact disk for IBM compatibles using AutoCAD 2012, testing procedures and results, functional check out procedure and results, manufacturers paperwork, operation and maintenance manuals and all other documents called for in these specifications.
- 2. All spare parts and training as specified.

1-15 TRAINING

- A. Where called for in Part 4 of these specifications, Contractor shall provide on-site training for Owner designated employees, in the operation, maintenance, calibration and/or programming of each instrument. Contractor shall retain training personnel fully familiar with the theory and operation of each instrument.
- B. Training shall be separate and not be included as part of a functional check out or acceptance conference.

1-16 SUBMITTALS

- A. Within ten (10) days following the signing of the contract by the Owner, the Contractor shall make submittals to enable the Owner to determine if the Contractor's proposed work and materials are in compliance with the Owner's drawings and specifications. Contractor shall not commence work until issued a "Notice to Proceed" by the Owner.
- B. As herein called for in the submittal procedure, the Contractor's signature shall constitute a representation that all quantities, dimensions, field construction criteria, materials, catalog numbers, performance criteria, and similar data have been verified and that, in his/her opinion the submittals fully meet the requirements of the contract plans and specifications.
- C. If Contractor's submittals depart from the contract documents, the Contractor shall make specific mention thereof in his letter(s) of transmittal; otherwise review of such submittals by the Owner shall not constitute acceptance or review of such departure(s). Review of drawings shall constitute review of the specific subject matter for which the drawings were submitted and not of any other structure, materials, equipment or apparatus shown on the drawing.
- D. The Primary Contractor shall be responsible for and shall provide all documentation and wiring diagrams, regardless of whether the equipment was supplied, wired and/or installed by the Primary Contractor or any Sub-contractor.
- E. Wiring diagrams shall include all interconnections, inter-wiring and terminals between all electrical and/or instrumentation units. Wire numbers shall be continuous from start to

finish. Wire numbers shall not change when going from one unit, cabinet, enclosure, terminal or any device to another.

- F. The contractor shall assign all wire numbers. Wire numbers will read from top to bottom and left to right. See Section 2-25.
- G. The Contractor shall submit the following:
 - 1) Flow chart P & ID and written narrative of the process (es).
 - 2) Fully dimensioned drawings and bills of materials for service entrance equipment, motor control equipment, transformer/panelboard units and process control panels showing layouts of door devices, nameplates and print pocket locations. Technical specifications, ratings and certifications pertinent to each of these items shall also be submitted.
 - 3) A copy of the electric utility's acceptance of the proposed service entrance equipment.
 - 4) Wiring diagrams on 11" x 17" paper copy and a CD compact disk for IBM compatibles using AutoCAD 2012 of a fully integrated, operable, workable system including instrumentation current loops, SCADA RTU I/O wiring and interconnection wiring diagrams.
 - 5) A separate technical brochure or bulletin for each instrumentation device called for in Process Control Instrumentation.
 - 6) Catalog cut sheets for: all raceways, conduit boxes, fittings, and securing hardware, ground conductor connections including proposed exothermic method, bonding bushings, 600 volt conductors, cable ties and their tensioning/cut off tool, #10 AWG and larger wire lugs and their compression tool(s), premises wiring devices such as switches, convenience outlets, area lighting fixtures and the like. All non-pertinent information and depictions are to be marked out on cut sheets.
- A. Submittals shall be bound, consecutively numbered, have an index, list the Owner's project name and number, the Contractor's name, and bear his/her signature. Contractor developed drawings and diagrams shall be on 11" x 17" paper copy and on a CD compact disk for IBM compatibles using AutoCAD 2012. Submittals made other than in this form will be returned, reviewed, to the Contractor.
- B. The Contractor shall forward six (6) complete sets of the submittals to the Owner's Engineering department. A letter of transmittal accompanying the submittals shall contain the Owner's project number, the name of the Contractor, a schedule of accompanying submittals and any requests for departure(s) from the Owner's plans and specifications.

- C. After the Contractor's submittal or re-submittal of shop drawings, the Owner shall be provided fifteen (15) working days for review. Should the Owner require additional review time above and beyond the stated fifteen (15) working days, the Contractor may ask for a time extension and/or monetary compensation, if they can present valid, factual evidence that actual damages were incurred by the Contractor. The Owner shall determine the amount of the time extension and/or the monetary compensation to be awarded the Contractor.
- D. After review by the Owner, drawings and/or descriptive data will be stamped "Approved as Noted", or "Unacceptable-Resubmit" and one copy of a Letter of Transmittal will be mailed to the Contractor at an address designated by the Contractor.
- E. If a shop drawing or data is stamped "Unacceptable-Resubmit", the Contractor shall make the necessary corrections and resubmit. The letter transmitting corrected documents shall indicate that the documents are re-submittals. Submittal items stamped "Approved" or "Approved as Noted" need not be resubmitted.
- F. If any changes, other than those requested in the Owner's review are made on a shop drawing prior to re-submittal, such changes shall be pointed out by the Contractor upon re-submittal.
- G. The Contractor shall revise and resubmit the shop drawing as required, until they are stamped either "Approved" or "Approved as Noted". This shall be done on 11" x 17" paper copy and on a CD compact disk for IBM compatibles using AutoCAD 2012.
- H. The Owner will not issue a "Notice to Proceed" until all submittals are approved.
- I. The Contractor will be charged for costs incurred by the Owner for third and subsequent submittals, and/or Contractors failure to comply with the procedure outlined above.

PART 2--CONSTRUCTION

2-01 IDENTIFICATIONS

- A. Every wire, instrumentation cable, cabinet, compartment, motor, field mounted instrumentation device, and panel-backplate mounted component shall be identified as follows:
- B. Wires and instrumentation cables: W.H. Brady Co. white heat-shrink sleeves using the Brady "I. D. Pro Plus " label maker covered with clear heat-shrink shall be placed a uniform distance from every termination. Both shall be sized and shrunk to provide a snug fit. Letters and numbers shall be machine printed in permanent black ink. Sleeves shall be adjusted so they can be easily read. Wire numbers will read from top to bottom and left to right. See Section 2-25.
- C. Conduit's: All conduits shall be identified as to destination with stamped brass or Stainless Steel tags attached with stainless steel wire.
- D. Power and Premises Wires: As outlined in Conductors, Terminations and Splices, Part 2-38, of these specifications.
- E. All other items: Engraved laminated nameplates, sized in pleasing proportion to the item identified, on a white surface with black characters are to be mounted as follows:

Cabinets: 60" above standing grade.

F. Instrumentation devices: On the mounting surface, directly above the item, not on the device.

Panel-backplate mounted components: Directly above the item.

G. All nameplates exposed to the weather shall be secured using stainless steel drive pins or screws.

2-02 WARNING SIGNS AND DECALS

- A. Red-White-Black, OSHA approved format, 7" high by 10" wide warning signs of not less than .040 enameling stock, made in accordance with Enamel Institute specifications S-103, suitable for outdoor use, shall be installed as follows:
- B. On each metal or block fence surface a warning sign shall be installed as directed by the Owner inspector that shall read.

DANGER HIGH VOLTAGE KEEP OUT

C. All equipment must have a sign or label meeting the NFPA section 70 E and NEC Arc Flash requirements.

2-03 SEALING OF EQUIPMENT

A. Free standing concrete pad mounted enclosures shall be permanently sealed at the base, and all openings into equipment shall be screened or sealed to prevent the entrance of rodents and insects. Sealing material at the base shall be concrete grout. Small cracks and openings shall be sealed from inside with silicone sealant, Dow-Corning "795" or General Electric "SCS1200".

2-04 TESTING

- A. Prior to energizing the electrical circuits, the tests shall be performed as specified. Unless otherwise specified, a 1000-volt megohimmeter shall be used for resistance measurements.
- B. General insulation resistance measurements shall be made on conductors and energized parts of electrical equipment. Minimum acceptable values of insulation resistance shall be in accordance with the applicable ICEA, NEMA or ANSI standards for the equipment or material being tested.
- C. Phase to ground insulation resistance shall be measured for all circuits 115 volts and above.
- D. Insulation resistance values less than 10 megohms are not acceptable.
- E. Ground impedance testing of the grounding electrode system shall be performed and documented by the Contractor. The tests shall conform to IEEE Standard 81. The reading for each isolated electrode shall be plotted on 8½" x 11" graph paper. The current reference rod shall be driven at least 100' from the ground rod or grid under test. The measurement shall be made at 10-foot intervals beginning 25' from the test electrode and ending 75' from it, in direct line between the ground rod or center of grid and the current reference electrode. An electrode system that shows greater than two ohms resistance for the flat portion of the plotted data shall be considered inadequately grounded. The Contractor shall add additional parallel-connected ground rods and/or deeper driven rods until the ground resistance measurement meets the two-ohm requirement. Use of salts, water or compounds to attain the specified ground resistance is not acceptable.
- F. The Contractor shall document all testing and functional checkouts as called for in these specifications.
- 2-05 SERVICE ENTRANCE SECTIONS (SES)

- A. The SES shall be a single panel or assembly of panels on which shall be mounted on a dead front mounting plate, fused switches, metering equipment provisions, power distribution panel and any monitoring or protection devices as indicated on the plans. Services of less than 1,000 amps shall not employ a circuit breaker as the service disconnecting means. Split bus (multiple) service disconnecting means is not acceptable.
- B. The SES shall be a one-piece enclosure with front accessibility and vandal resistant. The SES shall have a metered distribution section and a pull section, with option for both overhead and underground service, all of which shall comply with the requirements of the serving utility.
- C. The enclosure shall be NEMA 3; zinc coated steel, minimum 12-gauge thickness. Cabinet shall be protected against corrosion in accordance with UL 50, Cabinets and Boxes, Section 13. Exterior doors to be minimum 10-gauge steel and shall have heavy duty padlocking provisions. Dead front shall be a hinged type, 10-gauge minimum, and shall require the use of a tool to expose interior components for installation or servicing. All factory-installed components shall be UL listed. All factory-installed conductors shall be copper, size and type to conform to NEC and UL requirements. Bus bars (including neutral and ground) shall be silver or tin plated solid copper and braced to withstand short circuit amps as indicated on the plans. Ventilation openings shall be provided.
- D. Utility service shall be 240 Volt one phase plus neutral (three wire). System grounding is covered under Grounding and Bonding of these specifications. Grounding electrode conductor(s) connections (s) to ground bus shall be accessible without breaking utility company seals.
- E. The SES shall have a readily visible stamped steel nameplate indicating the equipment voltage, amperage and short circuit withstand rating.
- F. The service entrance interrupting switch shall be operable without opening the compartment door inside of the exterior door. A viewing window shall be provided in the compartment door to allow full view of the switch blades. The compartment door shall be hinged and interlocked with the switch shaft so that the switch must be opened before access to the fuses is possible and the door must be closed before the switch can be closed. True conditions of switch blades when fully open and fully closed shall be accurately and conspicuously labeled for switch handle positions. Handle shall be lockable only in the true, fully open switch condition. SES enclosures shall be securely anchored to their concrete supporting pad. SES shall have a (3.5 inch high) housekeeping pad, which shall not exceed switchgear base frame size by more than 1 inch.
- G. Fuse sizes and types shall be as indicated and specified on the plans.
- H. Manufacturer: Square "D", Cutler Hammer

- I. A three phase, 650 Volt surge arrester shall be installed on the exterior of the service entrance section as close as practical to the load side of the service disconnect switch, in accordance with Article 280 of the NEC. The grounding conductor shall be connected to the service ground bus.
- J. Manufacturers: General Electric #L18BAB30, or Hammond Company #1414 PHM6.

2-08 BRANCH CIRCUITS

A. Each field mounted instrumentation device requiring 120 VAC power shall be served by an individual branch circuit. Wiring at each device shall identify the circuit breaker power source.

2-09 PROCESS CONTROL PANELS

- A. This section shall outline fabrication of control panels other than motor control centers, containing ladder logic devices and/or electronic instrumentation equipment.
- B. Electronic instrumentation devices shown or indicated on the plans that are to be mounted in the panel are outlined in Process Control and Instruments, Part 3, of these specifications.
- C. Instrumentation current loops with two or more back-plate mounted components in the loop shall be interconnected via terminal blocks. Splicing of cable, other than at terminal blocks, is not acceptable. At terminations, heat shrink tubing shall be applied at cable jacket ends, for neatness and to tails of shield wires for insulation. Cable shields are to be made continuous except at current isolators, and except at the loop-current source, insulated from ground. The black insulated conductor of cables shall be the negative leg. Terminal block identities will be that of the cable conductor terminated thereon. The Contractor will assign all cable and cable conductor identities at time of submittals.
- D. Panels shall be completely shop assembled as shown in the plans and outlined in these specifications. They shall be totally operational upon connection to their external wiring.
- E. Enclosures are to be NEMA 3 Type manufactured by Hoffman Engineering Company. Doors are to be secured by a three point latching mechanism (a handle, latch, latch rods, adjustable rod guides and all hardware), and are to have a pad-lockable (3/8" dia. hole) door handle, catalog #C-WHPTO, a data pocket, catalog #A-DP2 and a folding shelf catalog #ACSHELF12 mounted to the inside of the door. Finish to be ANSI #61 white polyester urethane powder inside. This paragraph applies only if RTU is not located in an MCC Control Section.
- F. Conduit attachments shall be made using waterproof threaded hubs made up wrench tight against shiny-bare metal surfaces.
- G. An NEC sized equipment ground wire shall bond the backplate to the service ground bus.

- H. The Contrator will assign all wire number identities at time of submittals.
- I. Common wire ladder legs shall be double end connected to their source. That is, power to any device shall not be interrupted by a single open connection in the common wire.
- J. All interconnections between field wiring and panel components shall be done at terminal blocks on the back plate. Direct connection of field wiring to panel components is not acceptable.
- K. Manufacturer: Phoenix Contact terminal block #UK-5 with associated hardware
- L. All analog inputs and outputs shall be feed through a LED fused terminal block.
- M. Manufacturer: Phoenix Contact terminal block #UK 6-FSI/C with appropriate rated TCP series breaker
- N. Panel-door mounted components shall be connected using terminal blocks on the backplate, with the exception of ribbon-cable wired assemblies. Ribbon cables shall be routed and secured in a workman-like manner. Door harness groups shall be limited to a 12 conductors and/or cables. Sufficient slack shall be allowed in harnesses to allow panel door to open fully without harness becoming taut. Harness bundles shall be covered with a chaff resistant material.
- O. Wire nuts and/or butt splices are not acceptable anywhere within the enclosure.
- P. Wire duct of the slotted pattern design, a minimum of 1 1/2" width, shall be used to route wiring on the backplate. Hole pattern and/or adhesive mounted wire duct are not acceptable.
- Q. Manufacturer: Panduit white in color (slotted only)
- R. Panels having more than (10) conductors and/or cables leaving the enclosure, shall have wire duct mounted on the field side of terminal blocks as well.
- S. Cable tie practices set forth under the "Conductors, Termination and Splices" section shall be adhered to.

2-10 CONDUCTORS, PANEL WIRING

- A. Process control wiring limited to 10 amps or less shall use #16 AWG MTW insulated wiring.
- B. Color code for conductor insulations is to be as follows:

Ungrounded 120 VAC	Red
Grounded 120 VAC	White
Foreign voltage	Yellow
+24VDC	Blue
-24VDC	Purple
24VAC L1	Orange
24VAC N	White
Grounding	Green

- C. Wire Label Conventions for Cabinet Control Wiring
- D. All wire labels are to be read top to bottom or left to right.
- E. All power wire terminations shall be configured as line on top and load on the bottom. If terminations are horizontal, line shall be on the left and load on the right.
- F. All control wire terminations from the field shall be on the opposite side of all control equipment.
- G. These wiring conventions will be utilized on new installations, remodel or rework.
- H. Wire Label Convention for Discrete and Analog I/O's
- I. All wires must enter or exit through a terminal strip to the PLC
- J. All labels to be top to bottom and left to right.
- K. The 24vdc power supply shall have the D.C. power labeled as follows:

+ wire shall be labeled +24vdc from the power supply to the top of the D.C. circuit breaker. The bottom of the circuit breaker shall be labeled per the circuit breaker designation i.e. CB-6 etc and connected to the top of a terminal strip. AB jumpers will be used for additional distribution terminals if required.

- wire shall be labeled DCGRND from the power supply to the top side of a terminal strip. AB jumpers will be used for additional distribution terminals if required.

+24vdc power to Momentum bases shall be labeled as follows:

The +24vdc power (labeled per the circuit breaker it is derived from i.e. CB-6 etc.) shall terminate at the topside of a fused disconnect. Multiple fused disconnects if side by side can be jumpered together. The wire on the bottom side from the fuse block to the PLC shall be labeled L+ for the first row on the PLC base and sequentially for additional rows

i.e. 1L+2L+ etc. Additional bases if required shall continue the sequence i.e. 3L+4L+etc.

M- wires shall be labeled M- for the first row on the PLC and sequentially for additional rows i.e. 1M-, 2M- etc. Additional bases if required shall continue the sequence i.e. 3M-, 4M- etc. All M- shall then terminate at the DCGRND terminal strip.

All DI's, DO's, AI's and AO's start at 00 and are sequential.

- The +24vdc power (labeled per the circuit breaker it is derived from i.e. CB-6 etc.) for all field inputs shall terminate at the topside of the fuse holder. The wire from the bottom side of the fuse holder and the top side of the terminal strip shall be labeled as DC-1 for the first base and continued sequentially for additional bases i.e. DC-2, DC-3 etc. They will be fused at 1 amp. The DC power can use Phoenix Contact fixed bridge strips to provide every other terminal +24vdc for field distribution and allow 00A and 00B wires to be terminated next to each other at the terminals. Terminals on the PLC shall not be used for DC distribution.
- DI and DO's will have an A on the field wire side and a B on the PLC wire side. i.e. DI-00A for the field side of the terminal and DI-00B for the input to the PLC. DO-00A for field (DCGRND) and DO-00B for the output of the PLC.

AI's shall be labeled and terminated as follows: X X = assigned number

The + side of a field device will be AI-XX- and will terminate at the - input to the.

- The side of a field device will be connected to DCGRND.
- The + input to the isolator will be connected to +24vdc through a 1/16amp fuse and labeled AI-XX+. The +24vdc shall be labeled per the circuit breaker it is derived from i.e. CB-6 etc.
- Momentum bases have different configurations for analog inputs and need to be labeled and terminated as follows:
- For voltage analog inputs (1-5vdc) the + output of the Weidmueller isolator shall be labeled AI-XX+V and connected to the voltage input of the momentum. The – output of the Weidmueller isolator shall be labeled AI-XX-V and connected to the Analog ground input of the momentum and there shall be a 0.1% 250 ohm precision resistor installed across the output of the Weidmueller isolator to provide the voltage input to the momentum.
- For current analog inputs (4-20ma) the + output of the Weidmueller isolator shall be labeled AI-XX+A and connected to the current input of the momentum. The –output of the Weidmueller isolator shall be labeled AI-XX-A.
- If only one analog ground terminal is available at the Momemtum (usually term 13) then all AI-XX – wires will terminate at terminals jumpered together and connect to the PLC through a wire labeled AGND at both the terminal strip and the PLC.

AO's shall be labeled and terminated as follows: XX = assigned number:

- The + output of the momentum shall be labeled AO-XX+V and connect to the + input of the Weidmueller isolator through a 1/16 amp fuse.
- The output of the momentum shall be labeled AO-XX –V and connect to the input of the Weidmueller isolator.

- The + output of the Weidmueller isolator shall be labeled AO-XX+A and connect to the + terminal on the field device.
- The output of the Weidmueller isolator shall be labeled AO-XX –A and connect to the terminal on the field device.
- 2-11 RACEWAYS, BOXES, AND FITTINGS
 - A. Rigid conduit shall be a minimum 3/4" trade size.
 - B. Gunpowder-tool anchoring methods are not acceptable.
 - C. Liquidtight flexible conduit shall be 1/2" trade size, except where required by NEC to be larger. Length shall not exceed 36" (excluding well motor junction enclosures).
 - D. Fittings and conduit body materials shall match conduit.
 - E. Spare conduits shall have a pull string installed and be identified as to destination.
 - F. Conduit risers into concrete pad mounted enclosures (SES and MCC sections) may be non-metallic only if GRC 90 degree bends are used below SES and MCC sections.
 - G. All exposed risers shall be rigid conduit. Such risers, if originating from non-metallic conduit runs, shall incorporate GRC 90 degree bends.
 - H. Freestanding conduit risers shall be rigid conduit and supported by galvanized or stainless framing channel secured to a concrete pad.
 - I. Raceway construction shall be complete, cleaned and protected from entrance of foreign matter prior to wire pulling. UL listed pulling compounds shall be used to reduce pulling tensions.
 - J. All raceways shall contain at least one equipment grounding conductor.
 - K. Threads shall be made up wrench tight at each connection.
 - L. Prior to concrete pouring, any raceway to be embedded shall be approved by the Inspector.
 - M. Raceway supports of hot-dip galvanized framing channel shall be used to support groups of conduit. Individual conduit supports shall be one-hole galvanized malleable iron pipe straps with galvanized iron clamp backs and nesting backs where required. Ceiling hangers shall be adjustable, galvanized steel rod hangers. Hanger rods shall be 1/2" all-thread rod.
 - N. All conduit used at lift or sulfide stations shall be PVC coated GRC.

2-12 CONDUIT BOXES AND FITTINGS

- A. Boxes for use outdoors and in process areas shall be hot-dip, galvanized cast ferrous alloy type FD with integrally cast threaded hubs for conduit entry, and screw taps for fastening covers. Gaskets shall be provided and made of neoprene.
- B. Boxes larger than FD boxes shall be welded steel and hot-dip galvanized after fabrication.
- C. Conduit bodies shall be ferrous alloy type with screw taps for fastening covers. Gaskets shall be made of neoprene.
- D. Threadless fittings, aluminum conduit bodies or conduit bodies of the cross configuration or conduit bodies employing wedge-nut cover attachment are not acceptable.
- E. Except at eccentric or concentric knockouts on service entrance equipment, conduit attachment to sheet steel enclosures shall be made using weather proof threaded hub fittings, wrench tightened against shiny bare-metal surfaces.
- F. Manufacturer: Appleton, OZ Gedney

2-13 CONDUIT - GALV. RIGID

- A. Galvanized rigid conduit, elbows, sweeps, and couplings shall be hot dipped galvanized with zinc coated threads and outer coating of zinc bichromate conforming to ANSI C80.1 and FED. SPEC. WW-C-581.
- B. All parts of conduit runs in contact with earth shall be PVC coated as specified elsewhere in these specifications or shall be half-lap covered with 10 mil pipe-wrap tape.
- C. Conduit shall be supported away from the supporting surface by use of hot dipped zinc galvanized framing channel or by malleable iron hot dipped galvanized one hole clamp backs and nestback as required. Clamps, clamp backs and nestbacks are to be of the same manufacturer.
- D. All GRC exposed threads must be cold galvanized painted prior to installation.
- E. Bonded expansion couplings are to be provided for each 100 foot of exposed conduit run and/or across structural expansion joints.
- F. Freestanding conduit risers shall be supported by galvanized or stainless framing channel secured to a concrete pad. Such risers, if originating from non-metallic conduit runs, shall incorporate GRC 90 degree bends.
- 2-14 CONDUIT PVC COATED RIGID

- A. All applicable work practices of CONDUIT RIGID Section shall apply to this section.
- B. Galvanized rigid steel coated conduit shall have a 40-mil PVC coating bonded to the galvanized outer surface of the conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the coating. Zinc surfaces, both inside and outside the conduit, shall remain intact and undisturbed throughout the preparation and application process.
- C. A PVC coating shall be bonded to the outer surface of all conduit bodies and fittings and a PVC sleeve shall extend from all hubs. The wall thickness of the coating on conduit bodies and fittings and the sleeve walls shall be identical to those on couplings in length and thickness. The covers on all conduit bodies shall be coated on both sides and shall be designed to be completely interchangeable. The inside of conduit bodies shall remain undisturbed in the processing and shall retain the manufacturer's cadmium plate-aluminum paint finish. Type 304 stainless steel screws shall be furnished and used to attach the cover to the conduit body.
- D. All coated material shall be installed and patched according to the manufacturers installation and patching instructions. Conduit securing hardware shall be coated.
- E. PVC coated conduit, elbows and fittings shall be as manufactured by RobRoy or Plasti-Bond Corporation.
- F. All PVC coated conduit shall be painted to match surrounding paint colors.
- 2-15 CONDUIT NONMETALLIC
 - A. Rigid non-metallic conduit shall be NEMA schedule 40 or 80 PVC. All cut ends shall be reamed and fittings made up using PVC solvent-weld type cement.
 - B. PVC use shall be restricted to horizontal unexposed runs. Exception: vertical risers are permitted where entering concrete pad-mounted enclosures.
 - C. Nonmetallic condulets and boxes shall have type 304 stainless steel cover screws.
 - D. Manufacturer: Carlton

2-16 CONDUIT - LIQUIDTIGHT FLEXIBLE METAL

- A. Liquidtight flexible steel conduit shall conform to UL 360 standard and Fed. Spec. WW-C-566. It shall be the final raceway to all equipment where vibration will be present. It shall be used at all conduit served instrumentation devices.
- B. Extra-flexible type shall be used.
- C. Aluminum liquidtight flexible conduit is not acceptable.

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- D. Maximum length shall be limited to 36" except where permitted to be longer by the Inspector.
- E. Manufacturer: Anaconda or Alflex
- 2-17 CONDUIT LIQUIDTIGHT FLEXIBLE METAL FITTINGS
 - A. Manufacturer: Thomas Betts
- 2-18 CONDUIT LIQUIDTIGHT FLEXIBLE NONMETALLIC
 - A. May be used indoors in wet or caustic conditions.
 - B. Manufacturer: Hubbell
- 2-19 CONDUIT LIQUIDTIGHT FLEXIBLE NONMETALLIC FITTINGS
 - A. Manufacturer: Hubbell
- 2-20 CONDUIT FLEXIBLE METAL
 - A. Shall not be used.
- 2-21 ELECTRICAL METALLIC TUBING
 - A. Shall not be used.
- 2-22 CONDUCTORS, TERMINATIONS AND SPLICES
 - A. All 600 V. insulated conductors shall be copper with a minimum of 19 strands. An exception is permitted for Premises Wiring of these specifications, seven strand wiring being acceptable for those purposes. Conductors #8 AWG and larger shall be 90° C XHHW-2 and conductors #10 AWG and smaller shall be 90° C THHN/THHW-2.
 - B. Solid conductors are not acceptable.
 - C. Manufacturer: Essex Wire & Cable, Capital Wire & Cable and General Cable Co.
 - D. 600 volt insulated conductor color coding shall be as follows:

	Power	Premises
	(480V)	(208/120V/240)
Phase A	Brown	Black

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Phase B	Orange	Red (orange if delta derived)
Phase C	Yellow	Blue
Ground	Green	Green
Neutral	White	White

- A. The above color chart shall be used in determining the insulating colors of all conductors 750 MCM and smaller except where noted in specifications.
- B. Field wiring conductors for process control circuits fused 10 amps or less shall be #14 AWG MTW.
- C. Control field wire color coding shall be as follows:

Ungrounded 120 VAC	Red
Grounded 120 VAC	White
+24VDC	Blue
-24VDC	Purple
Grounding	Green

- D. Sufficient slack shall be provided in all enclosures to allow conductors and cables to be routed neatly along surfaces.
- E. Wires shall be bundled and secured as required for a neat appearance, using cable ties. Adhesive cable tie anchors are not acceptable. Epoxy or bolt type tie anchors are acceptable. Cable ties are to be tensioned and cut off, using a tool specifically designed for the purpose such as a Panduit GS2B. Improperly cut cable ties will be rejected.
- F. All control wires and instrumentation cables entering or leaving enclosed process control panels, motor control centers or SCADA RTU cabinets shall do so via terminal blocks. No more than two conductors are to be secured per terminal block screw.
- G. Manufacturer: Phoenix Contact terminal block #UK-5 with associated hardware
- H. All tool compressed wire terminals and lugs shall be made-up using the specific hand or hydraulic tool recommended by the manufacturer of the item.
- I. Wire terminals and lugs shall be copper and of the compression type using an anti-seizing compound. Split bolt, mechanical clamp, dimple or screw-type connectors shall not be used.

- J. Manufacturer: Thomas & Betts Corp., Panduit Corp.
- K. For fractional horsepower motor leads, receptacles and lighting, the use of properly sized and applied wire nuts and fork-style wire terminals are acceptable in field wiring.
- L. Splicing of conductors in conduit bodies is not acceptable.
- M. No splices will be permitted below grade except those indicated in the plans.

2-23 GROUNDING AND BONDING

- A. Where multiple grounding conductors terminate in an enclosure, a multiple ground bar shall be used. Grounding conductors shall not be wire nutted together.
- B. All metal conduit shall be bonded to the service ground-bus. Conduit shall not be the sole means used to ground equipment. All types of conduit are to contain an equipment grounding conductor.
- C. Where required, conduit bonding bushings shall be of the set screw locking, bond wire lay-in connection, insulated throat design.
- D. On new water well projects, the well casing shall be employed as a grounding electrode as specified in Article 250-81 (a) NEC.

PART 3 INSTRUMENTATION

3-01 GENERAL

- A. Instrumentation shall include furnishing, delivering, installing, adjusting, calibrating, testing, identifying, painting and placing in satisfactory operation all systems described herein and required for a complete installation. The work shall include all elements of the systems specified. The work shall also include operating instructions, shop and field tests, installation, services of manufacturer's engineer, and placing the equipment in satisfactory operation.
- B. Instruments, controls and appurtenances shall be designed to measure, indicate, record and control accurately over their entire range under continuous service. Like instruments shall be from the same manufacturer. All instruments on a single control panel shall be similar in design, appearance and finish. All equipment shall be of rugged and substantial construction, and built of non-corrosive materials particularly adapted to the service required.
- C. Review of drawings submitted prior to the final determination of related equipment shall not relieve the Contractor from supplying systems in full compliance with the specific requirements of the related equipment.

3-02 COORDINATION

A. Instrument, metering, and control systems supplied under this section shall be designed and coordinated for proper operation with related equipment and materials furnished by other suppliers under other sections of these specifications, under other contracts, and where applicable, to related existing equipment. All instruments and control devices shall be applied in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the instrument or device manufacturer, and the related equipment manufacturer.

3-03 INSTALLATION DRAWINGS

A. The coordinating supplier shall prepare systems and installation drawings for all interconnecting wiring and piping between components of the systems furnished and for all interconnecting wiring and piping between the related equipment and the equipment furnished under this section. All interconnecting piping and wiring shall be appropriate for the service and shall result in a properly functioning metering or control system.

3-04 INSTALLATION

A. Experienced and competent supervision and qualified instrumentation technician (qualified instrumentation technician will have 10 years minimum experience) shall be provided for installation of the equipment in full accordance with the drawings and instructions of the coordinating supplier. The services of the coordinating supplier's technical representative shall be

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provided as necessary to calibrate, test, and advise others of procedures for adjustment and operation.

3-05 FIELD-MOUNTED INSTRUMENTS

A. Instruments shall be mounted so that they may be readily approached and easily serviced.

3-06 CERTIFIED FIELD CALIBRATION

A. The field calibration will be performed by a certified factory technician of the manufacturer and delivered to the Owner after completion of all work and prior to acceptance by the Owner If any work is done or modifications made to any component or wiring of the system after completion of the certified field calibration, the system shall be re-calibrated in the field by the manufacturer's certified factory technician. The Contractor any of his employees or the manufacturer's sales representative will not be accepted as bona fide certified factory technicians.

3-07 SYSTEMS CHECK

A. A technical representative of the manufacturer shall participate in the checkout of metering systems.

3-08 INSTALLATION TEST EQUIPMENT

A. The Contractor shall provide all necessary test equipment for calibration and check of system components. This test equipment shall have been calibrated to manufacturer's specifications using test equipment traceable to National Institute of Standards and Technology (NIST) or other recognized standards or standards laboratories. It shall have a current Certificate of Calibration, Cal sticker, and seals showing that the test equipment has been calibrated within the previous twelve months.

3-09 METERING REQUIREMENTS, GENERAL

A. All equipment furnished under this section shall be expressly selected by the equipment supplier for its superior quality for its intended performance and shall be installed in accordance with the manufacturer's instructions. Equipment and materials used shall be subject to review and shall comply with the following requirements.

3-10 POWER AND INSTRUMENT SIGNALS

A. Unless noted otherwise, electrical power supply to the instrumentation equipment will be unregulated 120 volts ac. All transmitted electronic analog instrument signals shall be 4-20 mA dc and shall be linear with the measured variable.

3-11 POWER SUPPLIES

- A. D.C. power supplies shall be regulated for input voltage variations of plus or minus 10 percent and be overload protected. Output regulation shall be equal to or exceed that specified by the manufacturers of the equipment which it is to serve. Power supplies serving more than one current loop and/or control system shall have individual Phoenix Contact circuit breakers for each circuit. Such circuit breakers shall be readily accessible and clearly labeled. All power supplies shall be oversized by 25 percent for future loads. Power supplies are to be of a single output voltage type.
- B. Manufacturer: Power One 24VDC W Series DIN Rail Converters.

3-12 SCADA REMOTE TERMINAL UNIT

A. High Level Requirements

The Remote Terminal Unit (RTU) shall be a high performance device with built in advanced networking features. The unit must incorporate scalability and modularity to optimize the performance of the specified control system. The unit shall be of rugged, industrial design that meets the harsh environmental requirements listed later in the Technical Specifications.

B. Basic RTU Requirements

The RTU shall use an advanced hardware design utilizing current hardware components and software solutions for operation, programming, diagnostics and meet all of the following basic requirements Utilize a real-time high-performance (minimum 500MIPs) processor

Employ a true real-time operating system, (units running office operating systems such as Windows or Linux are not acceptable)

Include built-in multiple Ethernet ports 10/100 MB (expandable to three ports) Include built in multiple serial ports Rs-232/RS-485 (expandable to four ports) Include integrated wireless modems (two wireless networks minimum) Universal design suitable for industrial enclosures or 19" rack installation 19" rack mountable on a multi-slot frame, with a modular expandable

configuration to support small to very large I/O configurations Industrial enclosures - NEMA 4X Housing, 40 x 40 cm and 50 x 50 cm Single density I/O modules for stringent industrial applications Double density I/O modules for cost effective SCADA solutions Support Hot-Swap I/O replacement

Manufactured to meet world wide RoHS standards for environmentally friendly materials

Minimum operating temperature range -40 to +70 °C.

Universal AC and DC controlled power supplies with integrated and optimized battery charger

Integrated and modular backup battery up to 10 Ah

GPS receiver support for time synchronization

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Posses sufficient memory capacity to make control decisions on-site based on status conditions and values received from local and remote sources Be equipped with multiple and versatile communication ports that allow reliable interface to a wide range of wireless analog or digital communication media

Be suitable for interfacing to versatile intelligent sensors via RS-232 or RS-485 or IP ports and have the ability to speak their native protocol System building tools for configuration and programming Remote firmware and program download

C. Detailed RTU Information

The Remote Terminal Unit (RTU) shall be an intelligent unit capable of performing data acquisition, data processing and local control. It shall be able to monitor and activate or exchange information with local equipment in a stand-alone mode, as well as being an intelligent communications node in a distributed communications network.

The RTU shall be microprocessor based to allow reconfiguration and optimization to be performed via software only. The I/O shall be of modular construction when large I/O capability is required or future expansion is expected, but shall offer cost effective combination I/O modules when the site I/O requirement is small.

The RTU must be supplied with the number and type of I/O points described later in these specifications. Future expansion of the RTU shall be possible by simply plugging additional I/O modules into vacant/available slots. The RTU must include the two-way radio or other device that will be used for communications. In the case of radio, the manufacturer of the radio and the RTU shall be the same to ensure proper integration and certified and supported performance.

A personal computer (Windows based) shall be used for program application development, system configuration, and diagnostics as well as for downloading new applications/ configuration either directly to the RTU or through the systems data communications channel(s).

D. Communications

The RTU must be a true multi-port device and be able to concurrently communicate with hierarchies above it (RTU to multiple control centers or subcontrol centers), with hierarchies parallel to it (RTU-to-RTU) and hierarchies below it (RTU master to other RTUs, PLCs or IEDs–Intelligent Electronic Devices).

The RTU shall support a variety of communications media and data transmission rates, including VHF and UHF conventional radio, Trunked radios, Multiple Address System (MAS) data radios, Spread Spectrum licensefree radios, microwave, satellite, etc.

Any selected RTU shall be able to operate as a store and forward repeater to allow future extensions of the system beyond the reach of the main transmitter site. When S&F function is implemented, the RTU shall perform error

checking on the received message and corrections as needed prior to retransmission.

To allow future upgrades, the RTU shall be programmable to act as a communication node between two or more media connected to its ports and if required, using different protocols.

The RTU shall be programmable to operate in Polling or Report by Exception modes; each mode of operation providing reliable message acknowledgement to the sending site.

The RTU shall be able to operate in burst mode (suitable for non-critical messages) when it is not required to confirm the received message. Upon sending a Report by Exception message, the RTUs shall be programmable to efficiently deal with avalanche conditions (multiple RTUs sending messages).

The RTU shall be capable of operating over a range of physical wire-line media, including Local and wide Area Networks, point-to-point wire-lines, Fiber Optics, Public Switched Telephone Networks (PSTN), and/or a combination of all these, thus forming a complete, integrated SCADA systems. The RTU shall be able to communicate over four (4) links simultaneously as a minimum; e.g. on Link 1 via RS-232 or RS-485; on Link 2 via RS-232, or external modem; on Link 3 via radio modem or optional 3rd RS-232, on Link 4 via 100/10MB Ethernet LAN.

E. Native Data Protocol

The data communications shall utilize a secure, smart protocol proven in twoway, over-the-air radio or network conditions. This fully distributed protocol shall allow for the most complex hierarchical system structures of multiple host computers and sub-master stations. The native protocol suite shall be suitable for operation over multiple networks, both wireless or land-based and supplied with tools that allow the user to configure the transmission parameters, communications modes and handshaking for optimal utilization of the network and allow for both fast messaging and bulk messaging in the most efficient, fast and secure manner. Support must include as a minimum: RS-232 links, RS-485 links and network topologies, Ethernet LAN links, and Wide Area IP Networks.

The system structure shall be completely transparent to the system operator or engineer, and have the following minimum capabilities: Packet oriented with high efficiency, variable length messages. Adhere to the seven layer ISO reference model used SCADA systems (wired and wireless media) for Open Systems Interconnection (OSI). Have the ability to transfer complete programs and historical data files between RTU and the central or between any RTUs in the system. Allow complete configuration and hardware/software diagnostics to be transferable from/to the Central site or from RTU-to-RTU. This shall allow for complete RTU/system debugging without the need for visiting each remote site. Support third party protocol encapsulation mode or emulation mode using C-

programming tools.

F. Third Party Standard SCADA Protocols

ELECTRICAL / INSTRUMENTATION 16710 December, 2015 The RTU shall be able to use a wide range of SCADA protocols to allow the integration of elements from different SCADA Vendors. The RTU shall support as a minimum: DNP-3.0, IEC60870-5-101, and Modbus.

G. Communication Formats

In addition to the traditional, though frequently inefficient master/slave polling regime, where the control center polls (interrogates) the RTU in a pre-defined sequence, the RTU shall support a number of more efficient contention formats. The RTU must be able to initiate data transmissions under these conditions: Unsolicited Report-By-Exception (contention) – Automatically transmits alarms to the control center as soon as they occur, without waiting for polling to occur

Poll-by-Exception – Upon a polling request, it transmits only predefined status changes (not the entire input status list).

Analog Delta Limit Windows - Automatically transmit analog data, such as temperature or flow, only when the value differs from the last transmitted value by a predefined percentage.

Timed Transmission - Transmit data after a programmed time interval or upon a defined event.

Channel Checking - Prior to any transmission, the RTU shall check for a free channel.

Special Communications Requirements

In addition to the prior communication configurations, the RTU must also be able to support the following special modes.

Shared Transceiver Mode: The RTU must be able to share its communications media (radio, wireline, etc.) with other RTUs located nearby to reduce costs of the communications link.

Store and Forward (S&F) Data Repeater: Each RTU shall be able to receive information from other sites, store it and then re-transmit (relay) it to another site via either the same physical medium on which it received the information or via an alternate medium. This feature is very useful for simplex

communications to send information along a ribbon type network, eliminating the need for expensive high-powered transmitters at many sites.

Network Node: Interconnection point between different communication media, e.g., be able to route information from radio to wireline, between different radios or different radio frequencies, from Wireline or network to radio, etc. This feature shall be useful when the normal communication route is blocked, so that information can be sent to the Control Center via an adjacent RTU (automatic alternate rerouting).

Trunked Radio Interface: Each RTU, with appropriate interface, shall be able to be used in a Trunked radio communication system, analog or digital, even if this is not specified in the specific requirements section.

Group Broadcasts (Set Call): The control center shall be able to simultaneously transmit (broadcast) data to a defined set of locations, where the set may have a number of qualifications (parameters) if the communications infrastructure supports this mode of operation. Any change in an RTU or system data (i.e.

time synchronization, mode switching, etc.) shall also be able to generate such Group Broadcasts.

H. Communication Upload and Download features

To minimize remote site visits by operating or maintenance personnel after the RTU installation, the system shall support data transfer capability as follows: Uploads of the data collected and calculated by the application program of the RTU to a central site. Reception by the RTU of changes to downloaded application program. Reception by the RTU of the control application parameters, variables and site

Reception by the RTU of the control application parameters, variables and site specific limits Remote safe firmware upgrade (download to the RTU) from anywhere in the

Remote safe firmware upgrade (download to the RTU) from anywhere in the system's network.

The above transactions shall be possible to/from the RTU from anywhere in the network, either from/to the control center or any other RTU in the system.

I. RTU Hardware

Basic Processor

The basic processor (CPU) of the RTU shall be a real time process controller and support the following functions: Bus communication with I/O modules System memory allocation Communication port control System parameter/logic programming The CPU shall be a high speed (min, 200MHz clock rate) 32 bit CMOS microprocessor, with extended communication capability, DMA (direct memory access) and floating point calculation support. The CPU shall be equipped with different types of memory for different user applications: SDRAM – minimum of 32 MB FLASH Memory - minimum of 16 MB SRAM – 4MB (optional) Full calendar year with leap year support (Year, Month, Day, Hours, Minutes, Seconds, Milliseconds)

The RTU shall be able to support at least the listed types of built-in communication ports with the following characteristics: Serial – up to 4 x RS-232 Multi-drop – up to 3 x RS485 ports Ethernet – up to 2 x 10/100 MB ports and 1 x 10 MB port 2-way radio/analog trunked radio – up to 2 x modem ports

J. Input/Output Modules

General

The RTU shall be capable of addressing a variable I/O count by the addition of modules. Each module shall communicate with the CPU module via a high-speed data bus. Space for a minimum of 3 I/O modules shall be provided and more as required in the detailed I/O section of the specifications.

LEDs shall be provided to indicate the status of the I/Os on all modules. All I/O regardless of type shall meet the following regulatory standards: Safety UL 60950-1:2001

> CSA 22.2-60950-1 IEC 60950-1 AS/NZS 60950

2.2.1.4 Emission standards per:

CFR 47 FCC part 15, subpart B (class A) EN55022:2003 Class A EN61000-3-2 EN61000-3-3

2.2.1.5 Immunity standards for industrial environments per

EN50082-2 /IEC 61000-6-2

IEC 61000-4-2

IEC 61000-4-3

IEC 61000-4-4

IEC 61000-4-5

IEC 61000-4-6

IEC 61000-4-11

Detailed technical Specifications of I/O Modules

2.2.3.6 Mixed I/O 16DI + 4 DO + 4AI module SPECIFICATIONS

Total Number of Inputs/Outputs 16 Digital Inputs + 4 EE Relay Outputs + 4 Analog Inputs, ±20 mA

16 Digital Inputs + 4 ML Relay Outputs + 4 Analog Inputs, ±20

I/O Arrangement 1 group of 16 DIs with shared common, 4 relay outputs -Form C, 4 isolated analog inputs

DI Counter Inputs All inputs can be configured as fast counters

DI Frequency 0 - 1 KHz

mA

DI Fast Counter Frequency 0 - 5 KHz

DI Max. DC Voltage Max. 40 V DC

DI "ON" DC Voltage Range +11 to +30 V DC

DI "OFF" DC Voltage Range -5 to +5 V DC

DI Current 6-10 mA

Fast Capture Resolution1 mS (Interrupt upon change of state)

Event Time Tagging Resolution 1 mS (Interrupt upon change of state)

DI Filtering 0 to 255 mSec (DC, programmable in 1 mSec steps)

DI Counter Filtering 0 to 6.375 mSec (programmable in 0.025 mSec steps for inputs configured as high speed counter)

DO Contact Voltage Ratings Max. 60 V DC or 30 V AC RMS (42.4 V peak).

DO Contact Power Ratings 2A @ 30 V DC, 0.6A @ 60V DC or 0.6A @ 30V AC (resistive load)

DO Relay Back Indication Contact position - hardware back indication DO Fail State Configurable relay state on CPU fail: On, Off or 'last value'

AI Resolution 16 Bit (including sign)

AI Accuracy $\pm 0.1\%$ @ -40° C to $+70^{\circ}$ C

AI Sampling time 10 mSec @ 50 Hz filtering, 8.33 mSec @ 60 Hz filtering AI Smoothing Selectable input averaging: 2, 0, 8, 16, 30, 60 or 128 samples

AI max. potential between AIs 75 V DC, 60 V AC (RMS) AI Impedance $Rin < 250 \Omega$ AI Crosstalk Rejection Better than 80 dB between any pair of inputs AI Temperature Stability 25 PPM/°C AI Interference Suppression Selectable 50 or 60 Hz filtering, common mode rejection > 80 dB, differential mode rejection > 50 dB Diagnostics LEDs LED per each input/output status, module error LED 24 V DC Output Supports one isolated 24V/0.35 A plug-in"Wetting" Power Supply User Connection 4 Terminal Blocks (3.5mm pitch), Maximum 18 AWG Cable & TB Holder **Input Insulation** Insulation resistance 100 M Ω @ 500 V DC per IEC255-5 Operating Voltage 10.5-15.5 V DC and 3.3 V DC (from the motherboard connector)

- 2. RTU Software
- B. Application Software

The RTU shall be programmed with a high level, multi-tasking ladder diagram language which includes Boolean and arithmetic functions as well as specialized blocks such as proportional, integral, derivative (PID) control and American Gas Association (AGA) flow calculations.

The ladder diagrams or "C" programs shall be used for process definitions, data base and RTU profile as well as symbolic monitoring and debugging. The RTU application shall be defined using a stand-alone programming package – System Tool Suite (STS) running on a Windows XP computer. This STS shall allow the user to develop and download the site and system configuration as well as all local application programs, plus provide source level debugging. This terminal may be connected either locally via serial port or remotely from any site in the RTU system through the designated system communication channel.

Cross-network real-time synchronization (involving one or more media, but not Ethernet) via the network should be done with an accuracy of 5 milliseconds.

C. RTU Configurator and ToolBox Software General

The RTU shall use a Programming Software, Software Tool Suite (STS) a Windows based package of programs. It shall enable the system user to define and maintain the RTU system in accordance with user requirements without interrupting the real-time operation of the system. The RTU programming software shall be designed such that it will automatically create all software entities needed to support the different hardware modules and communication ports as configured by the system engineer.

Software Tool Suite Capabilities

Be able to program the RTU application including definition of the RTU configuration, system configuration, communications network setting and RTU application (database and process).

Download to the RTU or upload from the RTU, the full or partial database, either via a local connection or over the communications channel. Monitor on-line the RTU operations.

Perform remote software diagnostics. This program shall enable diagnostics of the RTU system software; by requesting diagnostics of each software module (object) using its logical name.

Perform hardware tests and calibrations. This shall allow the technician to verify the proper functioning of the I/O modules.

- Perform debugging of the application program in the RTU. The debugging tool shall use a protocol analyzer program to monitor the communication process, and enable selective display of sessions and protocol cross-sections that interest the application engineer.
- Each CPU shall be configurable to serve as a protocol analyzer interface between the link, which is to be checked and the computer. Configurator Capabilities

Be able to define the system configuration and communications settings.

Download to the RTU the full or partial database, either via a local connection or over the communications channel.

Monitor on-line the RTU operations.

Perform hardware tests and calibrations. This shall allow the technician to verify the proper functioning of the I/O modules.

Perform debugging of the application program in the RTU. The debugging tool shall use a protocol analyzer program to monitor the communication process, and enable selective display of sessions and protocol cross-sections that interest the application engineer.

Each CPU shall be configurable to serve as a protocol analyzer interface between the link, which is to be checked and the computer

Packaging

Physical Construction

- The RTU shall be completely modular in design and construction, allowing specific configuration by merely plugging in the appropriate CPU and I/O. All modules and their assembly shall be accomplished without screws or fasteners of any type. All connections shall utilize a "snap-in" action.
- All components shall be completely solid state making extensive use of CMOS, LSI and ASIC circuitry. No jumpers, DIP switches, or adjustable potentiometers shall be allowed. All calibrations must be done via communications and RTU software.
Front access to all controls, indicators, RAM battery and external connection cables shall be provided, except in the modular RTU in a 19" rack-mount configuration where rear end access is permitted. Motherboard interconnection between I/O modules shall be direct no daisy chain or multiple ribbon cable connections will be allowed. Enclosures

The RTU shall be available in a variety of wall mounted NEMA-rated painted-steel housings of category 2, 4, 12 or 13. Stainless Steel housings plus an industry standard 19" (inch) rack mounting assembly shall also be available.

Environmental

The RTU shall operate over an ambient temperature range of -40° C to $+70^{\circ}$ C with relative humidity <95% @ 50° C.

3-13 MEASUREMENT SYSTEM

3-14 FLOWMETER

A. Refer to Division 15 specification.

3-15 FLOWMETER SIGNAL CONVERTERS

A. Signal converters shall be provided for the flowmeter. Converter will be remote mounted on a wall or stand near the meter. The signal converters shall have all solid-state circuitry and shall have automatic quadrature rejection. The system accuracy, including the magnetic flowmeter transmitter and signal converter shall be plus or minus 0.5 percent of flow range for full scale settings of 3-30 feet per second. The signal cable between the converter and magnetic flowmeter shall be furnished by the meter manufacturer. The signal converter shall be housed in a corrosion resistant weatherproof NEMA 4 or NEMA 3R housing and shall be suitable for operation over an ambient temperature range of -30 F to +140 F with relative humidity of 10 to 100 percent. A shade cover shall be provided for the converter. The converter shall have an analog 4-20 ma and a pulse output. The pulse output shall be designed to operate a remote totalizer and shall be scaled so that the totalizer will operate for 60 days at 100% flow without repeating. Scaling factors shall be field adjustable and shall be selected to provide a totalizer multiplier power of 10. Converter shall be 120vac powered.

3-16 TOTALIZER

A. Totalizer shall have miniature rectangular, semi-flush counters, designed for use in conjunction with miniature indicators and recorders. The counter shall contain not less than seven digits with a multiplier of a power of 10 plainly engraved on the face of the

counter or on a nameplate below the counter so that a full range of 9,999,999 is reached before repeating. Totalizer shall not reset upon power failure.

B. Manufacturer: Love. Precision Digital

3-17 PRESSURE TRANSMITTERS

A. Not used.

3-18 PROCESS CONTROLLER

A. See 3-12 for information.

3-19 PANEL INDICATORS

- A. LED type indicators shall be 3-1/2 digit, LED readout, digital panel meters designed for 4-20 mA d-c input from a process transmitter. Indicators shall have adjustable span and zero for full-scale calibration of display in engineering units as scheduled. Accuracy shall be plus or minus 0.5 percent plus or minus one count. The indicator input shall be isolated. Power shall be 115-volt ac, 60 hertz. The indicator shall be contained in a NEMA 4 enclosure suitable for panel mounting.
- B. Manufacturer: Endress Hauser. Precision Digital, Love

3-20 SIGNAL ISOLATORS

- A. Current to current transducers shall be furnished and installed as required to eliminate interface and ground loop problems when connecting new instruments to other instrument loops.
- B. Isolators shall accept 4-20 mA DC input signals and produce a 4-20 mA DC output signal into at least 500 ohms while providing complete electrical isolation and power boosting. Input impedance shall be 50 ohms or less. Calibration accuracy shall be plus or minus 0.1 percent of span.
- C. Each isolator input shall be individually fused at 1/16 th amp.

D. Manufacturer: Weidmueller WAS5 CCC LP 0-20/0-20ma 8444950000 Phoenix Contact fuse block - UK 6,3-HESILED 24 Phoenix Contact end plate - E/NS 35 N Buss fuse - BK/AGC - 1/16

E. The Phoenix Contact fuse block, end plate and Buss fuse will be used on each Weidmueller isolator.

3-21 CABLE, INSTRUMENTATION AND SIGNAL

- A. Terminal blocks shall be provided at all cable junction points and at the point of the final enclosure entry for field cables. Each conductor and cable shall be identified at such junctions. Shields shall be grounded at the source point only. Cable ends shall be made up using heatshrink tubing.
- B. Cable shall be twisted shielded pair or triad as specified, 18 AWG, 16x30 stranded tinned copper with 300 volt polyethylene insulation, 100 % aluminum-polyester foil shield, 20 AWG stranded, tinned copper drain wire and overall PVC jacket.
- C. Manufacturer: Belden # 8760 (2 conductor), #8770 (3 conductor)

PART 4 TRAINING 4-01 DESCRIPTION

A. This section contains requirements for training the Owner's personnel, by persons retained by the Contractor specifically for the purpose, in the proper operation and maintenance of the equipment and systems installed under this contract.

4-02 QUALITY ASSURANCE

A. Contractor shall provide on-the-job training of the Owner's personnel. Qualified, experienced, factory-trained representatives of the various equipment manufacturers shall conduct the training sessions. Training shall include instruction in both operation and maintenance of the subject equipment.

4-03 SUBMITTALS

- A. The following information shall be submitted in accordance with the special provisions of the bidding and contract requirements. The material shall be reviewed and accepted by the Owner not less than 3 weeks prior to the provision of training.
 - 1. Lesson plans for each training session to be conducted by the manufacturer's representatives. In addition, training manuals, handouts, visual aids, and other reference materials shall be included.
 - 2. Subject of each training session, identity and qualifications of individuals to be conducting the training, and tentative date and time of each training session.

4-04 GENERAL

A. Contractor shall conduct training sessions for the Owner to instruct the staff on the proper operation, care, and maintenance of the equipment and systems installed under this contract. Training shall take place under the conditions specified in the following paragraphs. Approved operation and maintenance manuals shall be available at least 30 days prior to the date scheduled for the individual training session.

4-05 LOCATION

A. The Utility Operations Controls Section foreman shall determine training session's location.

4-06 LESSON PLANS

A. Formal written lesson plans shall be prepared for each training session. Lesson plans shall contain an outline of the material to be presented. Each plan shall contain a time allocation for each subject.

B. One complete set of originals of the lesson plans, training manuals, handouts, visual aids, and reference material shall be the property of the Owner and shall be suitably bound for proper organization and easy reproduction. The Contractor shall furnish sufficient number of copies of necessary training manuals and handouts for attendees, at least 1 week prior to each training session.

4-07 FORMAT AND CONTENT

- A. Each training session shall be comprised of time spent both in the classroom and at the specific location of the subject equipment or system. As a minimum, training session shall cover the following subjects for each item of equipment or system:
 - 1. Familiarization
 - a. Review catalog, parts lists, drawings, etc., which have been previously provided for the plant files and operation and maintenance manuals.
 - b.Check out the installation of the specific equipment items.
 - c. Demonstrate the unit.

d.Answer questions.

2. Safety

a. Using material previously provided, review safety references.

b.Discuss proper precautions around equipment.

3. peration

a. Check out Owner on proper use of the equipment.

b.Explain all modes of operation (including emergency).

- 4. Preventive Maintenance
 - a. Using material previously provided, review preventive maintenance (PM) lists including:
 - 1) Reference material.
 - 2) Daily, weekly, monthly, quarterly and annual jobs.

b.Show how to perform PM jobs.

- c. Show Owner's personnel what to look for as indicators of equipment problems.
- 5. Corrective Maintenance
 - a. List possible problems.
 - b.Discuss repairs--point out special problems.
 - c. Open up equipment and demonstrate procedures, where practical.
- 6. Parts

a. Show how to use previously provided parts list and order parts.

- b.Check over spare parts on hand. Make recommendations egarding additional parts that should be available.
- 7. Local Representatives

a. Where to order parts: Name, address, telephone.

b.Service problems:

- 1) Who to call.
- 2) How to get emergency help.
- 8. Operation and Maintenance Manuals

a. Review any other material submitted.

b.Update material, as required.

4-08 EXECUTION

- A. Training shall not be conducted in conjunction with the operational testing and commissioning periods. Classes shall be scheduled such that classroom sessions are interspersed with field instruction in logical sequence. The Contractor shall arrange to have the training conducted on consecutive days, with no more than 6 hours of classes scheduled for any one day. Concurrent classes shall not be allowed.
- B. Acceptable operation and maintenance manuals for the specific equipment shall be provided to the Owner prior to the start of any training.
- C. The following services shall be provided for each item of equipment or system.

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1. As a minimum classroom equipment training for personnel will include:

a. A working knowledge of the operating theory of the equipment.

- b.Startup, shutdown, normal operation, and emergency operating procedures, including a discussion of system integration and electrical interlocks, if any.
- c. Identify and discuss safety items and procedures.
- d.Routine preventative maintenance.
- e. Operator detection, without test instruments, to specific equipment trouble symptoms.
- f. Required equipment exercise procedures and intervals.
- 2. As a minimum, hands-on equipment training for owner will include:

a. Identify location of equipment and review the purpose.

b.Identifying instrumentation:

- 1) Location of primary element.
- 2) Location of instrument readout.
- 3) Discuss purpose, basic operation, and information interpretation.
- c. Discuss, demonstrate, and perform standard operating procedures and round checks.

d.Discuss and perform the preventative maintenance activities.

e. Discuss and perform startup and shutdown procedures.

f. Perform the required equipment exercise procedures.

g.Perform routine disassembly and assembly of equipment if applicable.

h.Identify and review safety items and perform safety procedures, if feasible.

Classroom equipment training for the maintenance and repair personnel will nclude:
a. Theory of operation.

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- b.Description and function of equipment.
- c. Startup and shutdown procedures.
- d.Normal and major repair procedures.
- e. Equipment inspection and troubleshooting procedures including the use of applicable test instruments.
- f. Routine and long-term calibration procedures.

g.Safety procedures.

4. Hands-on equipment training for maintenance and repair personnel shall include:

a. Locate and identify equipment components.

b.Review the equipment function and theory operation.

c. Review normal repair procedures.

d.Perform startup and shutdown procedures.

- e. Review and perform the safety procedures.
- f. Perform Owner approved practice maintenance and repair job(s), including electrical adjustments, calibration and troubleshooting equipment problems.

END OF SECTION