AECOM

ROSAMOND COMMUNITY SERVICES DISTRICT

Rosamond, California

BID DOCUMENTS & TECHNICAL SPECIFICATIONS

WWTP Grit Removal System Improvements

October 2026





DOCUMENT 00 0101

PROJECT MANUAL

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

Bid Opening Date
TUESDAY, DECEMBER 15TH, 2026 at 2:00 P.M.

Rosamond Community Services District

RCSD Project Number: 22515
Approved: Board of Directors
Required Contractor's License Classification: Class A
Construction Estimate: $2,991,000

Rosamond Community Services District
3179 35th Street West
Rosamond, CA 93560

MANDATORY PRE-BID JOBWALK

DATE: THURSDAY, NOV 19TH, 2026, at 10:00 A.M.

INTERESTED CONTRACTORS SHALL ASSEMBLE AT THE ROSAMOND COMMUNITY SERVICES DISTRICT OFFICE LOCATED AT

3179 35TH Street West,
Rosamond, CA 93560

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DOCUMENT 00 0105

CERTIFICATIONS PAGE

PROJECT TITLE:	**WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS**
LOCATION:	Rosamond Wastewater Treatment Plant, 875 Patterson Road, Rosamond, CA 93560
RCSD PROJECT NUMBER(S)	22515
OWNER:	ROSAMOND COMMUNITY SERVICES DISTRICT 3179 35TH STREET WEST ROSAMOND, CA 93560 TEL: 661-256-3411 FAX: 661-256-2557
OWNER'S PROJECT MANAGER:	General Manager or its Designee
CONSULTANT/PROJECT ENGINEER:	AECOM Technical Services, Inc. 5001 E. Commercenter Drive, Suite 100 Bakersfield, CA 93309



Amanda Parra, PE



William Black, PE

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DOCUMENT 00 0110

TABLE OF CONTENTS

00 0101	-	TITLE PAGE	4
00 0105	-	CERTIFICATIONS PAGE	2
00 0110	-	TABLE OF CONTENTS	2
00 1113	-	NOTICE TO CONTRACTORS	2
00 2113	-	INSTRUCTIONS TO BIDDERS	6
00 3100	-	GEOTECHNICAL DATA & EXISTING CONDITIONS	2
00 4100	-	BID FORM	4
00 4411	-	BOND ACCOMPANYING BID	2
00 4412	-	BIDDER INFORMATION FORM	2
00 4430	-	SUBCONTRACTOR LIST	2
00 4452	-	NON-COLLUSION DECLARATION	2
00 4453	-	IRAN CONTRACTING ACT CERTIFICATION	2
00 4455	-	BIDDER CERTIFICATIONS	2
00 5199	-	PROPOSED CONTRACT DOCUMENTS TRANSMITTAL	2
00 5200	-	AGREEMENT	4
00 5590	-	AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS	4
00 6001	-	CONSTRUCTION PERFORMANCE BOND	2
00 6002	-	CONSTRUCTION LABOR & MATERIALS PAYMENT BOND	2
00 6003	-	GUARANTEE	2
00 6200	-	WITHHELD CONTRACT FUNDS CERTIFICATION	2
00 6210	-	ESCROW AGREEMENT FOR SECURITY DEPOSIT IN LIEU OF RETENTION	2
00 7200	-	GENERAL CONDITIONS	32
00 7280	-	APPRENTICESHIP PROGRAM	2
00 7300	-	SUPPLEMENTAL CONDITIONS, INSURANCE & INDEMNIFICATION	6
00 9111	-	ADDENDUM FORM - RCSD	2

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DOCUMENT 00 1113
NOTICE TO CONTRACTORS

ARTICLE 1 – INVITATION TO BID

1.01 **Notice Inviting Bids:** Rosamond Community Services District (hereinafter "Owner") will receive sealed Bids at the Rosamond Community Services District office, **3179 35th Street West, Rosamond, California 93560** until **2:00 p.m. on Tuesday, December 15th, 2026,** for the following public work:

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

1.02 **Project Description:** The project, in general, consists of improving the grit removal process by adding a grit removal system along with the required electrical and instrumentation components. The work will consist of the construction of grit removal facilities, including the installation of equipment and the modification of existing piping. The Board of Directors has made a finding that the Grit King Grit Removal system is a necessary item that is available from only one source pursuant to to PCC § 3400(c)(3). Work shall be completed within **two hundred sixty (260) Working Days** from the date when the Contract Time commences to run.

1.03 **Procurement of Bidding Documents:** Interested Bidders shall access the bid documents via the link at Engineering & Planning - Rosamond Community Services District. It is the sole responsibility of the Bidder to contact the Owner at 661-256-3411 to verify that all addenda have been received. Addenda may be obtained from the Owner's website or from the Owner. Bid Proposals that do not contain a signed cover sheet for all addenda may, in the sole discretion of the Owner, be rejected as non-responsive.

1.04 **Instructions:** Bidders shall refer to Document 00 2113 Instructions to Bidders for the required documents and items to be submitted in a sealed envelope. Sealed proposals will be received on the date and time indicated in Paragraph 1.01, at the following location:

> Delivered in person, by courier service or by mail to the Rosamond Community Services District, 3179 35th Street West, Rosamond, CA 93560.

It is the sole responsibility of the Bidder to arrive at the Owner's lobby at least ten (10) minutes prior to the bid receipt deadline to receive a test time stamp. The time stamp clock in the main lobby of the Owner shall be the official time. Any bid received at or after **2:00 p.m.** will be returned unopened. Soon after **2:00 p.m.** the bids will be publicly opened and read in the Board Chambers at the Owner's address listed above.

1.05 **Mandatory Pre-Bid Site Visit: Owner will conduct a Mandatory Pre-Bid Conference and Site Visit at:**

Rosamond Community Services District Office
3179 35th Street West
Rosamond, CA
on
Thursday, November 19th, at 10:00 a.m.

1.06 **Bid Preparation Cost:** Bidders are solely responsible for the cost of preparing their Bids.

1.07 **Reservation of Rights:** Owner specifically reserves the right, in its sole discretion, to reject any or all Bids, to re-bid, or to waive inconsequential defects in bidding not involving time, price or quality of the work.

ARTICLE 2 – LEGAL REQUIREMENTS

2.01 **Required Contractor's License(s):** A California **"A"** contractor's license is required to bid this contract. Joint ventures must secure a joint venture license prior to award of this Contract.

2.02 **Substitution of Securities:** Owner will permit the successful bidder to substitute securities for any retention monies withheld to ensure performance of the contract, as set forth in Document 00 6210 Escrow Agreement For Security Deposits In Lieu Of Retention and incorporated herein in full by this reference, in accordance with Section 22300 of the California Public Contract Code.

2.03 **Prevailing Wage Laws:** Pursuant to Part 7 of Division 2 of the California Labor Code (Section 1720 et seq.) the Contractor shall pay not less than the prevailing rate of wages to workers on this project as determined by the Director of the California Department of Industrial Relations. The Director's schedule of prevailing rates is on file and open for inspection at the Rosamond Community Services District, 3179 35th Street West, Rosamond CA, 93560, and is incorporated herein by this reference.

This project may be subject to monitoring and enforcement by the Department of Industrial Relations (DIR), including the obligation to submit certified payroll records directly to the DIR Compliance Monitoring Unit (CMU) at least monthly in a format prescribed by the Labor Commissioner. The contractor must post job site notices as prescribed by DIR regulation.

2.04 **Required Registration with the State of California Department of Industrial Relations:** Pursuant to California Labor Code 1725.5, all contractors and subcontractors must be registered with the Department of Industrial Relations (DIR) in order to be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any public work contract. Detailed information about contractor's responsibilities and online registration may be obtained on the State of California Department of Industrial Relations, Public Works website, http://www.dir.ca.gov/Public-Works/PublicWorks.html

2.05 For projects **without** Federal Funding, each Bidder must be licensed, as required by law, at the time the bid is submitted. For projects **with** Federal Funding, each Contractor must be licensed at the time the Contract is awarded.

END OF DOCUMENT

DOCUMENT 00 2113
INSTRUCTIONS TO BIDDERS

Bids are requested by the Rosamond Community Services District ("hereinafter "Owner"), for a general construction contract, or work described in general, as set forth in Document 00 1113 (Notice to Contractors), and the following additional terms.

ARTICLE 1 - PROCEDURES FOR SUBMISSION OF BIDS

1.01 Required Pre-Bid Conference and Site Visit

A. Owner may conduct Pre-Bid Conference and Site Visit at the date, time and location indicated in Document 00 1113 (Notice to Contractors), to consider such matters as Bidders may request and perform a Site Visit immediately following, at the Site. If the Notice to Contractors specifies a required Site Visit, Bidders must attend Pre-Bid Conference and Site Visit and sign an attendance roster as a condition to bidding.

B. The Site Visit may be the Bidders' only opportunity to investigate conditions at the Site. Other Pre-Bid Site Visits may be scheduled at Owner's sole discretion, depending on staff availability.

1.02 Required Pre-Bid Investigations

A. Prior to submission of Bid, Bidder must conduct a careful examination of Bidding Documents and understand the nature, extent, and location of Work to be performed. Refer to Document 00 7200 (General Conditions) on required pre-bid investigations.

1.03 Bidder Questions and Answers

A. Bidders must direct all questions about the meaning or intent of Bidding Documents to Owner in writing. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by written Addenda. It is the sole responsibility of the Bidder to contact Owner at 661-256-3411 to verify that all addenda have been received. Addenda will only be available from ARC Document Solutions. The owner may not answer questions received less than ten Calendar Days prior to the date for opening Bids.

B. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect, and Bidders shall not rely on oral statements.

1.04 Addenda

A. Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner. It is the sole responsibility of the Bidder to contact Owner at 661-256-3411, to verify that all addenda have been received. Bid Proposals that do not contain a signed cover sheet for all addenda may, in the sole discretion of the Owner, be rejected as non-responsive. Addenda may also be acknowledged by number in Document 00 4100 (Bid Form). All addenda shall be part of the Contract Documents. A complete listing of Addenda may be secured from Owner.

ARTICLE 2 - RECEIPT OF BIDS:

2.01 Date and Time

A. Sealed Bids will be received by the Owner until the date and time indicated in Document 00 1113 (Notice to Contractors). All Bid envelopes will be time-stamped to reflect their submittal time. Owner shall reject all Bids received after the specified time and will return such Bids to Bidders unopened. Bidders must submit Bids in accordance with this Document 00 2113.

2.02 Bid Submission:

A. Owner will receive Bids in a sealed envelope, containing the required items described herein.

B. Bidders should mark their Bid envelope using the name, address, identifying information and project number, indicated in Document 00 1113 (Notice to Contractors).

2.03 Required Contents of Bid Submittal Envelope

A. Document 00 4100 (Bid Form). Bidders must submit Bids on Document 00 4100 (Bid Form) in accordance with the provisions of Document 00 4100. Bidders must complete all Bid items and supply all information required by Bid documents and specifications.

B. Document 00 4411 (Bond Accompanying Bid). Bidders must submit Document 00 4411 (Bond Accompanying Bid) accompanied by a cashier's check, certified check (certified without qualification and drawn on a solvent bank of the State of California or a National Bank doing business in the State of California) or completed form of Document 00 4411 of not less than 10% of the base Bid, payable to Owner and completed in accordance with the provisions of Document 00 4411.

C. Document 00 4412 (Bidder Registration and Experience Form). Bidders must submit Document 00 4412 (Bidder Registration and Experience Form), completed in accordance with the provisions of Document 00 4412.

D. Document 00 4430 (Subcontractors List). Bidders must submit Document 00 4430 (Subcontractors List) completed in accordance with the provisions of Document 00 4430. The Subcontractors List must include the names and addresses of all subcontractors for those subcontractors who will perform any portion of work, including labor, rendering of service, or specially fabricating and installing a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in excess of one half of one percent (0.5%) of the total Bid amount. Any violation of this requirement may result in a Bid being deemed non-responsive and not being considered.

E. Document 00 4452 (Non-Collusion Affidavit). Bidders must submit Document 00 4452 (Non-Collusion Affidavit) completed in accordance with the provisions of Document 00 4452.

F. Document 00 4455 (Bidder Certifications). Bidders must submit Document 00 4455 (Bidder Certification) completed in accordance with the provisions of Document 00 4455.

G. Document 00 4453 (Iran Contracting Act Certification) Bidders must submit Document 00 4453 (Iran Contracting Act Certification) in accordance with Public Contract Code Sections 2200 et seq.

ARTICLE 3 - BID OPENING AND EVALUATION

3.01 Determination of Apparent Low Bidder

A. Owner will open each Bidders' Envelope at the time and place indicated in Document 00 1113 (Notice to Contractors), initially evaluate them for bid bond, subcontractor listing and addenda. Further evaluation will follow, and notification of the "Apparent Low Responsive, Responsible Bidder" will be recommended to the Board of Directors during an open meeting.

B. If Apparent Low Bidder is determined to be non-responsive or non-responsible, then Owner may proceed to the next Apparent Low Bidder's Bid pursuant to any procedures determined in its reasonable discretion, and proceed for all purposes as if this Apparent Low Bidder were the original Apparent Low Bidder.

3.02 Evaluation of Bids

A. Bids must be full, complete, clearly written and using the required forms. Bidders shall make any change in the Bid by crossing out the original entry, entering and initialing the new entry. Bidder's failure to submit all required documents strictly as required entitles Owner to reject the Bid as non-responsive. All Bidders must submit Bids containing each of the fully executed documents supplied in this Project Manual.

B. In evaluating Bids, Owner will consider Bidders' qualifications, whether or not the Bids comply with the prescribed requirements, unit prices, and other data, as may be requested in Document 00 4100 (Bid Form) or prior to the Notice of Award.

C. Owner may conduct reasonable investigations and reference checks of Bidder and other persons and organizations as Owner deems necessary to assist in the evaluation of any Bid and to establish Bidder's responsibility, qualifications, financial ability and ability to perform the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time. Submission of a Bid constitutes Bidder's consent to the foregoing.

D. Owner shall have the right to consider information provided by sources other than Bidder. Owner shall also have the right to communicate directly with Bidder's surety regarding Bidder's bonds.

E. 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. Discrepancies between written words and figures will be resolved in favor of the words.

F. Bids shall be deemed to include the written responses of the Bidder to any questions or requests for information of Owner made as part of Bid evaluation process after submission of Bid.

3.03 Reservation of Rights

A. Owner reserves the right to reject any or all nonconforming, non-responsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder as non-responsive as a result of any error or omission in the Bid, or if Owner believes that it would not be in the best interest of Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. For purposes of this paragraph, an "unbalanced Bid" is one having nominal prices for some Bid items and enhanced prices for other Bid items.

B. Owner may retain Bid securities and Bid bonds of other than the Apparent Low Bidder for a period of 90 Calendar Days after award or full execution of the Contract, whichever first occurs.

C. Owner may reject any or all Bids and waive any informalities or minor irregularities in the Bids. Owner also reserves the right, in its discretion, to reject any or all Bids and to re-Bid the Project.

ARTICLE 4 - MANDATORY BID PROTEST PROCEDURES:

4.01 Submission of Written Bid Protest

A. Any Bid protest in connection with the construction contract or work described in general in Document 00 1113 (Notice to Contractors) must be submitted in writing to the Rosamond Community Services District, 3179 35th Street West, Rosamond, CA 93560, before 4:30 P.M. of the fifth Business Day following opening of the Bids.

B. The initial protest document must contain a complete statement of the basis for the protest.

C. The protest must refer to the specific portion of the document that forms the basis for the protest.

D. The protest must include the name, address, and telephone number of the person representing the protesting party.

E. Only Bidders who the Owner otherwise determines are responsive and responsible are eligible to protest a Bid; protests from any other Bidder will not be considered. In order to determine whether a protesting Bidder is responsive and responsible, Owner may evaluate all information contained in any protesting Bidder's Bid.

F. The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest that may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

4.02 Exclusive Remedy

A. The procedure and time limits set forth in this paragraph are mandatory and are Bidder's sole and exclusive remedy in the event of Bid protest. Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted by another Bidder, but must timely pursue its own protest.

ARTICLE 5 - AWARD AND EXECUTION OF CONTRACT

5.01 Notice of Award and Submittal of Executed Contract Documents

A. If Contract is to be awarded, it will be awarded to the lowest responsible responsive Bidder. Such Award, if made, will be made within sixty (60) Calendar Days after the opening of the Bid Proposals.

B. Successful Bidder must execute and submit to Owner the "Required Contract Documents and Proof of Insurance" set forth below, within the time limits requested by Owner. Failure to deliver the "Required Contract Documents" to Owner by 5:00 p.m. of the 10th Day following Contractor's receipt of the Documents, will entitle the Owner to consider the Bid abandoned, and to declare the Bid security forfeited.

5.02 Required Contract Documents and Proof of Insurance

A. Document 00 5200 (Agreement), fully executed by successful Bidder. Submit five originals, each bearing an original signature.

B. Document 00 6001 (Construction Performance Bond), fully executed by successful Bidder and surety, in the amount set forth in Document 00 6001. Submit five originals.

C. Document 00 6002 (Construction Labor and Material Payment Bond), fully executed by successful Bidder and surety, in the amount set forth in Document 00 6002. Submit five originals.

D. Document 00 6003 (Guaranty), fully executed by successful Bidder. Submit five originals.

E. Insurance certificates and endorsements required by Document 00 7300 (Supplementary Conditions—Insurance): Submit Five original set.

F. Connelly Asbestos Notification IF APPLICABLE. Submit five originals.

G. Corporate Resolution IF APPLICABLE. Submit five originals.

H. Fictitious Business form IF APPLICABLE (copy of recorded document). Submit five originals.

5.03 Failure to Execute and Deliver Documents:

A. If Bidder to whom Contract is awarded, within the period described in this Document 00 2113, fails or neglects to execute and deliver all required Contract Documents and file all required bonds, insurance certificates, and other documents, Owner may, in its sole discretion, rescind the award, recover on Bidder's surety bond, or deposit Bidder's cashier's check or certified check for collection, and retain the proceeds thereof as liquidated damages for Bidder's failure to enter into the Contract. Bidder agrees that calculating the damages Owner may suffer as a result of Bidder's failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of Bidder's required Bid security shall be the agreed and presumed amount of Owner's damages.

B. Upon such failure to timely deliver all required Contract Documents as set forth herein, Owner may determine the next Apparent Low Bidder and proceed accordingly.

ARTICLE 6 - GENERAL CONDITIONS AND REQUIREMENTS

6.01 Modification of Commencement of Work:

A. Owner expressly reserves the right to modify the date for the Commencement of Work under the Contract and to independently perform and complete work related to Project. Owner accepts no

responsibility to Contractor for any delays attributed to its need to complete independent work at the Site.

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

6.02 Conformed Project Manual:

A. Following Award of Contract and at Owner's discretion, Owner may prepare a conformed Project Manual reflecting Addenda issued during bidding, which will constitute the approved Project Manual.

6.03 Payment Bond:

A. If the Project described in Document 00 1113 (Notice to Contractors) involves an expenditure in excess of twenty-five thousand dollars ($25,000), the successful Bidder must file a payment bond with and approved by Owner prior to entering upon the performance of the Work, in accordance with Civil Code § 9550.

6.04 Wage Rates:

A. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are on file at the Rosamond Community Services District, 3179 35th Street West, Rosamond, CA 93560, and are deemed included in the Bidding Documents. Upon request, Owner will make available copies to any interested party. Also, Contractor shall post the applicable prevailing wage rates at the Site.

6.05 Withdrawal of Bids:

A. Bidders may withdraw their Bids at any time prior to the Bid opening time fixed in this Document 00 2113, only by written request for the withdrawal of Bid filed with Owner at the Rosamond Community Services District, 3179 35th Street West, Rosamond, CA 93560. Bidder or its duly authorized representative shall execute request to withdraw Bid.

6.06 Ineligible Contractors and Subcontractors:

A. Owner shall not accept a Bid from a Bidder who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code section 1777.1 or 1777.7. Bidders and the Contractor who is awarded the project contract shall not utilize, or allow work by, any subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code Section 1777.1 or 1777.7. (See California Public Contract Code Section 6109.) The California Division of Labor Standards Enforcement publishes a list of debarred contractors and subcontractors on the Internet at www.dir.ca.gov/DLSE/debar.html.

6.07 Substitutions:

A. Bidders must base their Bids on products and systems specified in Contract Documents or listed by name in Addenda. Owner will consider substitution requests only for "or equal items." Bidders wanting to use "or equal" item(s) shall submit Document 01 6000-A (Substitution Request Form) no later than 14 Calendar Days following the execution of the Contract by Owner. As a limitation on Bidder's privilege to request substitution of "or equal" items, Owner has found that certain items are designated as Owner standards and certain items are designated to match existing items in use on a particular public improvement either completed or in the course of completion or are available from one source. As to such items, Owner will not permit substitution. Such items are described in the Bidding Documents.

6.08 Definitions:

A. All abbreviations and definitions of terms used in this Document 00 2113 are set forth in Document 00 7200 (General Conditions) and Section 01 4216 (Definitions).

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DOCUMENT 00 3100
GEOTECHNICAL DATA AND EXISTING CONDITIONS

ARTICLE 1 - REPORTS AND INFORMATION ON EXISTING CONDITIONS

1.01 Inspection of Reports:

A. The Rosamond Community Services District (hereinafter "Owner"), its consultants, and prior contractors may have collected documents providing a general description of the Site and conditions of the Work. These documents may consist of geotechnical reports for and around the Site, contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding Underground Facilities (collectively, "Existing Conditions Data".)

B. Bidders may inspect Geotechnical and Existing Conditions Data. If available, these documents are listed in Section 01 1000 (Summary) and are available for review at the district upon request.

C. Existing Conditions Data is for information only and does not describe labor, materials or equipment furnished by Contractor, but rather, information regarding conditions of the work. Such Existing Conditions Data is not a Contract Document.

ARTICLE 2 - USE OF EXISTING CONDITIONS DATA

2.01 Above-Ground Existing Conditions:

A. Owner makes no warranty or representation of existing aboveground conditions, as-built conditions, or other aboveground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform prior to bidding and Bidder must not rely on the information supplied by Owner regarding existing conditions.

B. Bidder represents and agrees that in submitting its Bid, it is not relying on any information regarding above-ground existing conditions supplied by Owner.

C. Owner is not responsible for information regarding Underground Facilities owned by others.

2.02 Underground Facilities:

A. Information supplied regarding existing Underground Facilities at or contiguous to the Site is based on information furnished to Owner by others (e.g., the builders of such Underground Facilities or others).

B. Owner assumes responsibility for only the general accuracy, completeness or thoroughness of information regarding Underground Facilities that are owned by Owner. This express assumption of responsibility applies only if Bidder has conducted the independent investigation required of it under Document 00 7200 (General Conditions) and discrepancies were not apparent. Bidder is solely responsible for any interpretation or conclusion drawn from this information.

C. Owner is not responsible only for information regarding Underground Facilities owned by others.

2.03 Hazardous Materials Surveys:

A. Bidders may rely on this data and information for general accuracy regarding the locations of potentially hazardous materials subject of the Work. Owner does not warrant and makes no representation regarding the completeness or thoroughness of any data or information regarding existing conditions or hazardous materials, including, but not limited to, quantities, characteristics, volumes, or associated structural features. Bidder represents and agrees that in submitting a Bid it is not relying on any such data, information or deductions.

B. Data and information regarding the locations of hazardous materials are not part of Contract Documents.

2.04 Geotechnical Data:

A. Bidder may rely upon the general accuracy of the "technical data" contained in the geotechnical reports and drawings identified above, but only insofar as it relates to subsurface conditions, provided Bidder has conducted the independent investigation required of it and discrepancies were not apparent.

B. The term “technical data” shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment, or structures that were encountered during subsurface exploration. The term “technical data” does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures. The term “technical data” shall not include the location of Underground Facilities.

C. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder is solely responsible for any interpretation or conclusion drawn from any “technical data” or any other data, interpretations, opinions, or information contained in supplied geotechnical data.

D. Except as expressly set forth in this Document 00 3100, Owner does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data.

E. Bidder represents and agrees that in submitting its Bid, it is not relying on any geotechnical data supplied by Owner, except as specifically set forth herein.

ARTICLE 3 - INVESTIGATIONS

3.01 Required Investigations:

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

B. Bidders shall advise Owner in writing during the Bid period of any questions, suppositions, inferences or deductions Bidders may have for Owner’s review and response.

C. Owner has provided time in the period prior to bidding for Bidder to perform these investigations.

3.02 Access to Site for Investigations:

A. During the Pre-Bid Site Visit(s), Owner will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a Bid. Bidders must fill all holes and clean up and restore the Site to its former conditions upon completion of such explorations, investigations, tests, and studies. Such investigations may be performed only under the provisions of Document 00 2113 (Instructions to Bidders) and Document 00 7200 (General Conditions) including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such investigation work. Each Bidder shall supply all equipment required to perform any investigations as each Bidder deems necessary. Owner has the right to limit the number of pieces of machinery operating at one time due to safety concerns.

END OF DOCUMENT

DOCUMENT 00 4100
BID FORM

TO THE ROSAMOND COMMUNITY SERVICES DISTRICT

THIS BID IS SUBMITTED BY:

_____
(Firm/Company Name)

Project Name: WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS
RCSD Project No.: 22515

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the Rosamond Community Services District (hereinafter "Owner") in the form included in the Contract Documents, Document 00 5200 (Agreement), to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Sum and within the Contract Time indicated in this Bid and in accordance with all other terms and conditions of the Contract Documents.

2. Bidder accepts all of the terms and conditions of the Contract Documents, Document 00 1113 (Notice to Contractors), and Document 00 2113 (Instructions to Bidders), including, without limitation, those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for 60 Calendar Days after the day of Bid opening, unless there is a bid protest, then 90 Calendar days after the day of bid opening.

3. In submitting this Bid, Bidder represents that Bidder has examined all of the Contract Documents, performed all necessary Pre-Bid investigations, received, reviewed and has included the signed cover sheet for each of the following Addenda in this bid submission:

Addendum Number	Addendum Date	Signature of Bidder

4. The undersigned, as Bidder, declares that: the Bidder is duly licensed under the Contractor's State License Law Business and Professions Code Section 7000 et.seq.; the only persons or parties interested in this proposal as principals are those named herein; this proposal is made without collusion with any other person, firm or corporation; the bidder has examined the location of the proposed work, the attached proposed form of Agreement, Plans, Specifications, and Addenda referred to; the Bidder agrees that if this proposal is accepted by the Owner, Bidder will contract with the Owner by execution of the documents required by Document 00 2113 (Instruction to Bidders); to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements of the Owner as therein set forth, and that the Bidder will accept in full payment the following amounts:

SCHEDULE OF WORK ITEMS

Bid Schedule

Item No.	Qty	Unit	Description	Unit Price	Total Amount
1	1	LS	Mobilization & Temporary Facilities	$	$
2	1	LS	Construction Sequencing		
3	1	LS	Site Improvements		
4	1	LS	Grit Removal Equipment	$ 719,213	$ 719,213
5	1	LS	Grit Removal Equipment Installation - 12”-RS AND 20”-RS Connections, Drain, 12” & 20” Valves		
6	1	LS	Splitter box, 16” MOV and Valve Vault, Slide Gate, 20" GRE, 16" GRE and 24” ABI-2 Connections		
7	1	LS	RAS Connections and Valves		
8	1	LS	Motorized RAS Valve installations		
9	1	LS	16" ABI-2 Connection and 16" Manual Plug Valve		
10	1	LS	2" UW line with Backflow Prevention Assembly		
11	1	EA	8" Magnetic Flow Meter		
12	1	LS	Electrical Connection		
13	1	LS	Instrumentation and SCADA Programming		
14	1	LS	Startup and Commissioning		

Total Base Bid Schedule Bid Items 1 through 14 $_____

Total Bid Price:

_____($_____)
(Words)

5. Subcontractors for work included in all Bid items are listed on Document 00 4430 (Subcontractors List) submitted herewith.

6. The undersigned Bidder understands that Owner reserves the right to reject this Bid.

7. If the documents required by Document 00 2113 (Instructions to Bidders) are mailed or delivered to the undersigned Bidder within the time described in Paragraph 2 of this Document 00 4100, or at any other time thereafter before it is withdrawn, the undersigned Bidder will execute and deliver

the documents required by Document 00 2113 (Instructions to Bidders) within the times specified therein.

8. The undersigned Bidder herewith encloses cash, a cashier's check, or certified check of or on a responsible bank in the United States, or a corporate surety bond furnished by a surety authorized to do a surety business in the State of California, in form specified in Document 00 2113 (Instructions to Bidders), in the amount of ten percent (10%) of the Total Bid Price and made payable to the Rosamond Community Services District.

9. The undersigned Bidder agrees to commence Work under the Contract Documents on the date established in Document 00 7200 (General Conditions) and to complete all Work within the time specified in Document 00 5200 (Agreement).

10. The undersigned Bidder agrees that, in accordance with Document 00 7200 (General Conditions), liquidated damages for failure to complete all Work in the Contract within the time specified in Document 00 5200 (Agreement) shall be as set forth in Document 00 5200.

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

IMPORTANT NOTICE: If Bidder or other interested person is a corporation, give the legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of the firm and names of all individual co-partners composing the firm; if Bidder or other interested person is an individual, give first and last names in full.

NAME OF BIDDER: _____,

licensed in accordance with an act for the registration of Contractors, and with license number:

_____ Expiration: _____.

_____

(Place of Incorporation, if Applicable) (Principal)

_____

(Principal)

_____

(Principal)

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

_____

(Signature of Bidder)

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

Business Address: _____

_____

_____

Contractor's Representative(s): _____
(Name/Title)

_____
(Name/Title)

_____
(Name/Title)

Officers Authorized to Sign Contracts _____
(Name/Title)

_____
(Name/Title)

_____
(Name/Title)

Telephone Number(s): _____
(Area Code) (Number)

_____
(Area Code) (Number)

Fax Number(s): _____
(Area Code) (Number)

_____
(Area Code) (Number)

Date of Bid: _____

END OF DOCUMENT

DOCUMENT 00 4411

BOND ACCOMPANYING BID

ROSAMOND COMMUNITY SERVICES DISTRICT

KNOW ALL MEN BY THESE PRESENTS,

That we, _____ as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the Rosamond Community Services District (hereinafter Obligee), a political subdivision of the State of California, in the penal sum of ten percent (10%) of the total amount of the bid of the Principal above named, submitted by said Principal to Obligee for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents. In no case shall the liability of the Surety hereunder exceed the sum of $_____.

THE CONDITION OF THIS OBLIGATION IS SUCH,

THAT WHEREAS THE PRINCIPAL has submitted the above mentioned bid to Obligee for certain construction specifically described as follows, for which bids are to be opened at Bakersfield, California, on the date as indicated on the bid documents for the **WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS**.

NOW, THEREFORE, if the aforesaid Principal is awarded the contract and, within the time and manner required under the Specifications, after the prescribed forms are presented to him for signature, enters into a written Agreement, in the prescribed form, in accordance with the bid, files the two bonds with the Obligee, one to guaranty faithful performance and the other to guaranty payment for labor and materials, as required by law, provides all required insurance certificates, Guaranty, and all other endorsements, forms, and documents required under Document 00 2113 (Instructions to Bidders), then this obligation shall be null and void; otherwise, it shall remain in full force and virtue.

If suit is brought upon this Bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including reasonable costs and Attorney's fees to be fixed by the Court.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this ___ day of _____, 20__.

Correspondence of claims relating to this bond should be sent to the surety at the following address:

_____ (SEAL)

_____ (SEAL)

_____ (SEAL)

PRINCIPAL

_____ _____ (SEAL)

_____ _____ (SEAL)

_____ _____ (SEAL)

SURETY

Phone: ( ) _____

Note: Signatures of those executing for the Surety must be properly acknowledged.

END OF DOCUMENT

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DOCUMENT 00 4412
BIDDER INFORMATION FORM

INSTRUCTIONS

In order to register to undertake work for Owner, Bidder **must**:

1) Fill out this registration form completely; do not leave blanks.
2) Provide certificates of insurance or a letter evidencing coverage

INDEPENDENT CONTRACTOR REGISTRATION

Contractors DIR Registration Number: _____

Contractor's License # _____

Date: _____ Fed I.D. # _____

Full Corporate Name of Company: _____

Street Address: _____

_____

Mailing Address: _____

_____

Phone: _____ Fax: _____

Name of Principal Contact: _____

Type of Business: _____ Sole Proprietor _____ Partnership

_____ Non-Profit 501(c)(3) _____ Corporation

_____ other (please explain:_____)

INSURANCE

Workers' Compensation:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

General Liability:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

Policy Limits: $ _____

A.M. Best Rating: _____

Automobile Liability:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

Policy Limits: $ _____

A.M. Best Rating: _____

BONDING

Surety Company Providing Bonds: _____

Address: _____

Phone and Fax: _____

Admitted in California YES _____ **NO** _____

A.M. Best Rating: _____

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

_____
SIGNATURE

_____
DATE

SAFETY EXPERIENCE

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

1. List Bidder's interstate Experience Modification Rate for the last three years.

   20__ _____ **20__** _____ **20__** _____

2. Use Bidder's last year's Cal/OSHA 200 log to fill in the following number of injuries and illnesses:

   a. Number of lost workday cases _____

   b. Number of medical treatment cases _____

   c. Number of fatalities _____

3. Employee hours worked last year _____

4. State the name of Bidder's safety engineer/manager:

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

I CERTIFY, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND I AUTHORIZE THE ROSAMOND COMMUNITY SERVICES DISTRICT AND ITS AGENTS AND REPRESENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

BIDDER:

By: _____
Signature

Its: _____
Title

Date_____

END OF DOCUMENT

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DOCUMENT 00 4430

SUBCONTRACTORS LIST

Contractor Name: _____

Project Name: WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

Bidder submits the following information as to the subcontractors Bidder intends to employ if awarded the Contract. Only list subcontractors whose contract with the Contractor is in an amount greater than one-half of 1 percent of the Contractor's total bid.

Full Name of Subcontractor and Address of Mill or Shop	Description of Work: Reference To Bid Items	Subcontractor's License No.	DIR Registration No.

(Bidder to attach additional sheets if necessary)

Bidder must provide Subcontractor DIR Registration Number within twenty-four hours of bid opening.

END OF DOCUMENT

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DOCUMENT 00 4452
NON-COLLUSION DECLARATION

PUBLIC CONTRACT CODE §7106

PROJECT TITLE: **WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS**

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

The undersigned declares:

I am the _____ of _____
(Office of Affiant) (Name of Bidder)

the party making the foregoing Bid.

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

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

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____, at _____,
(Date) (City)

_____.
(State)

_____
(Name of Bidder)

_____
(Signature of Principal)

NOTE: If Bidder is a partnership or a joint venture, a copy of this declaration must be signed and sworn to by every member of the partnership or venture.

END OF DOCUMENT

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DOCUMENT 00 4453
IRAN CONTRACTING ACT CERTIFICATION
(Public Contract Code Sections 2200 *et seq.*)

Project Name: WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

As required by California Public Contract Code section 2204, the Contractor certifies that the option checked below relating to the Contractor's status in regard to the Iran Contracting Act of 2010 (Public Contract Code sections 2200 *et seq.*) is true and correct:

☐ The Contractor is not:

(i) Identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code section 2203; or

(ii) a financial institution that extends, for 45 days or more, credit in the amount of $20,000,000 or more to any other person or entity identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code section 2203, if that person or entity uses or will use the credit to provide goods or services in the energy sector in Iran.

☐ Rosamond Community Services District has exempted the Contractor from the requirements of the Iran Contracting Act of 2010 after making a public finding that, absent the exemption, Rosamond Community Services District will be unable to obtain the goods and/or services to be provided pursuant to the Contract.

☐ The amount of the Contract payable to the Contractor for the project is less than $1,000,000.

CERTIFICATION

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder to the above selected option. This certification is made under the laws of the State of California.

Firm	Signed
Date	Name/Title

Note: In accordance with Public Contract Code section 2205, false certification of this form shall be reported to the California Attorney General and may result in civil penalties equal to the greater of $250,000 or twice the Contract amount, termination of the Contract and/or ineligibility to bid on contracts for three years.

END OF DOCUMENT

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DOCUMENT 00 4455
BIDDER CERTIFICATIONS

TO BE EXECUTED BY ALL BIDDERS AND SUBMITTED WITH BID

The undersigned Bidder certifies to the Rosamond Community Services District (hereinafter "Owner") as set forth in sections 1 through 6 below.

1. STATEMENT OF CONVICTIONS

By my signature hereunder, I hereby swear, under the penalty of perjury, that no more than one final, unappealable finding of contempt of court by a Federal Court has been issued against Bidder within the past two years because of failure to comply with an order of a Federal Court or to comply with an order of the National Labor Relations Board.

2. STATEMENT OF BIDDER

Have you, or any officer of yours, or any employee of yours who may have a proprietary interest in your Bid, ever been disqualified, removed, or otherwise prevented from bidding on or completing any Federal, State, or Local Governmental project because of a violation of law or safety regulations:

YES _____ NO _____

3. CERTIFICATION OF WORKER'S COMPENSATION INSURANCE

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

4. CERTIFICATION OF PREVAILING WAGE RATES AND RECORDS

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

5. CERTIFICATION OF COMPLIANCE WITH PUBLIC WORKS CHAPTER OF LABOR CODE

By my signature hereunder, as the Contractor, I certify that I am aware of Sections 1777.1 and 1777.7 of the California Labor Code and am eligible to bid and work on public works projects.

6. CERTIFICATION OF ADEQUACY OF CONTRACT AMOUNT

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

BIDDER: _____
(Name of Bidder)

Date: _____, **20**___ By: _____
(Signature)

Name: _____
(Print Name)

Its: _____
(Title)

END OF DOCUMENT

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DOCUMENT 00 5199
PROPOSED CONTRACT DOCUMENTS TRANSMITTAL

Date

Contractor Name
Contractor Address
City, State Zip

SUBJECT **WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS**

The Contract Sum of your proposed contract is _____ **Dollars ($_____).**

1. The proposed Contract Documents listed below accompany this Document 00 5199. Contractor shall return FIVE copies of each of the required documents; each of the FIVE copies require original "wet" signatures.

2. Contractor shall return the required documents to the Rosamond Community Services District no later than _____ in order to meet the Board agenda requirements.

   a. Document 00 5200 (Agreement) **DO NOT DATE THE AGREEMENT. DATE OF BOARD MEETING WILL BE INSERTED BY THE DISTRICT.**

   b. Document 00 6001 (Construction Performance Bond), executed by you and your surety. **BE CERTAIN TO HAVE A POWER OF ATTORNEY AND NOTARY FOR EACH OF THE PERFORMANCE BONDS (FIVE IN TOTAL FOR THE PERFORMANCE BOND)**

   c. Document 00 6002 (Construction Labor and Material Payment Bond), executed by you and your surety. **BE CERTAIN TO HAVE A POWER OF ATTORNEY AND NOTARY FOR EACH OF THE LABOR AND MATERIAL PAYMENT BONDS (FIVE IN TOTAL FOR THE LABOR AND MATERIAL PAYMENT BOND)**

   d. Insurance certificates **(INCLUDE ENDORSEMENTS AND WAIVER OF SUBROGATION),** as required under Document 00 7300 (Supplementary Conditions – Insurance).

   e. Document 00 6003 (Guaranty)

   f. Document 00 6200 (Withheld Contract Funds Certification)

   g. Connelly Asbestos Notification

   h. Corporate Resolution, if applicable

   i. Fictitious Business form, if applicable (must be copy of recorded document)

3. Failure to comply with these conditions will entitle Owner to consider your Bid abandoned, and to declare your Bid security forfeited.

4. Upon commencement of the Work, you and each of your Subcontractors shall certify copies of payroll records on forms provided by the Division of Labor Standards Enforcement, in accordance with California Labor Code §1776. Contractor and Subcontractors shall provide copies of certified payroll records upon request by the County.

5. The General Manager will recommend the Board of Directors execute the Agreement during the meeting of _____at 6:00 pm. You will receive a copy of the Staff Report under separate cover.

6. The Owner has identified the following staff for this project:

   a. Project Contact - **(General Manager) at 661-256-3411, or its designee**

END OF DOCUMENT

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DOCUMENT 00 5200
AGREEMENT

THIS AGREEMENT, entered into on this day of _____, is by and between _____, whose place of business is located at _____ ("Contractor"), and the ROSAMOND COMMUNITY SERVICES DISTRICT, a political subdivision of the State of California (hereinafter "Owner"), acting under and by virtue of the authority vested in Owner by the laws of the State of California.

WHEREAS, in consideration for the promises and payment to be made and performed by Owner, and under the conditions expressed in the incorporated Bid Proposal (Bid), bonds and related papers, Contractor agrees to do all the work and furnish all the materials at the expense of Contractor (except such as the Specifications state will be furnished by Owner) necessary to construct and complete in a good and workmanlike manner to the satisfaction of the Rosamond Community Services District all the work shown and described in the plans and specifications for the project known as:

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

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

ARTICLE 1 - SCOPE OF WORK OF THE CONTRACT

1.01 Work of the Contract

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

1.02 Price for Completion of the Work

A. Owner shall pay Contractor the following Contract Sum of **_____ Dollars ($_____)** for completion of Work in accordance with Contract Documents as set forth in Contractor's Bid, attached hereto.

ARTICLE 2 - COMMENCEMENT AND COMPLETION OF WORK

2.01 Commencement of Work

A. Contractor shall commence Work on the date established in the Notice to Proceed (**Commencement Date**).
B. Owner reserves the right to modify or alter the Commencement Date.

2.02 Completion of Work

A. Contractor shall achieve Final Completion of the entire Work **260 Working** Days from the Commencement Date.

ARTICLE 3 - LIQUIDATED DAMAGES FOR DELAY IN COMPLETION OF WORK

3.01 Liquidated Damage Amounts

A. As liquidated damages for delay Contractor shall pay Owner **one thousand dollars ($1,000)** for each Calendar Day that expires after the time specified herein for Contractor to achieve Final Completion of the entire Work, until achieved.

3.02 Scope of Liquidated Damages

A. Measures of liquidated damages shall apply cumulatively.

B. Limitations and stipulations regarding liquidated damages are set forth in Document 00 7200 (General Conditions).

ARTICLE 4 - CONTRACT DOCUMENTS

4.01 Contract Documents consist of the following documents, including all changes, Addenda, and Modifications thereto:

Document 00 0101	Title Page
Document 00 1113	Notice to Contractors
Document 00 2113	Instruction to Bidders
Document 00 3100	Geotechnical Data and Existing Conditions
Document 00 4100	Bid Form
Document 00 4412	Bidder Information Form
Document 00 4430	Subcontractors List
Document 00 4452	Non-Collusion Declaration
Document 00 4453	Iran Contracting Act Certification
Document 00 4455	Bidder Certifications
Document 00 5199	Proposed Contract Documents Transmittal
Document 00 5200	Agreement
Document 00 5590	Release of Claims
Document 00 6001	Construction Performance Bond
Document 00 6002	Construction Labor and Material Payment Bond
Document 00 6003	Guaranty
Document 00 6200	Withheld Contract Funds Certification
Document 00 7200	General Conditions
Document 00 7280	Apprenticeship Programs
Document 00 7300	Supplementary Conditions – Insurance
Document 00 9111	Addendum Form - RCSD
Master Specifications	Divisions 01 through 44
Technical Specifications	
Drawings	

4.02 There are no Contract Documents other than those listed above. The Contract Documents may only be amended, modified or supplemented as provided in Document 00 7200 (General Conditions).

ARTICLE 5 - MISCELLANEOUS

5.01 Terms and abbreviations used in this Agreement are defined in Document 00 7200 (General Conditions) and Section 01 4216 (Definitions) and will have the meaning indicated therein.

5.02 It is understood and agreed that in no instance are the persons signing this Agreement for or on behalf of Owner or acting as an employee, agent, or representative of Owner, liable on this Agreement or any of the Contract Documents, or upon any warranty of authority, or otherwise, and it is further understood and agreed that liability of Owner is limited and confined to such liability as authorized or imposed by the Contract Documents or applicable law.

5.03 In entering into a public works contract or a subcontract to supply goods, services or materials pursuant to a public works contract, Contractor or Subcontractor offers and agrees to assign to the awarding body all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. §15) or under the Cartwright Act (Chapter 2 (commencing with §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 Owner tenders final payment to Contractor, without further acknowledgment by the parties.

5.04 Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California

Department of Industrial Relations, are deemed included in the Contract Documents and on file at Owner's Office, and shall be made available to any interested party on request. Pursuant to California Labor Code §§ 1860 and 1861, in accordance with the provisions of Section 3700 of the Labor Code, every contractor will be required to secure the payment of compensation to his employees. Contractor represents that it is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and Contractor shall comply with such provisions before commencing the performance of the Work of the Contract Documents.

5.05 This Agreement and the Contract Documents shall be deemed to have been entered into in the County of Kern, State of California, and governed in all respects by California law (excluding choice of law rules). The exclusive venue for all disputes or litigation hereunder shall be in the Superior Court for the County of Kern.

IN WITNESS WHEREOF the parties have executed five original Agreements on the day and year first above written.

RECOMMENDED AND APPROVED
AS TO CONTENT:

By _____
General Manager

By _____
Signature

_____
Typed Name

ROSAMOND COMMUNITY SERVICES DISTRICT

By _____
Gregory Washington
President, Board of Directors

CONTRACTOR:

_____
Firm's Name

_____
Type of Entity
(Corporation, partnership, sole proprietorship)

_____
Title of Individual Executing Document on behalf of Firm

NOTICE: CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND ARE REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR OF THAT BOARD, WHOSE ADDRESS IS CONTRACTORS' STATE LICENSE BOARD, 1020 "N" STREET, SACRAMENTO, CALIFORNIA 95814.

END OF DOCUMENT

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DOCUMENT 00 5590

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS
[Public Contract Code § 7100]

THIS AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS ("Agreement and Release"), made and entered into this _____ day of _____, **20**___, by and between the Rosamond Community Services District (hereinafter "Owner"), and _____ ("Contractor"), whose place of business is at _____.

RECITALS

Owner and Contractor entered into Contract Number _____ (the "Contract") for construction of Owner's **WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS** located at **Rosamond Wastewater Treatment Plant, 875 Patterson Road, Rosamond, CA 93560**

A. The Work under the Contract has been completed.

AGREEMENT

NOW THEREFORE, it is mutually agreed between Owner and Contractor as follows:

1. Contractor will not be assessed liquidated damages except as detailed below:

   Original Contract Sum $ _____

   Modified Contract Sum $ _____

   Payment to Date $ _____

   Liquidated Damages $ _____

   Payment Due Contractor $ _____

2. Subject to the provisions of this Agreement and Release, Owner will forthwith pay to Contractor the sum of _____ Dollars and _____ Cents ($_____) under the Contract, less any amounts withheld under the Contract or represented by any Notice to Withhold Funds on file with Owner as of the date of such payment.

3. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against Owner arising from the Contract, except for the claims described in Paragraph 4 of this Document 00 5590. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of Contractor against Owner, and all if its agents, employees, consultants, inspectors, representatives, assignees and transferees, except for the Disputed Claims set forth in Paragraph 4 of this Document 00 5590. Nothing in this Agreement and Release shall limit or modify Contractor's continuing obligations described in Paragraph 6 of this Document 00 5590.

4. The following claims submitted under Document 00 7200 (General Conditions), Article 12, are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release.

[*Insert information in Chart below, affix attachment if necessary*]

CLAIM NO.	DATE SUBMITTED	DESCRIPTION OF CLAIM	AMOUNT OF CLAIM

5. Consistent with California Public Contract Code §7100, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 2 of this Document 00 5590, Contractor hereby releases and forever discharges Owner, and all of its agents, employees, consultants, inspectors, assignees and transferees from any and all liability, claims, demands, actions or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract.

6. Guarantees and warranties for the Work, and any other continuing obligation of Contractor, shall remain in full force and effect as specified in the Contract Documents.

7. Contractor shall immediately defend, indemnify and hold harmless Owner, any of the Owner's Representatives, and all of their agents, employees, consultants, inspectors, assignees and transferees, from any and all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities that may be asserted against them by any of Contractor's suppliers and/or Subcontractors of any tier and/or any suppliers to them for any and all labor, materials, supplies and equipment used, or contemplated to be used in the performance of the Contract, except for the Disputed Claims set forth in Paragraph 4 of this Document 00 5590.

8. Contractor hereby waives the provisions of California Civil Code §1542, which provide as follows:

> **A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER, MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR.**

9. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable, and if any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal or other law, ruling, or regulation, then such provision, or part thereof shall remain in force and effect only to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.

10. Contractor represents and warrants that it is the true and lawful owner of all claims and other matters released pursuant to this Agreement and Release, and that it has full right, title and authority to enter into this instrument. Each party represents and warrants that it has been represented by counsel of its own choosing in connection with this Agreement and Release.

11. All rights of Owner shall survive completion of the Work or termination of the Contract, and execution of this Agreement and Release.

*** * * CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING * * ***

APPROVED AS TO FORM:

By _____
Signature

ROSAMOND COMMUNITY SERVICES DISTRICT

By _____
General Manager

<<_____ (Contractor)>>

Type of Entity
(corporation, partnership, sole proprietorship)

By _____
Signature

_____
Typed Name

_____
Title of Individual Executing
Document on behalf of Contractor

END OF DOCUMENT

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DOCUMENT 00 6001
CONSTRUCTION PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

A. THAT WHEREAS, the ROSAMOND COMMUNITY SERVICES DISTRICT (hereinafter "**Owner**"), a public agency of the State of California, has awarded to _____**,** as Principal, a contract dated _____ (the "**Contract**"), in the amount of **$**_____**.** The Contract is by this reference made a part hereof, for the work of the following project:

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

1.02 AND WHEREAS, Principal is required to furnish a bond in connection with the Contract, guaranteeing the faithful performance thereof;

1.03 NOW, THEREFORE, we, the undersigned Principal and_____, as Surety are held and firmly bound unto Owner in the sum of 100% OF THE CONTRACT PRICE to be paid to Owner or its successors and assigns; for which payment, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

1.04 THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its heirs, executors, administrators, successors, or assigns approved by Owner, shall promptly and faithfully perform the covenants, conditions, and agreements of the Contract during the original term and any extensions thereof as may be granted by Owner, with or without notice to Surety, and during the period of any guarantees or warranties required under the Contract, and shall also promptly and faithfully perform all the covenants, conditions, and agreements of any alteration of the Contract made as therein provided, notice of which alterations to Surety being hereby waived, on Principal's part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify, defend, protect, and hold harmless Owner as stipulated in the Contract, then this obligation shall become and be null and void; otherwise it shall be and remain in full force and effect.

1.05 No extension of time, change, alteration, modification, or addition to the Contract, or of the work required thereunder, or work or actions by Owner to mitigate the damages resulting from any breach in performance by Contractor, shall release or exonerate Surety on this bond or in any way affect the obligation of this bond; and Surety does hereby waive notice of any such extension of time, change, alteration, modification, or addition.

1.06 Whenever Principal shall be and declared by Owner in default under the Contract, Surety shall promptly remedy the default, or shall promptly, and in no event later than thirty (30) days from notice:

A. Undertake through its agents or independent contractors (but having qualifications and experience reasonably acceptable to Owner), to complete the Contract in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Contract, including without limitation, all obligations with respect to warranties, guarantees, indemnities, and the payment of liquidated damages; or

B. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and, upon determination by Owner of the lowest responsible bidder, arrange for a contract between such bidder and Owner and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract Sum, and to pay and perform all obligations of Principal under the Contract, including, without limitation, all obligations with respect to warranties, guarantees, and the payment of liquidated damages; but, in any event, Surety's total obligations hereunder shall not exceed the amount set forth in the third paragraph hereof. The term "balance of the Contract Sum," as used in this paragraph, shall mean the total amount payable by Owner to the Principal under the Contract and any amendments thereto, less the amount paid by Owner to Principal.

1.07 Surety's obligations hereunder are independent of the obligations of any other surety for the performance of the Contract, and suit may be brought against Surety and such other sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing Owner's rights against the others. If suit is brought upon this bond the Surety shall pay reasonable costs and attorney's fees to be fixed by the court.

1.08 Surety may not use Contractor to complete the Contract absent Owner's Consent. Owner shall have the right in its sole discretion to continue the work of the Contract, as necessary following a default and/or termination, as necessary to prevent risks of personal injury, property damage or delay to the Project.

1.09 No right of action shall accrue on this bond to or for the use of any person or corporation other than Owner or its successors or assigns.

1.10 Surety shall join in any proceedings brought under the Contract upon Owner's demand, and shall be bound by any judgment.

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

IN WITNESS WHEREOF, we have hereunto set our hands this ___day of _____. 20__,

CONTRACTOR AS PRINCIPAL (Corp. Seal)	**SURETY** (Corp. Seal)
Company	Company
Signature	Signature
Name & Title	Name & Title
Address	Address
City, State, Zip Code	City, State, Zip Code
	Phone

END OF DOCUMENT

DOCUMENT 00 6002
CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1.01 THAT WHEREAS, the ROSAMOND COMMUNITY SERVICES DISTRICT (hereinafter "**Owner**"), a public agency of the State of California, has awarded to _____**,** as Principal, a contract dated _____ (the "**Contract**"), in the amount of **$**_____**.** The Contract is by this reference made a part hereof, for the work of the following project:

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

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

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

C. THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its executors, administrators, successors, or assigns approved by Owner, or its subcontractors shall fail to pay any of the persons named in California Civil Code §9100, or amounts due under the State of California Unemployment Insurance Code with respect to work or labor performed under the Contract, or for any amounts required to be deducted, withheld, and paid over to the State of California Employment Development Department from the wages of employees of Principal and subcontractors pursuant to Section 13020 of the State of California Unemployment Insurance Code with respect to such work and labor, that Surety will pay for the same in an amount not exceeding the sum specified in this bond, plus reasonable attorneys' fees, otherwise the above obligation shall become and be null and void.

D. This bond shall inure to the benefit of any of the persons named in California Civil Code §9100, as to give a right of action to such persons or their assigns in any suit brought upon this bond. The intent of this bond is to comply with the California Mechanic's Lien Law.

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

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

Owner's rights against the other. If suit is brought upon this bond the Surety shall pay reasonable costs and attorney's fees to be fixed by the court.

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

IN WITNESS WHEREOF, we have hereunto set our hands this ___ day of _____, 20__.

CONTRACTOR AS PRINCIPAL (Corp. Seal)	**SURETY** (Corp. Seal)
Company	Company
Signature	Signature
Name & Title	Name & Title
Address	Address
City, State, Zip Code	City, State, Zip Code
	Phone

END OF DOCUMENT

DOCUMENT 00 6003
GUARANTEE

TO: THE ROSAMOND COMMUNITY SERVICES DISTRICT (hereinafter "Owner"), for construction of **WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS** located at **Rosamond Wastewater Treatment Plant, 875 Patterson Road, Rosamond, CA 93560.**

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

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

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

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

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

All abbreviations and definitions of terms used in this Agreement shall have the meanings set forth in the Contract Documents.

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

Date	Name/Title
Contractor	Signature

For maintenance, repair or replacement service contact:

Name	Telephone
Address	Alt. Telephone
City, State, and Zip	

END OF DOCUMENT

DOCUMENT 00 6200
WITHHELD CONTRACT FUNDS CERTIFICATION

Public Contract Code Section §22300 requires the inclusion in invitations for public agency bids and in public agency contracts a provision which will, at the expense of the contractor, permit the substitution of securities of equal value for any construction progress monies withheld to ensure performance under a contract. Therefore, as a contractor on: **WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS**

[ ] I do not intend to substitute securities for monies withheld and thereby avail myself of the process and rights provided in Public Contract Code Section §22300.

[ ] I do intend to exercise my option as specified in Public Contract Code Section §22300 and hereby agree to the following:

1. I will establish an escrow agreement satisfactory to the Owner, with a state or federally chartered bank, which shall contain at a minimum provisions governing inter alia:

    a. The amount of securities to be deposited;

    b. The type of securities to be deposited, (eligible securities for deposit are described in Government Code Section 16430);

    c. The providing of powers of attorney or other documents necessary for the transfer of the securities deposited;

    d. The terms and conditions of conversion to cash to provide funds to meet defaults by the Contractor including, but not limited to termination of the Contractor's control over the work, stop notices filed pursuant to law, assessment of liquidated damages or other amounts to be kept or retained under the provisions of the contract;

    e. The decrease in value of securities on deposit; and

    f. The termination of the escrow agreement upon completion of the contract and acceptance by the Owner.

2. I will obtain written consent of the surety to any such agreement; and

3. I will attach to each progress payment submitted a notarized copy of escrow instructions executed by agents thereof and on bank letterhead as proof that such an account has been established. Such instructions will set forth that securities deposited shall not be withdrawn for any purpose (with contractor's complete and unreserved agreement) without prior written approval by the Rosamond Community Services District with respect to the project herein above referenced.

_____
Signature of Bidder

END OF DOCUMENT

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DOCUMENT 00 6210

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

California Public Contract Code §22300

(Rosamond Community Services District – Vendor)

This Escrow Agreement is made and entered into on _____, 20__ by and between the Rosamond Community Services District whose address is **3179 35th Street West, Rosamond, California 93560** (hereinafter "Owner"), and _____, whose address is _____ (hereinafter "Contractor") and _____, whose address is _____ (hereinafter "Escrow Agent"),

W I T N E S S E T H:

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

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and the Contractor in the amount of _____dollars ($_____), dated _____ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within 10 days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of Rosamond Community Services District, and shall designate the Contractor as the beneficial owner.

2. Owner shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that Escrow Agent holds securities in the form and amount specified herein.

3. When Owner makes payment of retentions earned directly to Escrow Agent, Escrow Agent shall hold them for the benefit of Contractor until the time that the escrow created under this Contract is terminated. Contractor may direct the investment of the payments into securities.

All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when Owner pays Escrow Agent directly.

4. Contractor shall be responsible for paying all fees, costs, and expenses incurred by Escrow Agent in administering the escrow account and all expenses of Owner. These expenses and payment terms shall be determined by Owner, Contractor and Escrow Agent.

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

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

7. Owner shall have a right to draw upon the securities in the event of default by Contractor. Upon Seven (7) days written notice to the Escrow Agent from Owner of the default, Escrow Agent shall immediately convert the securities, any interest earned on the securities, and all interest earned on the interest, to cash and shall distribute the cash as instructed by Owner. Escrow Agent shall have no duty to determine whether a default has occurred and may rely solely upon the written notice of such default from Owner.

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

9. Escrow Agent shall rely on the written notifications from Owner and Contractor pursuant to Sections 5 to 8 of this Agreement. Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release, conversion, and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

(a) On behalf of the Owner:

General Manager
3179 35th Street West
Rosamond, CA 93560

_____
Signature

(b) On behalf of the Contractor

_____
Signature

(c) On behalf of the Escrow Agent

_____
Signature

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

RECOMMENDED AND APPROVED AS TO CONTENT:

By _____

General Manager

APPROVED AS TO FORM:

By _____

Signature

NAME OF BANK

By _____

Signature

_____

, Branch Manager

"ESCROW AGENT"

ROSAMOND COMMUNITY SERVICES DISTRICT

By _____

President, Board of Directors

"OWNER"

_____

Contractor's Name

_____

Type of Entity
(corporation, partnership, sole proprietorship)

By _____

Signature

_____

Print Name

_____

Title of Individual Executing Document on behalf of Firm

"CONTRACTOR"

END OF DOCUMENT

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DOCUMENT 00 7200
GENERAL CONDITIONS

Page

ARTICLE 1 - INTERPRETATION OF CONTRACT DOCUMENTS 1
1.1 Interpretation Of Documents 1
1.2 Order Of Precedence Of Documents 1
ARTICLE 2 - PRE-BID INVESTIGATIONS 1
2.1 Pre-Bid Investigations Required 1
2.2 Limited Reliance Permitted On Owner's Existing Conditions Data 1
2.3 Pre-Bid Investigation Requirements For Excavation And Utilities Relocation Projects 2
ARTICLE 3 - SUBCONTRACTORS 2
3.1 Subcontractor Listing Law 2
3.2 Subcontracts 2
ARTICLE 4 - DRAWINGS AND SPECIFICATIONS 3
4.1 Intent Of Drawings And Specifications 3
4.2 Checking Of Drawings And Specifications 3
4.3 Interpretation Of Drawings And Specifications 3
4.4 Use Of Drawings And Specifications. 4
4.5 Standard Specifications. 4
ARTICLE 5 - COMMENCEMENT OF THE WORK 4
5.1 Submission Of Required Schedules 4
5.2 Commencement Date Of Contract Time 4
ARTICLE 6 - CONTRACTOR'S ORGANIZATION AND EQUIPMENT 4
6.1 Contractor's Legal Address 4
6.2 Contractor's Superintendents Or Forepersons 5
6.3 Proficiency In English 5
6.4 Contractor's And Subcontractors' Employees 5
6.5 Contractor's Use Of The Site 5
ARTICLE 7 - OWNER'S ADMINISTRATION OF WORK 5
7.1 Owner's Representative(s) 5
7.2 Owner's Observation Of The Work 6
7.3 Architect/Engineer's Observation Of Work 6
7.4 Owner's And Architect/Engineer's Exercise Of Contract Responsibilities 6
7.5 Owner's Right Of Access To The Work 6
7.6 Owner's Right Of Separate Construction 6

DOCUMENT 00 7200
GENERAL CONDITIONS

Page

ARTICLE 8 - CONTRACTOR'S PROSECUTION AND PROGRESS OF THE WORK 7

8.1 Contractor To Supervise The Work 7
8.2 Contractor To Maintain Cost Data 7
8.3 Contractor To Supply Sufficient Workers And Materials 8
8.4 Contractor To Maintain Project Record Documents 8
8.5 Contractor To Not Disrupt Owner Operation 8
8.6 Contractor To Provide Temporary Facilities And Controls 8

ARTICLE 9 - WARRANTY, GUARANTY, AND INSPECTION OF WORK 9

9.1 Warranty And Guaranty 9
9.2 Inspection Of Work 9
9.3 Correction Of Defective Work 10
9.4 Acceptance And Correction Of Defective Work By Owner 11
9.5 Rights Upon Inspection, Correction Or Acceptance 11
9.6 Proof Of Compliance Of Contract Provisions 11
9.7 Correction Period And Project Warranty Period: 12
9.8 No Waiver 12

ARTICLE 10 - MODIFICATIONS OF CONTRACT DOCUMENTS 12

10.1 Owner's Right To Direct Changed Work. 12
10.2 Required Documentation For Changed Work 13
10.3 Procedures And Pricing Of Changed Work 13

ARTICLE 11 - TIME ALLOWANCES 13

11.1 Time Allowances 13
11.2 Excusable Delay And Inexcusable Delay Defined. 13
11.3 Notice Of Delay 13
11.4 Compensable Time Extensions 14
11.5 Non-Compensable Time Extensions 14
11.6 Adverse Weather 14
11.7 Liquidated Damages 14

ARTICLE 12 - CLAIMS BY CONTRACTOR 14

12.1 Obligation to File Claims for Disputed Work 14
12.2 Form And Contents Of Claim 15
12.3 Administration During/After Claim Submission 15
12.4 Informal Conference and Mediation 15
12.5 Claims by Subcontractors 156

DOCUMENT 00 7200
GENERAL CONDITIONS

Page

12.6 Compliance 156
12.7 Civil Actions; Consistency with Public Contract Code Section 9204 and 2014 et seq 157
ARTICLE 13 - UNDERGROUND CONDITIONS 17
13.1 Contractor To Locate Underground Facilities. 17
13.2 Contractor To Protect Underground Facilities. 17
13.3 Concealed Or Unknown Conditions 18
13.4 Notice Of Hazardous Waste Or Materials Conditions 19
ARTICLE 14 - LEGAL AND MISCELLANEOUS 20
14.1 Laws And Regulations 20
14.2 Permits And Taxes 20
14.3 Communications And Information Distribution 20
14.4 Suspension Of Work 21
14.5 Termination Of Contract For Cause 21
14.6 Termination Of Contract For Convenience 22
14.7 Remedies 22
14.8 Contract Integration and Non-Waiver 22
14.9 Interpretation. 23
14.10 Patents 23
14.11 Substitution For Patented And Specified Articles 23
14.12 Interest Of Public Officers 23
14.13 Limit Of Liability 24
ARTICLE 15 - WORKING CONDITIONS AND PREVAILING WAGES 24
15.1 Use Of Site/Sanitary Rules 24
15.2 Protection Of Work, Persons, And Property 24
15.3 Responsibility For Safety And Health 25
15.4 Emergencies 25
15.5 Use Of Roadways And Walkways 25
15.6 Nondiscrimination 25
15.7 Prevailing Wages And Working Hours 26
15.8 Environmental Controls 27
15.9 Shoring Safety Plan 27
15.10 Required Registration with State of California Department of Industrial Relations 27

DOCUMENT 00 7200

GENERAL CONDITIONS

ARTICLE 1 - INTERPRETATION OF CONTRACT DOCUMENTS

1.1 Interpretation Of Documents

A. Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. Individual Contract Documents subdivide at first level into Articles, and then into paragraphs.

1.2 Order Of Precedence Of Documents

A. In the case of discrepancy or ambiguity in the Contract Documents, the following order of precedence shall prevail:

1. Modifications in inverse chronological order (i.e., most recent first), and in the same order as specific portions they are modifying;
2. Agreement Forms (Document 00 5200), and terms and conditions referenced therein;
3. Supplementary General Conditions, if included;
4. General Conditions (Document 00 7200);
5. Division 1 Specifications, if included;
6. Drawings and Technical Specifications (Division 2 and above);
7. Written numbers over figures, unless obviously incorrect;
8. Figured dimensions over scaled dimensions;
9. Large-scale Drawings over small-scale Drawings.

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

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

D. All Technical Specifications included in the Project manual shall be included within the Contract Documents unless identified otherwise.

ARTICLE 2 - PRE-BID INVESTIGATIONS

2.1 Pre-Bid Investigations Required

A. Prior to and as a condition of submitting a Bid and executing Document 00 5200 (Agreement), Contractor shall investigate fully the Work of the Contract. Contractor shall visit the Site, examine thoroughly and understand fully the nature and extent of the Contract Documents, Work, Site, locality, actual conditions and as-built conditions.

B. During performance of the Contract, Contractor will be charged with knowledge of all information that it should have learned in performing these pre-bid investigations and other obligations, and shall not be entitled to Change Orders (time or compensation) due to any information, error, inconsistency, omission, or conditions that Contractor should have known as a part of this Work. Contractor shall be responsible for the resultant losses, including, without limitation, the cost of correcting Defective Work.

2.2 Limited Reliance Permitted On Owner's Existing Conditions Data

A. Regarding aboveground and as-built conditions shown on the Contract Documents or supplied by Owner, such information has been compiled in good faith, however, Owner does not expressly or impliedly warrant or represent that such information is correctly shown or indicated, or otherwise complete for construction purposes. Contractor must independently verify such information as part of its pre-bid investigations, and where conditions are not reasonably verifiable or discrepancies are identified, bring such matters to Owner's attention through written question issued during the bid period. In executing Document 00 5200 (Agreement), Contractor shall rely

on the results of its own independent investigation and shall not rely on Owner-supplied information regarding aboveground conditions and as-built conditions, and Contractor shall accept full responsibility for its verification work sufficient to complete the Work as intended.

B. Regarding subsurface conditions other than Underground Facilities shown on the Contract Documents or otherwise supplied by Owner, Contractor may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated in the Contract Documents. Owner is not responsible for the completeness of any subsurface condition information, Contractor's conclusions or opinions drawn from any subsurface condition information, or subsurface conditions that are not specifically shown. (For example, Owner is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown.)

2.3 Pre-Bid Investigation Requirements For Excavation And Utilities Relocation Projects

A. As part of its pre-bid investigations for Projects involving excavation and/or relocation of existing utilities, Contractor shall verify information regarding Underground Facilities, including but not limited to, requesting additional information or verification of information as necessary.

B. Because of the nature and location of the Project, the existence of Underground Facilities is deemed inherent in the Work of the Contract, as is the fact that Underground Facilities are not always accurately shown or completely shown on as-built records, both as to their depth and location. Contractor shall, therefore, take care to note the existence and potential existence of Underground Facilities, in particular, above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, chemical, hot water, and other similar items and utilities. Contractor shall carefully consider all supplied information, request additional information Contractor may deem necessary, and visually inspect the Site for above ground indications of Underground Facilities (such as, for example not by way of limitation, the existence of existing service laterals, appurtenances or other types of utilities, indicated by the presence of an underground transmission main or other visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the Site). Contractor shall also consider local underground conditions and typical practices for Underground Facilities, either through its own direct knowledge or through its subcontractors, and fully consider this knowledge in assessing the existing information and the reasonableness of its reliance.

ARTICLE 3 - SUBCONTRACTORS

3.1 Subcontractor Listing Law

A. Contractor shall comply with the Subcontractor Listing law, California Public Contract Code §§4101 et seq. Contractor shall not substitute any other person or firm in place of any Subcontractor listed in the Bid except as may be allowed by law.

B. Subcontractors shall not assign or transfer their subcontracts or permit them to be performed by any other contractor without Owner's written approval. At Owner's request, Contractor shall provide Owner with a complete copy of all executed subcontracts or final commercial agreements with Subcontractors and/or suppliers.

3.2 Subcontracts

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

B. Contractor shall provide for the assignment to Owner of all rights any Subcontractor (of any tier) may have against any manufacturer, supplier, or distributor for breach of warranties and guarantees relating to the Work performed by the Subcontractor under the Contract Documents.

Subcontracts shall provide and acknowledge Owner as an intended third-party beneficiary of each subcontract and supply contract (of any tier).

ARTICLE 4 - DRAWINGS AND SPECIFICATIONS

4.1 Intent Of Drawings And Specifications

A. Contractor shall interpret words or phrases used to describe Work (including services), materials, or equipment that have well-known technical or construction industry or trade meaning in accordance with that meaning. Drawings' intent specifically includes the intent to depict construction that complies with all applicable laws, codes and standards.

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

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

4.2 Checking Of Drawings And Specifications

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

4.3 Interpretation Of Drawings And Specifications

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

B. Should any discrepancy appear or any misunderstanding arise as to the import of anything contained in Drawings and Specifications, or should Contractor have any questions or requests relating to Drawings or Specifications, Contractor shall refer the matter to Owner, in writing, with a copy to the Architect/Engineer, where applicable. Owner will issue with reasonable promptness written responses, clarifications or interpretations as Owner may determine necessary, which shall be consistent with the intent of and be reasonably inferable from Contract Documents. Such written clarifications or interpretations shall be binding upon Contractor. If Contractor believes that a written response, clarification or interpretation justifies an adjustment in the Contract Sum or Contract Time, Contractor shall give Owner prompt written notice. If the parties are unable to agree to the amount or extent of the adjustment, if any, then Contractor shall perform the Work in

conformance with Owner's response, clarification, or interpretation and may make a written claim for the adjustment as provided in Article 12.

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

4.4 Use Of Drawings And Specifications.

A. Drawings, Specifications and other Contract Documents were prepared for use for Work of Contract Documents only. No part of Contract Documents shall be used for any other construction or for any other purpose except with the written consent of Owner. Any unauthorized use of Contract Documents is prohibited and at the sole liability of the user.

4.5 Standard Specifications.

A. Standard Specifications refers to the most recent edition of the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation.

B. In case of conflict between the Standard Specifications and these General Conditions or the Division 1 Specifications, the General Conditions and Division 1 Specifications shall take precedence over and be used in lieu of the conflicting provisions of the Standard Specifications.

ARTICLE 5 - COMMENCEMENT OF THE WORK

5.1 Submission Of Required Schedules

A. Contractor shall submit to Owner in draft for review and discussion at the Preconstruction Conference, and in final prior to the first payment application, the following schedules:

1. Schedule of Values
2. Critical Path Method Construction Schedule
3. Schedule of Submittals.

B. No progress payment shall be due or owing to Contractor until such schedules are submitted to and acceptable to Owner and/or Architect/Engineer as meeting the requirements of the Contract Documents. In Owner's sole discretion, Owner may elect to instead withhold a portion of any progress payment for unacceptable compliance with contract requirements for such schedules.

C. Owner's acceptance of Contractor's schedules will not create any duty of care or impose on Owner any responsibility for the sequencing, scheduling or progress of Work nor will it interfere with or relieve Contractor from Contractor's full responsibility therefore.

5.2 Commencement Date Of Contract Time

A. The Contract Time will commence ten (10) Working Days following execution of the Agreement by the Owner or, if a Notice to Proceed is given, on the date indicated in the Notice to Proceed.

ARTICLE 6 - CONTRACTOR'S ORGANIZATION AND EQUIPMENT

6.1 Contractor's Legal Address

A. Address, facsimile number, and email address given in Contractor's Bid are hereby designated as Contractor's legal address, facsimile number, and email address. Contractor may change its legal address, facsimile number, and email address by notice in writing, delivered to Owner, which in conspicuous language advises Owner of a change in legal address, facsimile number, or

email address, and which Owner accepts in writing. Delivery to Contractor's legal address or depositing in any post office or post office box regularly maintained by the United States Postal Service, in a wrapper with postage affixed, directed to Contractor at legal address, or of any drawings, notice, letter or other communication, shall be deemed legal and sufficient service thereof upon Contractor. Facsimile or email to Contractor's designated facsimile number or email address of any letter, memorandum, or other communication on standard or legal sized paper, with proof of facsimile transmission or email confirmation, shall be deemed legal and sufficient service thereof upon Contractor.

6.2 Contractor's Superintendents Or Forepersons

A. Contractor shall at all times be represented on Site by one or more superintendents or forepersons authorized and competent to receive and carry out any instructions that Owner may give and shall be liable for faithful observance of instructions delivered to Contractor or to authorized representative or representatives on Site. The Superintendent shall not be changed except with the consent of the Owner unless the Superintendent proves to be unsatisfactory to the Contractor and ceases to be in its' employ. If the Superintendent proves to be unsatisfactory to Owner, they shall be replaced within ten (10) Calendar Days after written notice from Owner to Contractor.

6.3 Proficiency In English

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

6.4 Contractor's And Subcontractors' Employees

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

6.5 Contractor's Use Of The Site

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

ARTICLE 7 - OWNER'S ADMINISTRATION OF WORK

7.1 Owner's Representative(s)

A. Owner's Representative(s) will have limited authority to act on behalf of Owner as set forth in the Contract Documents.

B. Except as otherwise provided in these Contract Documents or subsequently identified in writing by Owner, Owner will issue all communications to Contractor through Owner's Representative, and Contractor shall issue all communications to Owner through Owner's Representative in a written document delivered to Owner.

C. Should any direct communications between Contractor and Owner's consultants, architects or engineers not identified in Article 2 of Document 00 5200 (Agreement) occur during field visits or by telephone, Contractor shall immediately confirm them in a written document copied to Owner.

7.2 Owner's Observation Of The Work

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

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

7.3 Architect/Engineer's Observation Of Work

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

B. Project Manager/Engineer may review Contractor's Submittals, such as Shop Drawings, Product Data, and Samples, but only for conformance with design concept of Work and with information given in the Contract Documents.

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

7.4 Owner's And Architect/Engineer's Exercise Of Contract Responsibilities

A. Owner, Project Manager, Architect/Engineer and all Owner's representatives, in performing their duties and responsibilities under the Contract Documents, accept no duties, responsibilities or duty of care, nor may the same be implied or inferred, towards Contractor, any Subcontractor, sub-Subcontractor or supplier, except those set forth expressly in the Contract Documents.

7.5 Owner's Right Of Access To The Work

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

7.6 Owner's Right Of Separate Construction

A. Owner may perform with its own forces, construction or operations related to the Project, or the Site during Contractor's operations. Owner may also award separate contracts in connection with other portions of the Project or other construction or operations, on the Site or areas contiguous to the Site, under conditions similar to these Contract Documents, or may have utility Owners perform other work.

B. Contractor shall adjust its schedule and fully coordinate with and shall afford all other contractors, utility districts and Owner (if Owner is performing work with its own forces), proper and safe access to the Site, and reasonable opportunity for the installation and storage of their materials. Contractor shall ensure that the execution of its Work properly connects and coordinates with others' work, do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work, and shall cooperate with them to facilitate the progress of the Work.

C. To the extent that any part of Contractor's Work is to interface with work performed or installed by other contractors or utility owners, Contractor shall inspect and measure the in-place work. Contractor shall promptly report to Owner in writing any defect in in-place work that will impede or increase the cost of Contractor's interface unless corrected.

ARTICLE 8 - CONTRACTOR'S PROSECUTION AND PROGRESS OF THE WORK

8.1 Contractor To Supervise The Work

A. Subject to those rights specifically reserved in the Contract Documents, Contractor shall supervise, direct, have control over, and be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, safety precautions and programs incident thereto, and compliance with laws and regulations applicable to the furnishing or performance of Work.

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

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

D. Contractor is fully responsible for Contractor's own acts and omissions. Contractor is responsible for all acts and omissions of its Subcontractors, suppliers, and other persons and organizations performing or furnishing any of the Work, labor, materials, or equipment under a direct or indirect contract with Contractor.

E. Contractor shall conduct monthly Contractor Safety Committee meetings, and weekly toolbox safety talks.

8.2 Contractor To Maintain Cost Data

A. Contractor shall maintain full and correct information as to the number of workers employed in connection with each subdivision of Work, the classification and rate of pay of each worker in form of certified payrolls, the cost to Contractor of each class of materials, tools and appliances used by Contractor in Work, and the amount of each class of materials used in each subdivision of Work. Contractor shall provide summaries or reports comparing actual Project costs with Bid estimates or budgets, upon Owner's request.

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

Contractor shall maintain copies of all correspondence with Subcontractors and records of meetings with Subcontractors.

C. Owner shall have the right to audit and copy Contractor's books and records of any type, nature or description relating to the Project (including but not limited to financial records reflecting in any way costs claimed on the Project), and to inspect the Site, including Contractor's trailer, or other job Site office, and this requirement shall be contained in the subcontracts of Subcontractors working on Site. By way of example, Owner shall have the right to inspect and obtain copies of all Contract Documents, planning and design documents, Bid proposal and negotiation documents, cost records and job cost variance reports, design modification proposals, value engineering or other cost reduction proposals, revisions made to the original design, job progress reports, photographs, and as-built drawings maintained by Contractor. Owner and any other applicable governmental entity shall have the right to inspect all information and documents maintained hereunder at any time during the Project and for a period of five years following Final Completion, in accordance with the provisions of Section 8546.7 of the California Government Code. This right of inspection shall not relieve Contractor of its duties and obligations under the Contract Documents. This right of inspection shall be specifically enforceable in a court of law, either independently or in conjunction with enforcement of any other rights in the Contract Documents.

8.3 Contractor To Supply Sufficient Workers And Materials

A. Unless otherwise required by Owner under the terms of Contract Documents, Contractor shall at all times keep on the Site materials and employ qualified workers sufficient to prosecute Work at a rate and in a sequence and manner necessary to complete Work within the Contract Time. This obligation shall remain in full force and effect notwithstanding disputes or claims of any type.

8.4 Contractor To Maintain Project Record Documents

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

B. Throughout Contractor's performance of the Work of the Project, Contractor shall maintain construction records to include: shop drawings; product data/material data sheets; samples; submittal; purchases; materials; equipment; inspections; applicable handbooks; applicable codes and standards; maintenance and operating manuals and instructions; RFI Log; Submittal Log; other related documents and revisions which arise out of the Construction Contracts. Contractor shall maintain records of principal building layout lines, elevations for the bottom of footings, floor levels, and key site elevations (certified by a qualified surveyor or professional engineer). Contractor shall make all records available to Owner. At the completion of the Project, Contractor shall deliver all such records to the Owner to have a complete set of record as-built drawings.

8.5 Contractor To Not Disrupt Owner Operation

A. Contractor shall schedule and execute all Work in a manner that does not interfere with or disrupt Owner operations, including but not limited to, parking, utilities (electricity, gas, water), noise, access by employees and administration, access by vendors, physicians, patients and any other person or entity using Owner facilities or doing business with Owner. Contractor shall produce and supply coordination plans and requests to Owner, following Owner procedures, for all necessary interference of construction with Owner, which Owner will reasonably cooperate with.

8.6 Contractor To Provide Temporary Facilities And Controls

A. Unless expressly provided otherwise in the Contract Documents, Contractor shall provide all temporary utilities (including without limitation electricity, water, natural gas), lighting, heating, cooling and ventilating devices, telephone, sanitary facilities, barriers, fences and enclosures, tree and plant protection, fire protection, pollution, erosion, Storm Water Pollution Prevention controls,

noise and traffic control, and any other necessary services required for construction, testing or completion of the Work.

ARTICLE 9 - WARRANTY, GUARANTY, AND INSPECTION OF WORK

9.1 Warranty And Guaranty

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

B. Extended Guarantees: Any guarantee exceeding one year provided by the supplier or manufacturer of any equipment or materials used in the Project shall be extended for such term. Contractor shall supply Owner with all warranty and guarantee documents relative to equipment and materials incorporated in the Project and guaranteed by their suppliers or manufacturers.

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

1. To Contractor's knowledge after due inquiry, no lead or Asbestos-containing materials were installed or discovered in the Project at any time during Contractor's construction thereof. If any lead or Asbestos-containing materials were discovered, Contractor made immediate written disclosure to Owner.
2. To Contractor's knowledge after due inquiry, no electrical transformers, light fixtures with ballasts or other equipment containing PCBs are or were located on the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to Owner.
3. To Contractor's knowledge after due inquiry, no storage tanks for gasoline or any other toxic substance are or were located on the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to Owner.
4. Contractor's operations concerning the Project are and were not in violation of any applicable environmental federal, state, or local statute, law or regulation dealing with hazardous materials substances or toxic substances and no notice from any governmental body has been served upon Contractor claiming any violation of any such law, ordinance, code or regulation, or requiring or calling attention to the need for any Work, repairs, construction, alteration, or installation on or in connection with the Project in order to comply with any such laws, ordinances, codes, or regulations, with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide Owner with copies thereof.

9.2 Inspection Of Work

A. Work and materials, and manufacture and preparation of materials, from beginning of construction until Final Completion and acceptance of Work, shall be subject to inspection and rejection by Owner, its agents, representatives or independent contractors retained by Owner to perform inspection services, or governmental agencies with jurisdictional interests. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and program so that they may comply therewith as applicable. Upon

request or where specified, Owner shall be afforded access for inspection at the source of supply, manufacture or assembly of any item of material or equipment, with reasonable accommodations supplied for making such inspections.

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

C. Contractor shall give Owner no less than 48 hours notice of readiness of Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

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

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

F. Contractor shall furnish tools, labor and materials necessary to make examination of Work that may be completed or in progress, even to the extent of uncovering or taking down portions of finished Work. Cost of making examination and of reconstruction shall be borne by Contractor.

G. Inspection of the Work by or on behalf of Owner, or Owner's failure to do so, shall not under any circumstances be deemed a waiver or approval of any non-conforming aspect of the Work. Contractor shall have an absolute duty, in the absence of a written Change Order signed by Owner, to perform Work in conformance with the Contract Documents and to immediately correct Defective Work immediately upon Contractor's knowledge.

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

9.3 Correction Of Defective Work

A. Owner may direct Contractor to correct any Defective Work or remove it from the Site and replace it with Work that is not Defective and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting from the correction or removal. Contractor shall be responsible for any and all claims, costs, losses and damages caused by or resulting from such correction or removal. Owner's rights under this Paragraph shall be in addition to any other rights it may have under the Contract Documents or by law.

B. If Contractor fails to supply sufficient skilled workers, suitable materials or equipment, or to furnish or perform the Work in such a way that the completed Work will conform to Contract Documents, Owner may order Contractor to replace any such Defective Work, or stop any portion of Work to permit Owner (at Contractor's expense) to replace such Defective Work. These Owner rights are entirely discretionary on the part of Owner, and shall not give rise to any duty on the part of Owner to exercise the rights for the benefit of Contractor or any other party.

9.4 Acceptance And Correction Of Defective Work By Owner

A. Owner may in its sole discretion elect to accept Defective Work. Contractor shall pay all claims, costs, losses and damages attributable to Owner's evaluation of and determination to accept such Defective Work. If Owner accepts any Defective Work prior to final payment, a Change Order may be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, Owner may deduct from monies due Contractor, all claims, costs, losses, damages, expenses and liabilities attributable to the Defective Work. If Contractor disagrees with Owner's calculations, Contractor may make a claim as provided in Article 12 of this Document 00 7200. If Owner accepts any Defective Work after final payment, Contractor shall pay to Owner, an appropriate amount as determined by Owner.

B. Owner may correct and remedy deficiency if, after five (5) Calendar Days of written notice to Contractor, Contractor fails to correct Defective Work or to remove and replace rejected Work; or provide a plan for correction of Defective Work acceptable to Owner; or perform Work in accordance with Contract Documents. In connection with such corrective and remedial action, Owner may exclude Contractor from all or part of the Site; take possession of all or part of Work and suspend Contractor's Work related thereto; and incorporate in Work any materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, its representatives, agents, employees, and other contractors and Project Manager/Engineer's consultants' access to the Site to enable Owner to exercise the rights and remedies under this Paragraph. Contractor shall be responsible for all claims, costs, losses, damages, expenses and liabilities incurred or sustained by Owner in exercising such rights and remedies. A Change Order may be issued incorporating the necessary revisions in the Contract Documents with respect to Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, Owner may deduct from monies due Contractor, all claims, costs, losses and damages caused by or resulting from the correction or removal. If Contractor disagrees with Owner's calculations, Contractor may make a claim as provided in Article 12 of this Document 00 7200.

9.5 Rights Upon Inspection, Correction Or Acceptance

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

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

9.6 Proof Of Compliance Of Contract Provisions

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

B. Before commencing any portion of Work, Contractor shall inform Owner in writing as to time and place at which Contractor wishes to commence Work, and nature of Work to be done, in order that proper provision for inspection of Work may occur, and to assure measurements necessary for record and payment. Information shall be given to Owner a reasonable time in advance of

time at which Contractor proposes to begin Work, so that Owner may complete necessary preliminary work without inconvenience or delay to Contractor.

9.7 Correction Period And Project Warranty Period:

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

B. In special circumstances where a part of the Work is occupied or a particular item of equipment is placed in continuous service before the date of completion as identified in the recorded Notice of Completion of all the Work, the correction period for that part of Work or that item may start to run from an earlier date if so provided by Change Order.

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

9.8 No Waiver

A. Neither recordation of the Notice of Completion nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by Owner shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.

B. If, after installation, operation, or use of materials or equipment to be provided under Contract proves to be unsatisfactory to Owner, Owner shall have right to operate and use materials or equipment until said materials and equipment can, without damage to Owner, be taken out of service for correction or replacement. Period of use of Defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

C. Nothing in the Contract Documents shall be construed to limit, relieve, or release Contractor's, Subcontractors', and equipment suppliers' liability to Owner for damages sustained as result of latent defects in materials or equipment caused by negligence of Contractor, its agents, suppliers, employees, or Subcontractors.

ARTICLE 10 - MODIFICATIONS OF CONTRACT DOCUMENTS

10.1 Owner's Right To Direct Changed Work.

A. Owner may, without notice to the sureties and without invalidating the Contract, make changes in the Work ("Changed Work"), including without limitation: alterations, deviations, additions to, or deletions from Contract Documents; increase or decrease the quantity of any item or portion of the Work; expand, reduce or otherwise change the Contract Time; delete any item or portion of the Work; and require extra Work. Contractor shall perform such Work under applicable provisions of the Contract Documents, unless specifically provided otherwise at the time the change is ordered.

B. If Changed Work is of such a nature as to increase or decrease the time or cost of any part of Work, price fixed in Contract shall be increased or decreased by amount as the Contractor and Owner may agree upon as reasonable and proper allowance for increase or decrease in cost of

Work using the cost guidelines set forth in this Article, and absent such agreement, then as Owner may direct (with Contractor retaining its rights under Article 12 herein).

10.2 Required Documentation For Changed Work

A. Changes affecting the Contract Time or Contract Sum of the Work shall be set forth in a written Change Order that shall specify:

1. The Work performed in connection with the change to be made;
2. The amount of the adjustment of the Contract Sum, if any, and the basis for compensation for the Work ordered; and
3. The extent of the adjustment in the Contract Time, if any.

B. A Change Order will become effective when signed by Owner, notwithstanding that Contractor has not signed it. A Change Order will become effective without Contractor's signature, provided Owner indicates same thereon (by indicating it as a "unilateral change order").

10.3 Procedures And Pricing Of Changed Work

A. Procedures for changed work and pricing of changed work, claims and all forms of extra compensation, are set forth in Section 01 2050 (Modification Procedures).

ARTICLE 11 - TIME ALLOWANCES

11.1 Time Allowances

A. Time is of the essence. Contract Time may only be changed by Change Order, and all time limits stated in the Contract Documents are to mean that time is of the essence.

11.2 Excusable Delay And Inexcusable Delay Defined.

A. Excusable Delay. Subject to the provisions on Notice of Delay below, Contract Time may be adjusted in an amount equal to the time lost due to:

1. Changes in the Work ordered by Owner ("**Changes**");
2. Acts or neglect by Owner, Architect/Engineer, any Owner Representative, utility owners or other contractors performing other work, not permitted or provided for in the Contract Documents, provided that Contractor has performed its responsibilities under the Contract Documents (including but not limited to pre-bid investigations) ("**Acts or Neglect**"); or
3. Fires, floods, epidemics, abnormal weather conditions beyond the parameters otherwise set forth in this Article, earthquakes, civil or labor disturbances, or acts of God (together, "force majeure events"), provided damages resulting therefrom are not the result of Contractor's failure to protect the Work as required by Contract Documents ("**Force Majeure**").

B. Inexcusable Delay. Contract Time shall not be extended for any period of time where Contractor (and/or any Subcontractor) is delayed or prevented from completing any part of the Work due to a cause that is within Contractor's risk or responsibility under the Contract Documents. Delays attributable to or within the control of a Subcontractor, or its subcontractors, or supplier, are deemed delays within the control of Contractor.

C. Float. Float shall be treated as a Project resource. Contractor shall not be entitled to a time extension for impacts that consume float, but do not impact the critical path.

11.3 Notice Of Delay

A. Within five (5) Working Days of the beginning of any delay (excepting adverse weather delays), Contractor shall notify Owner in writing, by submitting a notice of delay that shall describe the anticipated delays resulting from the delay event in question. If Contractor requests an extension of time, Contractor shall submit a TIE within seven (7) Working Days of the notice of delay. Owner will determine all claims and adjustments in the Contract Time. No claim for an adjustment in the Contract Time will be valid and such claim will be waived if not submitted in accordance with the requirements of this subparagraph. In cases of substantial compliance with the seven-day notice requirement here (but not to exceed fifteen (15) Working Days from the

beginning of the delay event), Owner may in its sole discretion recognize a claim for delay accompanied with the proper TIE, provided Contractor also shows good faith and a manifest lack of prejudice to Owner from the late notice.

11.4 Compensable Time Extensions

A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in Contract Sum in addition to Contract Time for:

1. Excusable delay caused solely by Changes in the Work ordered by Owner, as provided above, and/or
2. Excusable delay caused solely by Acts or Neglect by Owner or other person, as provided above.

11.5 Non-Compensable Time Extensions

A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in Contract Time only, without adjustment in Contract Sum, for

1. Periods of excusable delay caused solely by weather or Force Majeure events as provided above in this Article, or
2. Periods of concurrent delay, where delay results from two or more causes, one of which is compensable (resulting from Changes or Acts or Neglect as set forth above in this Article), and the other of which is non-compensable or inexcusable, such as: acts or neglect of Contractor, Subcontractors or others for whom Contractor is responsible; other acts, omissions and conditions which would not entitle Contractor to adjustment in Contract Time; adverse weather; and/or actions of Force Majeure as provided above in this Article.

11.6 Adverse Weather

A. If the Contractor is delayed in the performance of the Work because of acts of God, fire, strikes, unavailability of materials or similar occurrences beyond his control, the Owner may grant such extension of time to complete the contract as he deems appropriate, providing the contractor has notified the Owner in writing of the causes of the delay within five (5) Working Days of the beginning of the delay.

B. Requests for extensions of time to complete the contract based on delays in the performance of the work due to inclement weather must be submitted in writing to the Owner with appropriate justification on the number of days of delay. The Contractor and Owner will review the inclement weather days weekly. The Contractor will not be entitled to payment for costs incurred as a result of taking such actions.

C. During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall employ best practices to protect the Work, manage the construction site and rainwater during inclement weather and provide requirements of implemented SWPPP and BMP's. Persons performing the Work shall examine surfaces to receive their Work and shall report in writing to Contractor, with copy to Owner representative and the Architect/Engineer conditions detrimental to the Work. Failure to examine and report discrepancies makes the Contractor responsible, at no increase in Contract Sum, for corrections Owner may require. Commencement of Work constitutes acceptance of surface.

11.7 Liquidated Damages

A. Time is of the essence. Execution of Contract Documents by Contractor shall constitute its acknowledgement that Owner will actually sustain damages in the form of Contract administration expenses (such as Project management and consultant expenses) in the amount fixed in the Contract Documents for each and every Day during which completion of Work required is delayed beyond expiration of time fixed for completion plus extensions of time allowed pursuant to provisions hereof.

ARTICLE 12 - CLAIMS BY CONTRACTOR

12.1 Obligation to File Claims for Disputed Work

A. Should it appear to Contractor that the Work to be performed or any of the matters relative to the Contract Documents are not satisfactorily detailed or explained therein, or should any questions arise as to the meaning or intent of the Contract Documents, or should any dispute arise regarding the true value of any work performed, work omitted, extra work that the Contractor may be required to perform, time extensions, payment to the Contractor during performance of this Contract, performance of the Contract, and/or compliance with Contract procedures, or should Contractor otherwise seek extra time or compensation FOR ANY REASON WHATSOEVER, then Contractor shall first follow procedures set forth in the Contract (including but not limited to other Articles of this Document 00 7200 and Section 01 2050). If a dispute remains, then Contractor shall give written notice to Owner that expressly invokes this Article 12. Owner shall decide the issue in writing within 15 Working Days; and Owner's written decision shall be final and conclusive. If Contractor disagrees with Owner's decision, or if Contractor contends that Owner failed to provide a decision timely, then Contractor's SOLE AND EXCLUSIVE REMEDY is to promptly file a written claim setting forth Contractor's position as required herein.

12.2 Form And Contents Of Claim

A. Contractor's written claim must identify itself as a "Claim" under Article 12 and must include the following: (1) a narrative of pertinent events; (2) citation to contract provisions; (3) theory of entitlement; (4) complete pricing of all cost impacts; (5) a time impact analysis of all time delays that shows actual time impact on the critical path; (6) documentation supporting items 1 through 5; a verification under penalty of perjury of the claim's accuracy. The Claim shall be submitted to Owner within thirty (30) Calendar Days of receiving Owner's written decision, or the date Contractor contends such decision was due, and shall be priced like a change order according to Section 01 2050, and must be updated monthly as to cost and entitlement if a continuing claim. Routine contract materials, for example, correspondence, RFI, Change Order requests, or payment requests shall not constitute a claim. Contractor shall bear all costs incurred in the preparation and submission of a claim.

12.3 Administration During/After Claim Submission

A. Owner may render a final determination in writing based on the Claim or may in its discretion conduct an administrative hearing on Contractor's claim, in which case Contractor shall appear, participate, answer questions and inquiries, and present any further evidence or analysis requested by Owner prior to rendering a final determination in writing. Should Owner take no action on the Claim within 45 Calendar Days of submission, it shall be deemed denied. The parties may extend this 45 day period by mutual agreement upon submission of a claim.

B. Notwithstanding and pending the resolution of any claim or dispute, Contractor shall diligently prosecute the disputed work to final completion in accordance with Owner's determination.

C. After their submission, claims that total less than $375,000 in the aggregate at Contract closeout shall also be subject to the Local Agency Disputes Act.

D. Owner shall issue payment on any undisputed portion of the Claim within 60 days of Owner's final determination in writing. Failure by Owner to issue a written statement shall result in the claim being rejected in its entirety. A Claim that is denied by reason of Owner's failure to respond shall not constitute an adverse finding with regard to the merits of the Claim

12.4 Informal Conference and Mediation

A. If the Contractor disputes the Owner's written statement, or if the Owner fails to respond to a Claim issued pursuant to this Article within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the Owner shall schedule a meet and confer conference within thirty (30) calendar days of the demand.

B. Within ten (10) business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the Owner shall provide the Contractor with a written statement identifying the portion of the Claim that remains in dispute and the portion that

is undisputed. Any payment due on an undisputed portion of the Claim shall be made within sixty (60) days after the Owner issues this written statement.

C. Any remaining disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the Owner and the Contractor sharing the associated costs equally. The Owner and Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator, and those mediators shall selected a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of a neutral mediator.

D. Mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this Article.

E. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this Article.

F. Unless otherwise agreed to by the Owner and the Contractor in writing, the mediation conducted pursuant to this Article shall excuse any further obligation under Section 20104.4 of the Public Contract Code to mediate after litigation has been commenced.

G. The Claim resolution procedures in this Article do not preclude Owner from requiring arbitration of disputes under private arbitration if mediation under this Article does not resolve the parties' dispute.

H. Amounts not paid in a timely manner as required by this Article shall bear interest at 7 percent per annum**.**

12.5 Claims by Subcontractors

A. If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a Claim against Owner because privity of contract does not exist, the Contractor may present to the Owner a Claim on behalf of a Subcontractor or lower tier Subcontractor. A Subcontractor may request in writing, either on his or her own behalf, or on behalf of a lower tier Subcontractor, that the Contractor present a Claim for work which was performed by the Subcontractor or by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the Claim be presented to Owner shall furnish reasonable documentation to support the Claim. Within forty-five (45) days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the Claim to the Owner and, if the original Contractor did not present the Claim, provide the Subcontractor with a statement of the reasons for not having done so**.**

12.6 Compliance

A. The provisions of this Article 12 constitute a non-judicial claim settlement procedure that, pursuant to Section 930.2 of the California Government Code, shall constitute a condition precedent to submission of a valid Government Code Section 910 Claim under the California Government Code. Contractor shall bear all costs incurred in the preparation, submission and administration of a claim. Any claims presented thereafter in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the claims procedure herein and the previous dispositions under Paragraph 12.03 above of the claims asserted. Pursuant to Government Code Section 930.2, the one-year period in Government Code section 911.2 shall be reduced to 150 Calendar Days from either accrual of the cause of action, substantial completion or termination of the contract, whichever occurs first; in all other respects, the requirements of the Government Code shall apply unchanged, including, without limitation, Contractor's obligation to file a Government Code Section 910 Claim.

B. Failure to submit and administer claims as required in Article 12 shall waive Contractor's right to claim on any specific issues not included in a timely submitted claim. Claim(s) or issue(s) not

raised in a timely protest and timely claim submitted under this Article 12 may not be asserted in any subsequent litigation, Government Code Section 910 Claim, or legal action.

C. Owner shall not be deemed to waive any provision under this Article 12, if at Owner's sole discretion, a claim is administered in a manner not in accord with this Article 12. Waivers or modifications of this Article 12 may only be made a signed change order approved as to form by legal counsel for both Owner and Contractor; oral or implied modifications shall be ineffective.

12.7 Civil Actions; Consistency with Public Contract Code Section 9204 and 20104 et seq.

A. If the Government Code claim is denied, Contractor may file an action in court. Such action shall be subject to Public Contract Code sections 9204 or 20104.4. This Section applies only to Claims subject to Public Contract Code Sections 9204 or 20104; if a Claim is not subject to those sections, the Contractor's rights to file a civil action shall be as otherwise provided by law.

B. If any Claim arising under this Contract is subject to the provisions of Public Contract Code sections 9204 or 20104 et seq., and if the provisions of that article require a procedure or procedural element different from that established herein, then the provisions of that article shall apply in place of the conflicting procedure or procedural element established herein.

ARTICLE 13 - UNDERGROUND CONDITIONS

13.1 Contractor To Locate Underground Facilities.

A. During construction, Contractor shall comply with Government Code Sections 4216 to 4216.9, and in particular Section 4216.2 which provides, in part: "Except in an emergency, every person planning to conduct any excavation shall contact the appropriate regional notification center at least two (2) Working Days, but no more than ten (10) Working Days, prior to commencing that excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator, and, if practical, the excavator shall delineate with white paint or other suitable markings the area to be excavated. The regional notification center shall provide an inquiry identification number to the person who contacts the center and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation."

B. Contractor shall contact Underground Service Alert (USA) or the appropriate regional notification center and schedule the Work to allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities. Contractor is charged with knowledge of all subsurface conditions reflected in underground utility records. Contractor shall advise Owner of any conflict between information provided in Document 00 3100 (Geotechnical Data and Existing Conditions), the Drawings and that provided by underground utility records. Contractor's excavation shall be subject to and comply with the Contract Documents.

C. Contractor shall also investigate the existence of existing service laterals, appurtenances or other types of utilities, indicated by the presence of an underground transmission main implied by the presence of visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the Site, even if not shown or indicated in Document 00 3100 (Geotechnical Data and Existing Conditions), or the Drawings or that provided by underground utility records. Contractor shall immediately secure all such available information and notify Owner and the utility owner, in writing, of its discovery.

13.2 Contractor To Protect Underground Facilities.

A. At all times during construction, all operating Underground Facilities shall remain in operation, unless the Contract Documents expressly indicate otherwise. Contractor shall maintain such Underground Facilities in service where appropriate; shall repair any damage to them caused by the Work; and shall incorporate them into the Work, including reasonable adjustments to the design location (including minor relocations) of the existing or new installations. Contractor shall take immediate action to restore any in service installations damaged by Contractor's operations.

B. Prior to performing Work at the Site, Contractor shall lay out the locations of Underground Facilities that are to remain in service and other significant known underground installations indicated by the Underground Facilities Data. Contractor shall further locate, by carefully

excavating with small equipment, potholing and principally by hand, all such utilities or installations that are to remain and that are subject to damage. If additional utilities whose locations are unknown are discovered, Contractor shall immediately report to Owner for disposition of the same. Additional compensation or extension of time on account of utilities not shown or otherwise brought to Contractor's attention, including reasonable action taken to protect or repair damage, shall be determined as provided in this Document 00 7200.

C. If during construction, an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated in the materials supplied by Owner for bidding or in information provided through USA or otherwise reasonably available to Contractor, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than five (5) Working Days), and prior to performing any Work in connection therewith (except in an emergency), identify the owner of such Underground Facility and give written notice to Underground Facility owner and Owner. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

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

E. Consistent with California Government Code §4215, as between Owner and Contractor, Owner will be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the Site only if such utilities are not identified in the Contract Documents or information made available for bidding. Owner will compensate for the cost of locating and repairing damage not due to Contractor's failure to exercise reasonable care, removing and relocating such main or trunk line utility facilities not indicated in the Contract Documents or information made available for bidding with reasonable accuracy, and equipment on the Project necessarily idled during such Work. Contractor shall not be assessed liquidated damages for delay in completion of the Project, when such delay was caused by the failure of Owner or the utility to provide for removal or relocation of such utility facilities.

13.3 Concealed Or Unknown Conditions

A. If either of the following conditions is encountered at Site when digging trenches or other excavations that extend deeper than four feet below the surface, Contractor shall give a written Notice of Differing Site Conditions to Owner promptly before conditions are disturbed, except in an emergency as set forth in this Document 00 7200, and in no event later than five (5) Working Days after first observance of:

1. Subsurface or Latent physical conditions which differ materially from those indicated in the Contract Documents; or
2. Unknown physical conditions of an unusual nature or which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

B. In response to Contractor's Notice of Differing Site Conditions under this Paragraph, Owner will investigate the identified conditions, and if they differ materially and cause increase or decrease in Contractor's cost of, or time required for, performance of any part of the Work, Owner will negotiate the appropriate change order following the procedures set forth in the Contract Documents. If Owner determines that physical conditions at the Site are not Latent or are not materially different from those indicated in Contract Documents or that no change in terms of the Contract Documents is justified, Owner will so notify Contractor in writing, stating reasons (with Contractor retaining its rights under Article 12 of this Document 00 7200.)

C. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed Latent or materially different Site conditions (whether above or below grade) if Contractor

knew or should have known of the existence of such conditions at the time Contractor submitted its Bid, failed to give proper notice, or relied upon information, conclusions, opinions or deductions of the kind that the Contract Documents preclude reliance upon.

D. Regarding Underground Facilities, Contractor shall be allowed an increase in the Contract Sum or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that is owned and was built by Owner only where the Underground Facility:

1. Was not shown or indicated in the Contract Documents or in the information supplied for bidding purposes or in information provided through USA; and
2. Contractor did not know of it; and
3. Contractor could not reasonably have been expected to be aware of it or to have anticipated it from the information available. (For example, if surface conditions such as pavement repairs, valve covers, or other markings, indicate the presence of an Underground Facility, then an increase in the Contract Sum or an extension of the Contract Time will not be due, even if the Underground Facility was not indicated in the Contract Documents, in the information supplied to Contractor for bidding purposes, information provided through USA, or otherwise reasonably available to Contractor.)

E. Contractor shall bear the risk that Underground Facilities not owned or built by Owner may differ in nature or locations shown in information made available by Owner for bidding purposes, in information provided through USA, or otherwise reasonably available to Contractor. Underground Facilities are inherent in construction involving digging of trenches or other excavations on Owner's Project, and Contractor is to apply its skill and industry to verify the information available.

F. Contractor's compensation for claimed Latent or materially different Site conditions shall be limited to the actual, reasonable, incremental increase in cost of that portion of the Work, resulting from the claimed Latent or materially different Site conditions. Such calculation shall take into account the estimated value of that portion of the Work and the actual value of that portion of the Work, using for guidance Contractor's or its subcontractor's bid amount and actual amounts incurred for that portion of the Work and the reasonable expectation (if any) of differing or difficult site conditions in the Work area based on the available records and locale of the Work. For example, if Contractor excavates in an area unexpected, then such costs would be recoverable entirely; while if Contractor extends an existing excavation, then such costs would be recoverable if the resulting excavation costs in that work area exceeded the reasonable expectations therefore.

13.4 Notice Of Hazardous Waste Or Materials Conditions

A. Contractor shall give a written Notice of Hazardous Materials Condition to Owner promptly, before any of the following conditions are disturbed (except in an emergency as set forth in this Document 00 7200), and in no event later than 24 hours after first observance of any:

1. Material that Contractor believes may be hazardous waste or hazardous material, as defined in Section 25117 of the Health and Safety Code (including, without limitation, Asbestos, lead, PCBs, petroleum and related hydrocarbons, and radioactive material) that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law ("hazardous material"); or
2. Other material that may present an imminent substantial danger to persons or property exposed thereto in connection with Work at the Site ("other materials").

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

C. Contractor's Notice of Hazardous Materials Condition shall indicate whether the hazardous materials or other materials were shown or indicated in the Contract Documents to be within the

scope of Work, and whether the hazardous materials or other materials were brought to the Site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible.

D. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed hazardous waste or materials if:

1. Contractor knew of the existence of such hazardous materials or other materials at the time Contractor submitted its Bid; or
2. Contractor should have known of the existence of such hazardous material or other materials as a result of its having the responsibility to obtain additional or supplementary examinations, investigation, explorations, tests, studies, and data concerning the conditions at or contiguous to the Site prior to submitting its Bid; or
3. Contractor failed to give the written notice within the required timeframe set forth below.

E. If Owner determines that conditions involve hazardous materials or other materials and that a change in Contract Document terms is justified, Owner may issue either a Request for Proposal or Construction Change Order under the procedures described in the Contract Documents. If Owner determines that conditions do not involve hazardous materials or other materials or that no change in Contract Document terms is justified, Owner will notify Contractor in writing, stating the reasons for its determination.

F. In addition to the parties' other rights under this Document 00 7200, if Contractor does not agree to resume Work based on a reasonable belief that it is unsafe, or does not agree to resume Work under special conditions, Owner may order the disputed portion of Work deleted from the Work, or performed by others, or Owner may invoke its right to terminate Contractor's right to proceed under the Contract Documents in whole or in part, for convenience or for cause as the facts may warrant.

G. If Contractor does not agree with any Owner determination of any adjustment in the Contract Sum or Contract Time under this Article, Contractor may make a claim as provided in Article 12 of this Document 00 7200.

ARTICLE 14 - LEGAL AND MISCELLANEOUS

14.1 Laws And Regulations

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

14.2 Permits And Taxes

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

14.3 Communications And Information Distribution

A. All communications recognized under the Contract Documents shall be in writing, in the form of a serialized document, by type of communication. For example, RFI's shall be serialized beginning with RFI No. 1; payment applications shall be serialized beginning with Payment Application No. 1, submittals shall be serialized per specification section and transmitted with transmittal sheets beginning with Transmittal No. 1; and correspondence shall be serialized beginning with letter No. 1. Contractor may propose other record management and identification systems or protocols, intended to facilitate orderly transmittal of project information, storage and retrieval of such information, which Owner will review consistent with these stated objectives, and accept or reject in its sole discretion.

B. Documents Requiring Signatures. All documents requiring signatures for approval prior to implementing action, as stipulated in other portions of Contract Documents, shall require a manually signed, serialized letter delivered to the other party at its address for notice otherwise specified in the Contract Documents, either personally or by mail.

C. Electronic data transfer of such correspondence will serve to expedite preliminary concurrence of information, only. Receipt of "hard copy" signature on forms is required prior to implementing action or work as the conditions may require. For example, change orders and authorizations for extra cost, require signatures. A party may acknowledge receipt of portable document file (PDF) copies of required correspondence by e-mail, but in the absence of such acknowledgment, mail or personal delivery is required.

D. All emails shall be copied to Owner's and Contractor's Project Representative. Owner reserves the right to preclude e-mail communication, in whole or in part, as Project needs may require. Communication between Owner and Contractor shall not be via Twitter, Facebook, or other types of instant text message systems. Any such communications shall be inadmissible for any purpose related to this Contract.

14.4 Suspension Of Work

A. Owner may, without cause, order Contractor in writing to suspend, delay or interrupt Work in whole or in part for such period of time as Owner may determine. An adjustment shall be made for increases in cost of performance of Work of the Contract Documents caused by any such suspension, delay or interruption, calculated using the measures set forth in Section 01 2050 (Modification Procedures). No adjustment shall be made to extent that performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible.

14.5 Termination Of Contract For Cause

A. The Contractor shall be in default of the Contract Documents and Owner may terminate the Contractor's right to proceed under the Contract Documents, for cause, in whole or in part, should the Contractor commit a material breach of the Contract Documents and not cure such breach within ten (10) Calendar Days of the date of notice from Owner to the Contractor demanding such cure; or, if such breach is curable but not curable within such ten (10) day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for the Contractor to avail itself of a time period in excess of ten (10) Calendar Days, the Contractor must provide Owner within the ten (10) day period with a written plan acceptable to Owner that demonstrates actual resources, personnel and a schedule to promptly to cure said breach, and then diligently commence and continue such cure according to the written plan).

B. In the event of termination by Owner for cause as provided herein, the Contractor shall deliver to Owner possession of the Work in its then condition, including but not limited to, all designs, engineering, Project records, cost data of all types, plans and specifications and contracts with vendors and subcontractors, all other documentation associated with the Project, and all construction supplies and aids dedicated solely to performing the Work which, in the normal course of construction, would be consumed or only have salvage value at the end of the construction period. The Contractor shall remain fully liable for the failure of any Work completed and materials and equipment provided through the date of such termination to comply with the provisions of the Contract Documents. The provisions of this Section shall not be interpreted to diminish any right which Owner may have to claim and recover damages for any breach of the Contract Documents or otherwise, but rather, the Contractor shall compensate Owner for all loss,

cost, damage, expense, and/or liability suffered by Owner as a result of such termination and/or failure to comply with the Contract Documents.

C. In the event a termination for cause is later determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience, and the Contractor shall have no greater rights than it would have had following a termination for convenience. Any Contractor claim arising out of a termination for cause shall be made in accord with Article 12 herein. No other loss, cost, damage, expense or liability may be claimed, requested or recovered by the Contractor.

14.6 Termination Of Contract For Convenience

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

B. Contractor shall comply strictly with Owner's direction regarding the effective date of the termination, the extent of the termination, and shall stop work on the date and to the extent specified.

C. Contractor shall be entitled to a total payment on account of the Contract work so terminated measured by (i.) the actual cost to Contractor of Work actually performed, up to the date of the termination, with profit and overhead limited to twelve percent (12%) of actual cost of work performed, up to but not exceeding the actual contract value of the work completed as measured by the Schedule of Values and Progress Schedule, (ii.) offset by payments made and other contract credits. In connection with any such calculation, however, Owner shall retain all rights under the Contract Documents, including but not limited to claims, indemnities, or setoffs.

D. Under no circumstances may Contractor recover legal costs of any nature, nor may Contractor recover costs incurred after the date of the termination or lost profits on terminated Work.

14.7 Remedies

A. Subject to Contract Documents provisions regarding Contractor claims, claim review, and claim resolution, and subject to the limitations therein, the exclusive jurisdiction and venue for resolving all claims, counter claims, disputes and other matters in question between Owner and Contractor arising out of or relating to Contract Documents, any breach thereof or the Project shall be the applicable court of competent jurisdiction located in the State and County where the Project is located.

B. All Owner remedies provided in the Contract Documents shall be taken and construed as cumulative and not exclusive; that is, in addition to each and every other remedy herein provided; and in all instances Owner shall have any and all other equitable and legal rights and remedies which it would have according to law.

14.8 Contract Integration and Non-Waiver

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

B. Either party's waiver of any breach or failure to enforce any of the terms, covenants, conditions or other provisions of the Contract Documents at any time shall not in any way affect, limit, modify or waive that party's right thereafter to enforce or compel strict compliance with every term,

covenant, condition or other provision hereof, any course of dealing or custom of the trade or oral representations notwithstanding.

C. Neither acceptance of the whole or any part of Work by Owner nor any verbal statements on behalf of Owner or its authorized agents or representatives shall operate as a waiver or modification of any provision of the Contract Documents, or of any power reserved to Owner herein nor any right to damages provided in the Contract Documents.

14.9 Interpretation

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

B. Contract Documents shall not be construed to create a contractual relationship of any kind between (1) Project Manager or any Owner's representative and Contractor; (2) Owner and/or its Representatives and a Subcontractor, sub-Subcontractor, or supplier of any Project labor, materials, or equipment; or (3) between any persons or entities other than Owner and Contractor.

14.10 Patents

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

14.11 Substitution For Patented And Specified Articles

A. Except as noted specifically in the instructions to Bidders or in Contract Documents, whenever in Specifications, material or process is designated by patent or proprietary name or by name of manufacturer, such designation shall be deemed to be used for purpose of facilitating description of material and process desired, and shall be deemed to be followed by the words "or Approved Equal" and Contractor may offer any substitute material or process that Contractor considers "equal" in every respect to that so designated and if material or process offered by Contractor is, in opinion of Owner, Equal in every respect to that so designated, its use will be approved. However, Contractor may utilize this right only by timely submitting Document 01 6000-A (Substitution Request Form) as provided in Document 00 2113 (Instructions to Bidders). A substitution will be approved only if it is a true "or equal" item in every aspect of its design and quality, including but not limited to its dimensions, weights, materials of construction, service requirements, durability, functioning, impact on contiguous construction elements, overall schedule and design.

14.12 Interest Of Public Officers

A. No representative, officer, or employee of Owner no member of the governing body of the locality in which the Project is situated, no member of the locality in which Owner was activated, and no

other public official of such locality or localities who exercises any functions or responsibilities with respect to the Project, during the tenure of the official or for one year thereafter, shall, as principal, agent, attorney or otherwise, be directly or indirectly interested, in the Contract Documents or the proceeds thereof.

14.13 Limit Of Liability

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

ARTICLE 15 - WORKING CONDITIONS AND PREVAILING WAGES

15.1 Use Of Site/Sanitary Rules

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

B. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Site and land areas identified in and permitted by Contract Documents and other land and areas permitted by applicable laws and regulations, rights of way, permits and easements or as designated by Owner, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, any improvement located thereon, or to Owner or occupant thereof resulting from the performance of Work.

C. During the progress of the Work, Contractor shall keep the Site and the Project free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, Contractor shall clean the site, remove all waste materials, rubbish and debris from and about the Site as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall leave the premises clean and ready for occupancy by Owner at Completion of Work. Contractor shall restore to original condition all property not designated for alteration by Contract Documents.

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

15.2 Protection Of Work, Persons, And Property

A. Contractor shall be responsible for initiating, maintaining and supervising all safety and site security precautions and programs in connection with Work, and shall develop and implement a site security and safety plan throughout construction. Contractor shall comply with all safety requirements specified in any safety program established by Owner, or required by state, federal or local laws and ordinances. Contractor shall be responsible for remedying all theft or damage to Work, property or structures, and all injuries to persons, either on the Site or constituting the Work (e.g., materials in transit), arising from the performance of Work of the Contract Documents from a cause.

B. Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owners of adjacent property and of Underground Facilities and utility Owners when

prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property.

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

D. 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.

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

F. Work within the right-of-way lines of the city and/or Owner and/or State shall be done in accordance with the standards and specifications of the controlling agency. Permit for such work shall be obtained and paid for by the Contractor before executing the work within such right-of-ways.

15.3 Responsibility For Safety And Health

A. Contractor shall ensure that its and each tier of Subcontractors' employees, agents and invitees comply with applicable health and safety laws while at the Site. These laws include the Occupational Safety and Health Act of 1970 and rules and regulations issued pursuant thereto, and Owner's safety regulations as amended from time to time. Contractor shall comply with all Owner directions regarding protective clothing and gear.

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

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

15.4 Emergencies

In emergencies affecting the safety or protection of persons or Work or property at the Site or adjacent thereto, Contractor, without special instruction or authorization from Owner, is obligated to act to prevent threat and damage, injury or loss, until directed otherwise by Owner. Contractor shall give Owner prompt written notice of actions taken due to emergency.

15.5 Use Of Roadways And Walkways

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

15.6 Nondiscrimination

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

15.7 Prevailing Wages And Working Hours

A. Contractor shall pay to persons performing labor in and about Work provided for in the Contract Documents an amount equal to or more than the general prevailing rate of per diem wages for (1) work of a similar character in the locality in which the Work is performed and (2) legal holiday and overtime work in said locality. The per diem wages shall be an amount equal to or more than the stipulated rates contained in a schedule that has been ascertained and determined by the Director of the State Department of Industrial Relations and Owner to be the general prevailing rate of per diem wages for each craft or type of workman or mechanic needed to execute this Contract. Contractor shall also cause a copy of this determination of the prevailing rate of per diem wages to be posted at each Site. The Director's schedule of prevailing rates is on file and open for inspection at Rosamond Community Services District, 3179 35th Street West, Rosamond, California 93560, and is incorporated herein by this reference.

B. Contractor shall forfeit, as a penalty to Owner, Fifty Dollars ($50.00) for each laborer, workman, or mechanic employed in performing labor in and about the Work provided for in the Contract Documents for each Day, or portion thereof, that such laborer, workman or mechanic is paid less than the said stipulated rates for any Work done under the Contract Documents by him or her or by any Subcontractor under him or her, in violation of Articles 1 and 2 of Chapter 1 of Part 7 of Division II of the California Labor Code. The sums and amounts which shall be forfeited pursuant to this Paragraph and the terms of the California Labor Code shall be withheld and retained from payments due to Contractor under the Contract Documents, pursuant to this Document 00 7200 and the California Labor Code, but no sum shall be so withheld, retained or forfeited except from the final payment without a full investigation by either the State Department of Industrial Relations or by Owner. The Labor Commissioner pursuant to California Labor Code §1775 shall determine the final amount of forfeiture.

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

D. Contractor stipulates that it shall comply with all applicable wage and hour laws, including without limitation, California Labor Code §§ 1776 and 1810-1815. Failure to so comply shall constitute a default under this Contract.

E. Contractor and its Subcontractors shall be responsible for compliance with Labor Code §§ 1810-1815.

1. Eight hours of labor performed in execution of the Contract constitutes a legal day's work. The time of service of any workman employed on the Project is limited and restricted to 8 hours during any one calendar day, and 40 hours during any one calendar week.
2. Contractor and its Subcontractors shall keep an accurate record showing the name of and actual hours worked each calendar day and each calendar week by each worker employed by him or her in connection with the Project. The record shall be kept open at all reasonable hours for inspection by Owner and the Division of Labor Standards Enforcement.
3. Contractor or its Subcontractors shall, as a penalty to Owner, forfeit twenty-five dollars ($25) for each worker employed in the execution of the Contract Documents by the respective Contractor or Subcontractor for each calendar day during which the worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of Labor Code §§ 1810-1815.

4. Work performed on the Project by employees of Contractor or its Subcontractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than 1 1/2 times the basic rate of pay.

F. Contractor and its Subcontractors shall be responsible for compliance with Labor Code Section 1776.

1. Contractor and Subcontractors must keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the Work of the Contract Documents. Each payroll record shall contain or be verified by a written declaration as required by Labor Code Section 1776.
2. The payroll records enumerated above must be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor as required by Labor Code Section 1776.

    a. Contractor shall inform Owner of the location of records enumerated above, including the street address, city and county, and shall, within five (5) Working Days, provide a notice of a change of location and address.
    b. Contractor or Subcontractor has ten (10) Working Days in which to comply subsequent to receipt of a written notice requesting the records enumerated above. In the event that the Contractor or Subcontractor fails to comply with the ten-day period, he or she shall, as a penalty to Owner on whose behalf the contract is made or awarded, forfeit $25.00 for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. Contractor is not subject to a penalty assessment pursuant to this Paragraph due to the failure of a Subcontractor to comply with this Paragraph.

3. Contractor shall also deliver certified payrolls to Owner with each Application for Payment as set forth above in this Document 00 7200 (General Conditions).
4. This project may be subject to monitoring and enforcement by the Department of Industrial Relations (DIR), including the obligation to submit certified payroll records directly to the DIR Compliance Monitoring Unit (CMU) at least monthly in a format prescribed by the Labor Commissioner. The contractor must post job site notices as prescribed by DIR regulation.

15.8 Environmental Controls

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

15.9 Shoring Safety Plan

A. Any conflict between this Paragraph and Division 2 or Division 31 of the Specifications shall be resolved in favor of the most stringent requirement.

B. At least five (5) Working Days in advance of any excavation five feet or more in depth, Contractor shall submit to Owner a detailed plan showing the shoring, bracing and sloping design (including calculations) and other provisions to be made for worker protection from the hazard of caving ground during the excavation, as required by California Labor Code §6705. A civil or structural engineer registered in California shall prepare and sign any plan that varies from the shoring system standards established by the State Construction Safety Orders.

C. During the course of Work, Contractor shall be responsible for determining where sloping, shoring, and/or bracing is necessary and the adequacy of the design, installation, and maintenance of all shoring and bracing for all excavation, including any excavation less than five feet in depth. Contractor will be solely responsible for any damage or injuries that may result from excavating or trenching. Owner's acceptance of any drawings showing the shoring or bracing design or Work schedule shall not relieve Contractor of its responsibilities under this Paragraph.

D. Appoint a qualified supervisory employee who shall be responsible for determining the sloping or shoring system to be used depending on local soil type, water table, stratification, depth, etc.

15.10 Required Registration with the State of California Department of Industrial Relations

A. Pursuant to California Labor Code 1725.5, all contractors and subcontractors must be registered with the Department of Industrial Relations (DIR) in order to be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code or engage in the performance of any public work contract. Detailed information about contractor's responsibilities and online registration may be obtained on the State of California Department of Industrial Relations, Public Works website, http://www.dir.ca.gov/Public-Works/PublicWorks.html.

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DOCUMENT 00 7280
APPRENTICESHIP PROGRAM

ARTICLE 1 - COMPLIANCE REQUIRED

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

ARTICLE 2 - CERTIFICATION OF APPROVAL

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

A. When unemployment for the previous three-month period in the area exceeds an average of 15 percent;
B. When the number of apprentices in training in the area exceeds a ratio of one to five;
C. When a trade can show that it is replacing at least 1/30 of its membership through apprenticeship training on an annual basis state-wide or locally; or
D. Assignment of an apprentice to any work performed under a public works contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyperson.

ARTICLE 3 - FUND CONTRIBUTIONS

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

ARTICLE 4 - APPRENTICESHIP STANDARDS

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

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DOCUMENT 00 7300
SUPPLEMENTARY CONDITIONS – INSURANCE AND INDEMNIFICATION

ARTICLE 1 - INSURANCE

1.01 At or before the date specified in Document 00 2113 (Instructions to Bidders), Contractor, in order to protect the Rosamond Community Services District ("Owner") and its board members, officials, agents, officers, and employees against all claims and liability for death, injury, loss and damage as a result of Contractor's actions in connection with the performance of Contractor's obligations, as required in the Contract Documents, shall secure and maintain insurance as described below. Contractor shall not perform any work under the Contract Documents until Contractor has obtained all insurance required under this section and the required certificates of insurance and all required endorsements have been filed with Owner. Receipt of evidence of insurance that does not comply with all applicable insurance requirements shall not constitute a waiver of the insurance requirements set forth herein. The required documents must be signed by the authorized representative of the insurance company shown on the certificate**.** Upon request, Contractor shall supply proof that such person is an authorized representative thereof, and is authorized to bind the named underwriter(s) and their company to the coverage, limits and termination provisions shown thereon. Contractor shall promptly deliver to Owner a certificate of insurance, and all required endorsements, with respect to each renewal policy, as necessary to demonstrate the maintenance of the required insurance coverage for the term specified herein. Such certificates and endorsements shall be delivered to Owner prior to the expiration date of any policy and bear a notation evidencing payment of the premium thereof if so requested. Contractor shall immediately pay any deductibles and self-insured retentions under all required insurance policies upon the submission of any claim by Contractor or Owner as an additional insured.

A. Workers' Compensation and Employers Liability Insurance Requirement -- In the event Contractor has employees who may perform any services pursuant to the Contract Documents, Contractor shall submit written proof that Contractor is insured against liability for workers' compensation in accordance with the provisions of section 3700 of the California Labor Code.

By signing the Agreement, Contractor makes the following certification, required by section 1861 of the Labor Code:

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

Contractor shall require any sub-contractors to provide workers' compensation for all of the subcontractors' employees, unless the sub-contractors' employees are covered by the insurance afforded by Contractor. If any class of employees engaged in work or services performed under this Agreement is not covered by California Labor Code section 3700, Contractor shall provide and/or require each sub-contractor to provide adequate insurance for the coverage of employees not otherwise covered.

Contractor shall also maintain employer's liability insurance with limits of one million dollars ($1,000,000) for bodily injury or disease.

B. General Liability Insurance Requirements – Contractor shall maintain in full force and effect, at all times during the term of the Agreement Commercial General Liability Insurance including, but not limited to, Contractual Liability Insurance (specifically concerning the indemnity provisions of the Contract Documents), Products-Completed Operations Hazard, Personal Injury (including bodily

injury and death), and Property Damage for liability arising out of Contractor's performance of work under the Agreement. Contractor shall maintain the Products-Completed Operations Hazard coverage for the longest period allowed by law following termination of the Agreement. The amount of said insurance coverage required by the Contract Documents shall be the policy limits, which shall be at least five million dollars ($5,000,000) each occurrence. Commercial General Liability Insurance shall continue coverage for a minimum of five (5) years after completion of the Work.

C. Automobile Liability Insurance Requirements – Contractor shall maintain Automobile Liability Insurance against claims of Personal Injury (including bodily injury and death) and Property Damage covering any vehicle and/or all owned, leased, hired and non-owned vehicles used in the performance of services pursuant to the Contract Documents with coverage equal to the policy limits, which shall be at least one million dollars ($5,000,000) each occurrence.

D. Builder's Risk (Course of Construction) – Contractor shall maintain insurance utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions.

1.02 The Commercial General Liability and Automobile liability Insurance required in sub-paragraphs B. and C. above shall include an endorsement naming the Rosamond Community Services District and District's board members, officials, officers, agents, employees and volunteers as additional insureds for liability arising out of the Agreement and any operations related thereto. Said endorsement shall be provided using one of the following three options: (i) on ISO form CG 20 10, CG 11 85; or (ii) both ISO form CG 20 10, CG 20 26, CG 20 33, or CG 20 38 and CG 20 37.

1.03 Self-insured retentions shall be declared to and approved by the Owner. The Owner may require the Contractor to purchase coverage with a lower retention or provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or Owner. The CGL and any policies, including Excess liability policies, shall not be subject to a self-insured retention (SIR) or deductible that exceeds $25,000 unless approved in writing by Owner. Any and all deductibles and SIRs shall be the sole responsibility of Contractor or subcontractor who procured such insurance and shall not apply to the Indemnified Additional Insured Parties. Owner may deduct from any amounts otherwise due Contractor to fund the SIR/deductible. Policies shall NOT contain any self-insured retention (SIR) provision that limits the satisfaction of the SIR to the Named Insured. The policy shall also provide that Defense costs, including the Allocated Loss Adjustment Expenses, will satisfy the SIR or deductible. Owner reserves the right to obtain a copy of any policies and endorsements for verification.

1.04 If any coverage required is written on a claims-made coverage form:

1. The retroactive date shall be shown, and this date must be before the execution date of the contract or the beginning of contract work.
2. Insurance shall be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
3. If coverage is cancelled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective, or start of work date, the Contractor shall purchase extended reporting period coverage for a minimum of five (5) years after completion of contract work.
4. A copy of the claims reporting requirements shall be submitted to the Owner for review.
5. If the services involve lead-based paint or asbestos identification/remediation, the Contractors Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification/remediation, the Contractors

Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.

1.05 Cancellation of Insurance -- The above stated insurance coverages required to be maintained by Contractor shall be maintained until the completion of all of Contractor's obligations under the Contract Documents except as otherwise indicated herein. Each insurance policy supplied by Contractor shall not be suspended, voided, modified, canceled, or reduced in coverage or in limits except after ten (10) days notice by Contractor in the case of non-payment of premiums, or on thirty (30) days prior written notice in all other cases. This notice requirement does not waive the insurance requirements stated herein. Contractor shall immediately obtain replacement coverage for any insurance policy that is terminated, canceled, non-renewed, or whose policy limits have been exhausted or upon insolvency of the insurer that issued the policy.

1.06 The Contractor may use Umbrella or Excess Policies to provide the liability limits as required in this agreement. This form of insurance will be acceptable provided that all of the Primary and Umbrella or Excess Policies shall provide all of the insurance coverages herein required, including, but not limited to, primary and non-contributory, additional insured, Self-Insured Retentions (SIRs), indemnity, and defense requirements. The Umbrella or Excess policies shall be provided on a true "following form" or broader coverage basis, with coverage at least as broad as provided on the underlying Commercial General Liability insurance. No insurance policies maintained by the Additional Insureds, whether primary or excess, and which also apply to a loss covered hereunder, shall be called upon to contribute to a loss until the Contractor's primary and excess liability policies are exhausted.

1.07 All insurance shall be issued by a company or companies admitted to do business in California and listed in the current "Best's Key Rating Guide" publication with a minimum rating of A: VII. Any exception to these requirements must be pre-approved by the Owner.

1.08 Waiver of Subrogation – Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the Owner for all work performed by the Contractor, its employees, agents and subcontractors.

1.09 If Contractor is, or becomes during the term of the Agreement, self-insured or a member of a self-insurance pool, Contractor shall provide coverage equivalent to the insurance coverages and endorsements required above. Owner will not accept such coverage unless Owner determines, in its sole discretion and by written acceptance, that the coverage proposed to be provided by Contractor is equivalent to the above-required coverages.

1.10 All insurance afforded by Contractor pursuant to the Contract Documents shall be primary to and not contributing to any other insurance or self-insurance maintained by Owner. An endorsement shall be provided on all policies which shall waive any right of recovery (waiver of subrogation) against Owner. A waiver of right of recovery (waiver of subrogation) is only required when Contractor's personnel deliver services or perform service for the Owner while on Owner property.

1.11 Insurance coverages in the minimum amounts set forth herein shall not be construed to relieve Contractor for any liability, whether within, outside, or in excess of such coverage, and regardless of solvency or insolvency of the insurer that issues the coverage; nor shall it preclude Owner from taking such other actions as are available to it under any other provision of the Contract Documents or otherwise in law.

1.12 Failure by Contractor to maintain all such insurance in effect at all times required by the Contract Documents shall be a material breach of the Contract by Contractor. Owner, at its sole option,

may terminate the Contract and obtain damages from Contractor resulting from said breach. Alternatively, Owner may purchase such required insurance coverage, and without further notice to Contractor, Owner shall deduct from sums due to Contractor any premiums and associated costs advanced or paid by Owner for such insurance. If the balance of monies obligated to Contractor pursuant to the Contract are insufficient to reimburse Owner for the premiums and any associated costs, Contractor agrees to reimburse Owner for the premiums and pay for all costs associated with the purchase of said insurance. Any failure by Owner to take this alternative action shall not relieve Contractor of its obligation to obtain and maintain the insurance coverages required by the Contract Documents.

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

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

1.15 All Subcontractors shall maintain the same insurance required to be maintained by Contractor with respect to their portions of the Work unless otherwise indicated in the Contract Documents, and Contractor shall cause the Subcontractors to furnish proof thereof to Owner within ten Days of Owner's request.

ARTICLE 2 - RESPONSIBILITY OF CONTRACTOR AND INDEMNIFICATION

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

2.02 To the furthest extent permitted by law (including without limitation California Civil Code §2782), Contractor shall assume defense of, and indemnify and hold harmless, Owner and each of its officers, employees, consultants and agents, including but not limited to the Board, Project Manager and each Owner's Representative, from claims, suits, actions, losses and liability of every kind, nature and description, including but not limited to claims and fines of regulatory agencies and attorney's fees of counsel retained by Owner, expert fees, costs of staff time, and investigation costs, directly or indirectly arising out of, connected with or resulting from performance of the Work, failure to perform the Work, or condition of the Work which is caused in whole or part by any act or omission of Contractor, Subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, resulting from any cause whatsoever.

2.03 With respect to third-party claims against Contractor, Contractor waives any and all rights to any type of express or implied indemnity against Owner and each of its officers, employees, consultants and agents including, but not limited to Owner, the Board, Project Manager and each Owner's Representative. Owner shall provide timely notice to Contractor of any third-party claim relating to the Contract Documents, in accordance with Section 9201 of the California Public Contract Code.

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

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

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

END OF DOCUMENT

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DOCUMENT 00 9111

ADDENDUM NO. _____
Date: _____

ROSAMOND COMMUNITY SERVICES DISTRICT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

3179 35th Street West, Rosamond, CA 93560

Project No. 22515

Item No. 1:

Item No. 2:

Item No. 3:

The following Addenda were issued, modifying the Project Manual:

Addendum No. ___, issued on _____.

_____
Amanda Parra, PE
Architect/Engineer

Contractor	Signature
Date	Name/Title

END OF DOCUMENT

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MASTER SPECIFICATIONS
INDEX

DIVISION 01 - GENERAL REQUIREMENTS

01 1000	-	SUMMARY OF THE WORK	4
01 2000	-	PRICE AND PAYMENT PROCEDURES	6
01 2000A	-	PERIODIC ESTIMATE FOR PARTIAL PAYMENT	2
01 2000B	-	REQUEST FOR PAYMENT CERTIFICATION	2
01 2050	-	MODIFICATION PROCEDURES	12
01 3000	-	ADMINISTRATIVE REQUIREMENTS	6
01 3216	-	CONSTRUCTION AND PROGRESS SCHEDULES	2
01 4000	-	QUALITY REQUIREMENTS	10
01 4100	-	REGULATORY REQUIREMENTS	6
01 4216	-	DEFINITIONS	8
01 5000	-	TEMPORARY FACILITIES AND CONTROLS	4
01 6000	-	PRODUCT REQUIREMENTS	4
01 6000A	-	SUBSTITUTION REQUEST FORM	4
01 7000	-	CONTRACT CLOSEOUT	4
01 7000A	-	CONTRACT CLOSEOUT- ATTACHMENT	4
01 7050	-	CUTTING AND PATCHING	4
01 9113	-	STARTING OF SYSTEMS	4

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DIVISION 1 GENERAL REQUIREMENTS

SECTION 01 1000

SUMMARY OF THE WORK

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes Summary of Work and Work Restrictions including:

1. Work Covered By Contract Documents
2. Base Bid
3. Work Under Other Contracts
4. Future Work
5. Work Days and Hours
6. Cooperation of Contractor and Coordination with Other Work
7. Partial Occupancy/Utilization Requirements
8. Contractor Use of Site
9. Air Quality Standards
10. Construction Staking and Monument Protection
11. Protection of Existing Structures and Underground Facilities
12. Permits

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Work comprises of the construction of the Rosamond Community Services District (hereinafter "Owner") **WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS PROJECT located at the Wastewater Treatment Plant (WWTP) east of Sierra HWY and south of Patterson Rd in Rosamond, CA. The Work includes the construction of a system that consists of improving the grit removal process by adding a grit removal system along with the required electrical and instrumentation components. The work will consist of the construction of grit removal facilities, including the installation of equipment and the modification of existing piping, as described on the plans.** Contract Documents fully describe the Work.

B. The Work of this Contract comprises construction of all the Work indicated, described in the Specifications, or otherwise required by the Contract Documents. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered by Contract Documents shall rest with Contractor until Final Acceptance of the Work. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in prices Bid and no direct or additional payment will be made therefore.

C. For all Bid items, furnish and install all Work, including connections to existing systems, indicated and described in Specifications and all other Contract Documents. Work and requirements applicable to each individual Bid item, or unit of Work, shall be deemed incorporated into the description of each Bid item (whether Lump Sum or Unit Price). Any Bid item may be deleted from the Work and Contract Sum, in total or in part, prior to or after award of Contract without compensation in any form or adjustment of other Bid items or prices therefore.

D. Modifications to allowance Work dollar values shall be done as Change Orders and as specified in Section 00 2050 (Modification Procedures). Identify Allowance Items (See Document 00 4100 Bid Form) work on the Progress Schedules and on Applications for Payment. The Amount given on Document 00 4100 (Bid Form) under each Allowance Item is the sum of money set aside for each Allowance Item. These amounts shall be included in the Contract Sum on the Bid Form. If the cost of Work done under any Allowance Item is less than the amount given on the Bid Form under that Allowance Item, the Contract Sum shall be reduced by the difference between the amount given in the Bid Form and the cost of Work actually done.

1.03 BASE BID

A. Descriptions of Base Bid Item: Provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements as therein set forth.

1.04 WORK SEQUENCE

A. Construct Work in stages and at times to accommodate Owner operation requirements during the construction period; coordinate construction schedule and operations with Owner and accordance with work sequence specifications.

1.05 WORK DAYS AND HOURS

A. Work Days and hours: Monday-Friday inclusive, **7:00 a.m.-5:00 p.m.** local time or as allowed by permit requirements from the County of Kern.

B. Work at the Site on weekends or holidays is not permitted, unless Contractor requests otherwise from Owner in writing at least 48 hours in advance and Owner approves in its sole discretion. Any work performed outside normal work days and hours will cause the contractor to pay all overtime inspection and testing costs, as determined by the Owner.

1.06 SHUTDOWN FOR DISCOVERY OF CULTURAL RESOURCES

A. If discovery is made of items of historical archaeological or paleontological interest, immediately cease all Work in the area of discovery. Archaeological indicators may include, but are not limited to, dwelling sites, locally darkened soils, stone implements or other artifacts, fragments of glass or ceramics, animal bones, human bones, and fossils. After cessation of excavation, immediately contact Owner. Do not resume Work until authorization is received from Owner. When resumed, excavation or other activities shall be as directed by Owner.

1.07 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK

A. Coordinate with Owner and any Owner forces, or other contractors and forces, as required by 00 7200 (General Conditions).

B. Contractor shall review Contract Documents, submittals, changes, and prepare overlay drawings as necessary to avoid conflicts, errors, omissions and untimely construction.

1.08 PARTIAL OCCUPANCY/UTILIZATION REQUIREMENTS

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

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

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

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

E. Prior to date of recordation of the Notice of Completion, all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to Defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor, as required in Document 00 7200 (General Conditions).

F. Use by Owner of Work or part thereof as contemplated by this Section 01 1000 shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by Owner of any of the conditions thereof.

1.09 CONTRACTOR USE OF SITE

A. **Project Site: The Project is located at the Rosamond Wastewater Treatment Plant, 875 Patterson Road, Rosamond, CA 93560**

B. Confine operations at Project Site to areas permitted by Contract Documents, permits, ordinances, and laws. Do not unreasonably encumber Project Site with materials or equipment.

C. Assume full responsibility for protection and safekeeping of products stored on premises. Move any stored products that interfere with operations of Owner or other contractor.

D. The Contractor is responsible for securing parking, storage, staging, and Work areas. Comply with Kern County encroachment permit requirements.

E. Prior to commencement of Work or excavation, Contractor and Owner shall jointly survey the area adjacent to the Project Site making permanent note and record of such existing damage such as cracks, sags or other similar damage. Contractor shall supplement record with photographs indexed on a key map or drawing. This record and photographs shall serve as a basis for determination of subsequent damage to structures, conditions or other existing improvements due to Contractor's operations. All parties making the survey shall sign the official record of existing damage. Cracks, sags or damage of any nature to the adjacent Project area, not noted in the original survey but subsequently noted, shall be reported immediately to Owner.

F. The Contractor shall follow all applicable county and local jurisdictional ordinances in force during the duration of this Contract.

G. It is essential that the Contractor perform the Work with as little interference and disturbance as possible to the surrounding neighborhoods.

H. When suspect materials, outside the scope of Work, are encountered during the Work or restoration process, the Contractor shall immediately contact the Owner or Owner's representative for evaluation and approval of the methods for dealing with the material.

1.010 AIR QUALITY STANDARDS

A. Ensure that idling time for all heavy equipment is minimized to reduce on-Site emissions.

B. Maintain equipment in good mechanical condition.

C. Cover the loads of trucks hauling dirt.

D. Limit work generating dust emissions during periods of high winds (greater than 15 miles per hour).

E. Replace ground cover in disturbed areas as soon as possible.

F. Enclose, cover, water, or apply soil binders to exposed stockpiles.

G. Remove earth tracked onto neighboring paved roads at least once daily.

H. Limit equipment speed to 10 miles per hour in unpaved areas.

I. Implement Storm Water Pollution Prevention Plan as required.

J. Follow applicable air district requirements.

1.011 CONSTRUCTION STAKING AND MONUMENT PROTECTION

A. **Contractor** shall provide engineering surveys to establish construction stakes that in Owner's judgment are necessary to enable Contractor to proceed with the Work.

B. Contractor shall be responsible for laying out the Work, shall protect and preserve the established construction stakes and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Whenever Contractor knows or reasonably should know that any Work activity is likely to damage or destroy any construction stakes or property monuments, or require relocation because of necessary changes in grades or locations, provide at least 2 Business Days advance notice to Owner. In any event, notify Owner whenever any construction stakes or property monuments are lost or destroyed or require relocation because of necessary changes in grades or locations. Contractor shall employ a registered professional to replace or repair construction stakes or property monuments at Contractor's expense.

C. When Contractor performs construction staking, provide Owner with Contractor's survey staking information in writing within 3 Working Days after it becomes available to Contractor.

1.012 GEOTECHNICAL DATA AND EXISTING CONDITIONS

A. Available Documentation: In accordance with, and subject to, the provisions of Document 00 3100 (Geotechnical Data and Existing Conditions), the following documentation is available for review. This information is not part of the Contract Documents.

1. Geotechnical Engineering Investigation Report; RCSD WWTP Rehabilitation Project, Rosamond CA; BSK Project G18-169-11B; August 31, 2018

1.013 PROTECTION OF EXISTING STRUCTURES AND UNDERGROUND FACILITIES

A. The Drawings may indicate existing above- and below-grade structures, drainage lines, storm drains, sewers, water lines, gas lines, electrical lines, and other similar items and Underground Facilities that are known to Owner. Owner operates potable water and sewer facilities within the District. At least 2 Business Days, or as otherwise noted, prior to commencement of excavation, notify the Owner and the representatives of the following Underground Facilities in addition to contacting Underground Service Alert.:

1. **Power: Southern California Edison**
2. **Gas: Southern California Gas**
3. **Water: Rosamond Community Services District**
4. **Sewer: Rosamond Community Services District**

B. Attention is directed to power and telephone lines where overhead service to a structure, known to receive service, does not exist, then underground service shall be assumed to exist.

C. Perform pot-holing by hand within 24 inches (in any direction) of the Underground Facilities. This may be done on an area-by-area basis, but shall be accomplished at least 7 Days in advance of the date of construction within such area.

D. No attempt has been made to locate private utilities on private property such as sprinkler irrigation systems or electrical conduits. Verify with the facility operator prior to construction.

E. In addition to reporting, if a utility is damaged, Contractor must take appropriate action as provided in Document 00 7200 (General Conditions).

F. Additional compensation or extension of time on account of utilities not indicated or otherwise brought to Contractor's attention including reasonable action taken to protect or repair damage shall be determined as provided in 00 7200 (General Conditions).

1.014 PERMITS

A. Permits, agreements, or written authorizations that may apply to this project include, but are not limited to the following:

1. None

B. All other permits that may be required, such as air district, electrical, mechanical, fire prevention, irrigation, grading, slope protection, tree cutting, etc., have not been applied for and shall be obtained by Contractor. Applicable permit fees will be reimbursed to the extent specified in Document 00 7200 (General Conditions).

1.015 ACTUAL DAMAGES FOR PERMIT VIOLATIONS

A. Contractor shall be liable for and shall pay Owner the amount of any actual losses due to permit violations, in addition to liquidated damages or other remedies provided by the Contract Documents.

B. The amount of liquidated damages provided in Document 00 5200 (Agreement) and Document 00 7200 (General Conditions) is not intended to include, nor does the amount include, any damages incurred by Owner for reasons other than those listed in that paragraph. Any money due or to become due to Contractor may be retained by Owner to cover both the liquidated and the actual damages described above and, should such money not be sufficient to cover such damages, Owner shall have the right to recover the balance from Contractor or its sureties.

PART 2 – PRODUCTS

2.01 OWNER-FURNISHED PRODUCTS

1. NOT USED.

PART 3 – EXECUTION – NOT USED

END OF SECTION

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SECTION 01 2000

PRICE AND PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

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

1.02 REFERENCES

A. A current version of the following shall be used:

1. California Public Contract Code
2. Code of Civil Procedures
3. Government Code

1.03 COMPOSITION AND SCOPE OF CONTRACT SUM

A. **Scope of Contract Sum**

1. The Contract Sum for performance of the Work under Contract Documents, or under any Bid item, allowance, or Alternate, shall include full compensation for all Work required under the Contract Documents, including without limitation, all labor, materials, taxes, transport, handling, storage, supervision, administration, and all other items necessary for the satisfactory completion of the Work, whether or not expressly specified or indicated, incidental work and expenses, and all terms, conditions, requirements and limitations set forth in the Contract Documents.
2. Contract Sum may be expressed as lump sum, unit price, allowance, or combination thereof.

B. **Unit Price items**

1. Quantity of Work to be paid for under any item for which a unit price is fixed in Contract Documents shall be determined by Owner based on, so far as practicable, actual number of units satisfactorily completed, as certified by Contractor, and reviewed by Owner, within prescribed or ordered limits, and no payment will be made for Work unsatisfactorily performed or done outside of limits.

C. **Lump Sum Items**

1. When estimated quantity for specific portion of Work is not indicated and/or Work is designated as lump sum, payment will be on a lump sum basis for Work satisfactorily completed in accordance with Contract Documents.
2. Payment for lump sum Work, or items of Work subject to a lump sum (e.g. without limitation, change order work), shall be made on the basis of satisfactory completion of such Work or work item, earned in progressive stages in accordance with the Contract Documents, up to but not exceeding 95% of the Contractor's percentage completion of the Work or item.
3. Lump sum items shall be paid based upon the approved Schedule of Values, which shall be used to measure progressive payments based upon satisfactory progress towards completion of the item.

1.04 PAYMENT PROCEDURES

A. **Schedule of Values:**

1. Within ten Days from issuance of Notice of Award and prior to the Contractor's first Application for Payment, Contractor shall submit a detailed breakdown of its Bid by scheduled Work items and/or activities, in the accepted Owner format, including coordination responsibilities and Project Record Documents responsibilities. Where more than one Subcontractor comprises the work of a Work item or activity, the Schedule of Values shall show a separate line item for each subcontract. Contractor shall furnish such breakdown of the total Contract Sum by assigning dollar values (cost estimates) to each applicable Progress Schedule network activity, which cumulative sum equals the total Contract Sum. This breakdown shall be referred to as the Schedule of Values.
2. Along with each applicable Progress Schedule network activities, General Conditions, scheduling, record documents and quality assurance control shall be separate line items in the Schedule of Values, which cumulative sum equals the total Contract value. Owner will review the breakdown in conjunction with the Progress Schedule to ensure that the dollar amounts of this Schedule of Values are, in fact, reasonable cost allocations for the Work items listed. Upon favorable review by Owner, Owner will accept this Schedule of Values for use. Owner shall be the sole judge of fair market cost allocations.
3. Owner will reject any attempt to increase the cost of early activities, i.e., "front loading," resulting in a complete reallocation of moneys until such "front loading" is corrected. Repeated attempts at "front loading" may result in suspension or termination of the Work for default, or refusal to process progress payments until such time as the Schedule of Values is acceptable to Owner.

B. **Contractor's Requests for Progress Payments**

1. If requested by Contractor, progress payments will be made monthly, under the following conditions:
2. On or before the 25th Day of each monthly billing cycle, Contractor shall submit to Owner an Application for Payment for the cost of the Work put in place during the period from the last Day of the previous month to the end of the current month, along with one copy of an updated Progress Schedule. Such Applications for Payment shall be for the expected total value of activities completed or partially completed, based upon Schedule of Values prices (or Bid item prices if unit price) of all labor and materials incorporated in the Work up until midnight of the last Day of that one month period, less the aggregate of previous payments. Accumulated retainage shall be shown as separate item in payment summary. Owner and Contractor will reconcile any differences in the field, based on the reconciled monthly report sheets. Except as otherwise provided in a labor compliance program applicable to the Work (if any) or as otherwise required by Owner, concurrently with each Application for Payment, Contractor shall submit to the Owner the Contractor's and its Subcontractors' certified payroll records required to be maintained pursuant to Labor Code Section 1776 for all labor performed during pay periods ending during the period covered by the Application for Payment.
3. No progress payment will be processed prior to Owner receiving all requested, acceptable schedule update information, updated as-built drawings, and certified payrolls, and in Owner's sole and absolute discretion, Owner may deny the entire Application for Payment for noncompliance.
4. Each Application for Payment shall list each Change Order executed prior to date of submission, including the Change Order Number, and a description of the Work activities, consistent with the descriptions of original Work activities. Contractor shall submit a monthly Change Order status log to Owner.
5. If Owner requires substantiating data, Contractor shall submit information requested by Owner, with cover letter identifying Project, Application for Payment number and date, and

detailed list of enclosures. Contractor shall submit one copy of substantiating data and cover letter for each copy of Application for Payment submitted.

6. If Contractor fails or refuses to participate in monthly Work reconciliations or other construction progress evaluation with Owner, Contractor shall not receive current payment until Contractor has participated fully in providing construction progress information and schedule update information to Owner.

C. **Owner's Review of Progress Payment Applications**

1. Owner will review Contractor's Application for Payment. If adjustments need to be made to percent of completion or completed quantities of each activity, Owner will make appropriate notations and return to Contractor. Contractor shall revise and resubmit. All parties shall update percentage of completion values in the same manner, i.e., express value of an accumulated percentage of completion to date.
2. If Owner determines that portions of the Application for Payment are not proper or not due under the Contract Documents, then Owner may approve the other portions of the Application for Payment, and in the case of disputed items or Defective Work not remedied, may withhold up to 150 percent of the disputed amount from the progress payment.
3. Pursuant to California Public Contract Code §20104.50, if Owner fails to make any progress payment within 30 Days after receipt of an undisputed and properly submitted Application for Payment from Contractor, Owner shall pay interest to the Contractor equivalent to the legal rates set forth in subdivision (a) of Section 685.010 of the California Code of Civil Procedure. The 30-Day period shall be reduced by the number of Days by which Owner exceeds the seven-Day return requirement set forth herein.
4. As soon as practicable after approval of each Application for Payment for progress payments, Owner will pay to Contractor in manner provided by law, an amount equal to 95 percent of the amounts otherwise due as provided in the Contract Documents, or a lesser amount if so provided in Contract Documents and by law, provided that payments may at any time be withheld if, in judgment of Owner, Work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract, or to comply with labor compliance, stop notices or to offset liquidated damages accruing or expected.
5. Before any progress payment or final payment is due or made, Contractor shall submit satisfactory evidence that Contractor is not delinquent in payments to employees, Subcontractors, suppliers, or creditors for labor and materials incorporated into Work. This specifically includes, without limitation, conditional lien release forms for the current progress payment and unconditional release forms for past progress payments. This also includes copies of certified payroll from contractor and subcontractors for the current payment period.

D. **Payment for Material and Equipment Not Yet Incorporated Into the Work**

1. No payment shall be made for materials or equipment not yet incorporated into the Work, except as specified elsewhere in the Contract Documents or as may be agreed to by Owner in its sole discretion. Where Contractor requests payment on the basis of materials and equipment not incorporated in the Work, Contractor must satisfy the following conditions:
2. The materials and/or equipment shall be delivered and suitably stored at the Site or at another local location agreed to in writing, for example, a mutually acceptable bonded and insured warehouse.
3. Full title to the materials and/or equipment shall vest in Owner at the time of delivery to the Site, warehouse or other storage location. Obtain a negotiable warehouse receipt, endorsed over to Owner for materials and/or equipment stored in an off-site warehouse. No payment will be made until such endorsed receipts are delivered to Owner.
4. Stockpiled materials and/or equipment shall be available for Owner inspection, but Owner shall have no obligation to inspect them and its inspection or failure to inspect shall not relieve Contractor of any obligations under the Contract Documents. Materials and/or equipment shall be segregated and labeled or tagged to identify these specific Contract

Documents.

5. After delivery of materials and/or equipment, if any inherent or acquired defects are discovered, defective materials and/or equipment shall be removed and replaced with suitable materials and/or equipment at Contractor's expense.
6. At Contractor's expense, ensure the materials and/or equipment against theft, fire, flood, vandalism, and malicious mischief, as well as any other coverages required under the Contract Documents.
7. Contractor's Application for Payment shall be accompanied by a bill of sale, invoice or other documentation warranting that 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 and other arrangements to protect Owner interest therein, all of which must be satisfactory to Owner. This documentation shall include, but not be limited to, conditional releases of mechanics' liens and stop notices from all those providing materials and equipment as to which the Application for Payment relates, as well as unconditional releases of the same from the same as to the previous Application for Payment for which they have not already been provided. Amounts previously paid for materials and equipment prior to incorporation into the Work shall be deducted from amounts otherwise due Contractor as they are incorporated.

1.05 FINAL PAYMENT

A. **Final Payment**

1. As soon as practicable after all required Work is completed in accordance with Contract Documents, including punchlist, testing, record documents and Contractor maintenance after Final Acceptance, Contractor shall submit its Application for Final Payment.
2. Provided Contractor has met all conditions required for Final payment, Owner will pay to Contractor, in manner provided by law, unpaid balance of Contract Sum of Work (including, without limitation, retentions), or whole Contract Sum of Work if no progress payment has been made, determined in accordance with terms of Contract Documents, less sums as may be lawfully retained under any provisions of Contract Documents or by law.

B. **Final Accounting**

1. Prior progress payments and change orders shall be subject to audit and correction in the final payment.
2. Contractor and each assignee under an assignment in effect at time of final payment shall execute and deliver at time of final payment, and as a condition precedent to final payment, Document 00590 (Agreement and Release of Claims).

1.06 SUBSTITUTION OF SECURITIES

A. **Public Contract Code Section 22300.** In accordance with the provisions of Public Contract Code Section 22300, substitution of securities for any moneys withheld under Contract Documents to ensure performance is permitted under following conditions:

1. At request and expense of Contractor, securities listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and Owner which are equivalent to the amount withheld under retention provisions of Contract shall be deposited with Controller or with a state or federally chartered bank in California, as the escrow agent, who shall then pay such moneys to Contractor. Upon satisfactory completion of Contract, securities shall be returned to Contractor.
2. Alternatively, Contractor may request and Owner shall make payment of retentions earned directly to the escrow agent at the expense of Contractor. At the expense of Contractor, Contractor may direct the investment of the payments into securities and receive the interest earned on the investments upon the same terms provided for securities deposited by Contractor. Upon satisfactory completion of the work of the Contract Documents, Contractor shall receive from escrow agent all securities, interest, and payments received by the escrow agent from Owner. Contractor shall then pay to each Subcontractor, not

later than seven (7) Days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each Subcontractor, on the amount of retention withheld to insure the performance of Contractor.

3. Contractor shall be beneficial owner of securities substituted for moneys withheld and shall receive any interest thereon.
4. Contractor may enter into an escrow agreement, form included in Contract Documents, as authorized under Public Contract Code Section 22300, specifying amount of securities to be deposited, terms and conditions of conversion to cash in case of default of Contractor, and termination of escrow upon completion of Contract Documents.
5. Public Contract Code Section 22300, in effect on Bid Day, is hereby incorporated in full by this reference and shall supersede anything inconsistent therewith.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

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ATTACHMENT 01 2000-A

PERIODIC ESTIMATE FOR PARTIAL PAYMENT

PROJECT: _____ Invoice or Estimate No. _____

CONTRACTOR: _____

PROJECT NO: _____ PERIOD: _____ TO: _____

ITEM NO.	DESCRIPTION	SCHEDULED VALUE	PREVIOUS ESTIMATE	COMPLETED THIS PERIOD	TOTAL TO DATE	%
1			0.00	0.00	0.00	
2			0.00	0.00	0.00	
3			0.00	0.00	0.00	
4			0.00	0.00	0.00	
5			0.00	0.00	0.00	
6			0.00	0.00	0.00	
7			0.00	0.00	0.00	
8			0.00	0.00	0.00	
9			0.00	0.00	0.00	
10			0.00	0.00	0.00	
11			0.00	0.00	0.00	
12			0.00	0.00	0.00	
13			0.00	0.00	0.00	
14			0.00	0.00	0.00	
15			0.00	0.00	0.00	
16			0.00	0.00	0.00	
17			0.00	0.00	0.00	
18			0.00	0.00	0.00	
19			0.00	0.00	0.00	
20			0.00	0.00	0.00	
	SUBTOTAL ORIGINAL CONTRACT	**$0.00**	**$0.00**	**$0.00**	**$0.00**	
CO1		0.00	0.00	0.00	0.00	
CO2		0.00	0.00	0.00	0.00	
CO3		0.00	0.00	0.00	0.00	
CO4		0.00	0.00	0.00	0.00	
	TOTAL ADJUSTED CONTRACT	**$0.00**	**$0.00**	**$0.00**	**$0.00**	

A.	Notice to Proceed Date	(Enter as text, i.e.: January 1, 2023)		
B.	Original Contract Time (Working Days)	(Enter as number)	0	Days
C.	Additional Contract Time due to Change Orders (Working Days)	(Enter number)	0	Days
D.	Contract Completion Date	<Completion Date Calculated Here>		

SUMMARY OF VALUE OF COMPLETED WORK

1.	Value of work completed to date	$0.00
2.	Less: Retention - 5%	$0.00
3.	Less: Deductions/Labor Non-Compliance	$0.00
4.	Net amount payable on work performed to date	$0.00
5.	Less: Amount of previous payment requests	$0.00
6.	Amount due this payment	$0.00

Approved by Contractor: _____ Date: _____

Approved by Owner: _____ Date: _____

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ATTACHMENT 01 2000B: REQUEST FOR PAYMENT CERTIFICATION

1. CERTIFICATION BY CONTRACTOR:

According to the best of my knowledge and belief, I certify that all items and amounts shown on the attached Periodic Estimate for Partial Payment are correct; that all work has been performed in accordance with the terms and conditions of the contract between the Rosamond Community Services District and _____, dated _____.

I further certify that all just and lawful bills against the undersigned have been paid, or will be paid from funds received from this payment, in full accordance with the terms and conditions of said contract.

By _____ By _____
Contractor (Name of Company) Authorized Agent (Signature)

Date _____ Title _____

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2. CERTIFICATION BY OWNER:

I certify that I have reviewed the attached Periodic Estimate for Partial Payment No. _____for the period ending _____; that to the best of my knowledge and belief it is a true statement of value of work performed to date and that such work has been performed in full accordance with Plans and Specifications and the terms and conditions of the construction contract. I further certify that all work included in the Periodic Estimate for Partial Payment has been inspected by a duly authorized representative and/or qualified staff. I therefore approve the amount of $_____ as the balance due this payment.

Rosamond Community Services District By:_____

Date _____ Title: _____

THIS SECTION FOR USE WITH FEDERALLY FUNDED PROJECTS

3. CERTIFIED PAYROLL AUDIT CERTIFICATION

☐ I hereby certify that I have reviewed the weekly payroll forms and related material for this project and find them to be up-to-date, satisfactory and in compliance with the monitoring regulations included in OMB A-87, A-102 and CRF24.

☐ I hereby certify that I have reviewed the weekly payroll forms and related material for this project and find them to contain discrepancies. A sufficient amount has been withheld to cover any problems that may arise. In addition, the final retention will be held until all discrepancies are resolved.

☐ I hereby certify that weekly payroll forms for the subject project are not required to be submitted.

By: _____ Signature _____

Title: _____ Date _____

END OF DOCUMENT

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SECTION 01 2050

MODIFICATION PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes requirements that supplement the paragraphs of Document 00 7200 (General Conditions).

B. Description of procedures for modifying the Contract Documents and determining costs for changes in contract amounts.

C. Contractor shall submit construction related documentation in accordance with Section 01 3000.

1.02 PROCEDURES FOR CONTRACTOR INITIATED CHANGES

A. Contractor-Initiated Request for Information ("RFI") Procedures, Requirements and Limitations:

1. Contractor may submit RFIs for clarifications in Owner-prepared Contract Documents, which may result in a change in Work, Contract Price, or Contract Time.
2. Whenever Contractor requires information regarding the Project or Owner-prepared Contract Documents, or receives a request for such information from a Subcontractor, Contractor may prepare and deliver an RFI to Owner. Contractor shall use the RFI format provided by Owner. Contractor shall not issue an RFI to Owner solely to clarify Owner-prepared Construction Documents. Contractor must submit time critical RFIs at least 30 days before scheduled start date of the affected Work activity. Contractor shall reference each RFI to an activity of Progress Schedule and shall note time criticality of the RFI, indicating time within which a response is required. Contractor's failure to reference RFI to an activity on the Progress Schedule and note time criticality on the RFI shall constitute Contractor's waiver of any claim for time delay or interruption to the Work resulting from any delay in responding to the RFI.
3. Contractor shall be responsible for its costs to implement and administer RFIs throughout the Contract duration. Regardless of the number of RFIs submitted, Contractor shall not be entitled to additional compensation for the effort required to submit the RFIs. Contractor shall be responsible for Owner's administrative costs for answering RFIs where the answer could reasonably be found by reviewing the Contract Documents, as determined by Owner; at Owner's discretion, such costs may be deducted from progress payments or final payment.
4. Owner will provide a written response in the form of an Instruction Bulletin ("**IB**") to Contractor within 14 days from receipt of RFI. Contractor shall distribute the response to all appropriate Subcontractors.
5. If Contractor is satisfied with the response and does not request a change in Contract Sum or Contract Time, then the response shall be executed without a change.
6. If Contractor believes the response is incomplete, Contractor shall issue another RFI (with the same RFI number with the letter "A" indicating it is a follow-up RFI) to Owner clarifying original RFI. Contractor shall reference the IB issued by the Owner. Additionally, Owner may return the RFI requesting additional information if the original RFI is inadequate in describing the condition.

B. Contractor Cost Proposal:

1. Contractor may initiate changes by submitting a Cost Proposal ("**CP**") in response to an Instruction Bulletin.
2. Whenever Contractor elects or is entitled to submit a CP, Contractor shall prepare and submit to Owner for consideration a CP using the form included in this Project Manual. All CPs must contain a complete breakdown of costs or credits, deducts and extras; itemizing

materials, labor, taxes, markup and any requested changes to Contract Time. All Subcontractor Work shall be so indicated. Individual entries on the CP form shall include applicable Schedule of Values code, with all amounts determined as provided herein. After receipt of a CP with a detailed breakdown, Owner will act promptly through issuance of an Instruction Bulletin.

3. If Owner accepts a CP, Owner will prepare a Change Order for Owner and Contractor signatures.
4. If CP is not acceptable to Owner because Owner does not agree with Contractor's proposed cost and/or time, Owner will provide comments. Contractor will then, within seven Days (except as otherwise provided herein), submit a revised CP.
5. The Contractor will forfeit compensation for costs and/or time for proceeding with changes to the Work without written authorization from the Owner. The Contractor shall notify the Owner in writing and request an evaluation whenever it appears a change is necessary. The written notice shall be made within 24 hours of such discovery. If the Owner concurs with the Contractor's request for a change to the Work, the Owner will follow the procedures described above.

C. Time Requirements:

1. If Contractor believes that an Owner response to an RFI, submittal, or other Owner direction, results in change in Contract Sum or Contract Time, Contractor shall notify Owner with the issuance of a preliminary CP within seven Days after receiving Owner's response or direction, and in no event after starting the disputed work or later than the time allowed under Article 12 of Document 00 7200 (General Conditions). If Contractor also requests a work time extension, or has issued a notice of delay or otherwise requests a time extension with a CP, then Contractor shall submit the TIE as described in Section 01 3216 concurrently with the CP and in no event later than ten Days after providing the notice of delay.
2. If Contractor requires more time to accurately identify the required changes to the Contract Sum or Contract Time, Contractor may submit an updated and final CP and TIE within 14 Days of submitting the preliminary CP.
3. If Owner agrees with Contractor's CP and/or TIE, then Owner will prepare a Change Order. If Owner disagrees with Contractor, then Contractor may give notice of potential claim as provided in Article 12 of Document 00 7200 (General Conditions), and proceed thereunder.
4. Contractor must submit CPs, notices of potential claim, or Claims within the required time periods. Any failure to do so waives Contractor's right to submit a CP or file a Claim.

D. Cost Estimate Information:

1. Contractor and subcontractors shall, upon Owner's request, permit inspection of the original unaltered cost estimates, subcontract agreements, purchase orders relating to the change, and documents substantiating all costs associated with its CP or Claims arising from changes in the Work.

1.03 PROCEDURES FOR OWNER INITIATED CHANGE ORDERS

A. Owner Initiated Changes

1. Owner may initiate changes in the Work or Contract Time by issuing an Instruction Bulletin. Owner may issue an IB to Contractor. Any IB will detail all proposed changes in the Work and may request a quotation of changes in Contract Sum and Contract Time from Contractor.
2. In response to an IB, Contractor shall furnish a CP within 21 Days. For time sensitive changes and upon Owner's approval of CP, Owner may direct contractor to proceed with extra work in writing ahead of inclusion in a Change Order. Upon approval of CP, Owner may issue an Instruction Bulletin directing Contractor to proceed with extra Work.
3. If the parties agree on price and time for the Work, the Owner will issue a Contract Change Order. If the parties do not agree on the price or time for a CP, Owner may either issue an Instruction Bulletin, order the work done by force account or decide the issue per Article 12

of Document 00 7200 (General Conditions). Contractor shall perform the changed Work notwithstanding any claims or disagreements of any nature.

B. Force Account

1. The Contractor, provided he received an order for force account work, shall proceed with the work on a force account basis as defined in Section 9 of the Standard Specifications and as modified by this Section 01 2050.
2. A daily time and material record of all force account work shall be kept by the Contractor, as directed by the Owner. The daily record shall be signed by the Contractor and submitted daily to the Owner.
3. In any case, the Owner shall certify to the amount, including markup, due to the Contractor and any subcontractor submitting for extra under the proposed change. For this purpose, markup shall include, but not be limited to overhead, profit, home office overhead, bonds, insurance, labor pool, remobilization, and escalation*.* In no instance shall mark up to Contractor be more than 15%. Pending final determination of value, payments on account of changes shall be made on the Contractor's estimate.

1.04 PROCEDURES THAT APPLY TO CONTRACTOR- AND OWNER-INITIATED CHANGES

A. Adjustment of Schedules to Reflect Change Orders:

1. Contractor shall revise Schedule of Values and Application for Payment forms to record each authorized Change Order ("**CO**") as a separate line item and adjust the Contract Sum as shown thereon prior to the next monthly pay period.
2. Contractor shall revise the Progress Schedules prior to the next monthly pay period, to reflect CO.
3. Contractor shall enter changes in Project Record Documents prior to the next monthly pay period.

B. Required Documentation for Adjustments to Contract Amounts:

1. For all changes and cost adjustments requested, Contractor shall provide documentation of change in Contract Amounts asserted, with sufficient data to allow evaluation of the proposal.
2. In all requests for compensation, cost proposals, estimates, claims, and any other calculation of costs made under the Contract Documents, Contractor shall break out and quantify costs of labor, equipment and materials identified herein, for Contractor and subcontractors of any tier.
3. Contractor shall, on request, provide additional data to support computations for:

    a. Quantities of products, materials, labor, and equipment.
    b. Taxes, insurance, and bonds.
    c. Justification for any change in Contract Time and new Progress Schedule showing revision due, if any.
    d. Credit for deletions from Contract, similarly documented.

4. Contractor shall support each claim or computation for additional cost, with additional information including:

    a. Origin and date of claim or request for additional compensation.
    b. Dates and times Work was performed and by whom.
    c. Time records and wage rates paid.
    d. Invoices and receipts for products, materials, equipment and subcontracts, similarly documented.
    e. Credit for deletions from Contract, similarly documented.

C. Responses and Disputes:

1. For all responses for which the Contract Documents do not provide a specific time period, recipients shall respond within a reasonable time.

2. For all disputes arising from the procedures herein, Contractor shall follow Article 12 of Document 00 7200 (General Conditions).

1.05 COST DETERMINATION FOR CHANGES IN CONTRACT AMOUNTS

A. Calculation of Total Cost of Extra Work:

1. Total cost of changed Work, extra Work, or of Work omitted shall be the sum of three components defined immediately below as: Component 1 (Direct Cost(s)); Component 2 (Markup); and, Component 3 (bonds, insurance, taxes)
2. Component 1: Direct Cost(s) of labor, equipment and materials, is calculated based upon actually incurred (or omitted) labor costs, material costs and equipment rental costs, as defined herein;
3. Component 2: Markup on such actually incurred Direct Costs, is applied in the percentages identified below; and
4. Component 3: Actual additional costs for any additionally required insurance, bonds, and/or taxes, defined herein, is calculated without Markup.

1.06 MEASUREMENT OF DIRECT COST OF CONSTRUCTION (COST COMPONENT NO. 1)

A. Composition of Component 1 (Direct Cost of Construction):

1. Component 1 has four subcomponents, also referred to as **"LEMS"**:

   a. Labor (Component 1A)
   b. Equipment (Component 1B)
   c. Materials (Component 1C)
   d. Subcontractors (Component 1D)

B. Measurement of Cost of Labor (Component 1A):

1. Cost of Labor shall be calculated as: Cost of labor for workers (including forepersons when authorized by Owner) used in actual and direct performance of the subject work, whether employer is Contractor, Subcontractor, or other forces, in the sum of the following:

   a. Actual Wages: Actual wages paid shall include any employer payments to or on behalf of workers for health and welfare, pension, vacation, and similar purposes.
   b. Labor surcharge: Payments imposed by local, county, state, and federal laws and ordinances, and other payments made to, or on behalf of, workers, other than actual wages as defined, such as worker's compensation insurance. Such labor surcharge shall not exceed generally accepted standards in the State for labor rates in effect on date upon which extra Work is accomplished.
   c. Cost of Labor shall include no other costs, fees or charges.

2. Labor cost for operators of equipment owned and operated by Contractor or any Subcontractor, shall be no more than rates of such labor established by collective bargaining agreements for type of worker and location of Work, whether or not owner-operator (i.e., Contractor or Subcontractor) is actually covered by such an agreement.
3. Cost of Labor shall be recorded and documented in certified payroll records, maintained in the form customary and/or required in the State, delivered to Owner weekly.

C. Measurement of Cost of Equipment (Component 1B):

1. Measurement of Component 1B (Cost of Equipment). Cost of Equipment shall be calculated as: Cost of Equipment used in actual and direct performance of the subject Work, whether by Contractor, Subcontractor, or other forces. Cost of Equipment shall be calculated as herein described.
2. For rented equipment, cost will be based on actual rental invoices, appropriate for the use and duration of the Work. Equipment used on extra Work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type, as determined by Owner.

3. Equipment rental cost for Contractor or Subcontractor-owned equipment, shall be determined by reference to, and not in excess of, the generally accepted standards in the State for equipment rental rates in effect on the date upon which extra Work is accomplished. If there is no applicable rate for an item of equipment, then payment shall be made for Contractor- or Subcontractor-owned equipment at the rental rate listed in the most recent edition of the CalTrans Standard Schedules and Specifications, and absent a rental rate therein, then the Association of Equipment Distributors (AED) book.
4. In all cases, rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.
5. Unless otherwise specified, manufacturer's ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of $100 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.
6. For equipment on Site, rental time to be paid for equipment shall be the time that equipment is in operation on extra Work being performed or on standby as approved by Owner. The following shall be used in computing rental time of equipment:

    a. When hourly rates are listed, less than 30 minutes of operation shall be considered to be ½ hour of operation.
    b. When daily rates are listed, less than four hours of operation shall be considered to be ½ Day of operation.
    c. Rates shall correspond to actual rates paid by Contractor, i.e., if Contractor pays lower weekly or monthly rates, then same shall be charged to Owner.

7. For equipment that must be brought to Site to be used exclusively on extra Work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:

    a. Owner will pay for costs of loading and unloading equipment.
    b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
    c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission or appropriate State Dept. of Transportation.
    d. Owner will not make any payment for transporting and loading and unloading equipment if equipment is used on Work in any other way than upon extra Work.
    e. Rental period may begin at time equipment is unloaded at Site of extra Work and terminate at end of the performance of the extra Work or Day on which Owner directs Contractor to discontinue use of equipment, whichever first occurs. Excluding Saturdays, Sundays, and Owner legal holidays, unless equipment is used to perform extra Work on such Days, rental time to be paid per Day shall be four hours for zero hours of operation, six hours for four hours of operation and eight hours for eight hours of operation, time being prorated between these parameters. Hours to be paid for equipment that is operated less than eight hours due to breakdowns, shall not exceed eight less number of hours equipment is inoperative due to breakdowns.

8. Employee vehicles are not part of Component 1A, rather, are included within Component 2 (Markup).
9. Equipment costs shall include no other costs, fees, or charges.

D. Measurement of Cost of Material (Component 1C):

1. Cost of material shall be calculated as herein described. Cost of such materials will be cost to purchaser (Contractor, Subcontractor, or other forces) from supplier thereof, except as the following are applicable:
2. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to Owner notwithstanding fact that such discount may not have been taken.
3. For materials salvaged upon completion of Work, salvage value of materials shall be deducted from cost, less discounts, of materials.
4. If cost of a material is, in opinion of Owner, excessive, then cost of material shall be deemed to be lowest current wholesale price at which the material is available in quantities concerned delivered to Site, less any discounts as provided in this Paragraph 1.06.
5. Material costs shall include no other costs, fees, or charges.

E. Measurement of Cost of Subcontractors (Component 1D):

1. Where reimbursed or calculated per the terms of the Contract Documents, Change Order, , cost of Subcontractors shall be calculated as amounts earned by Subcontractors procured in compliance with the Contract Documents and approved by the Owner, provided such subcontractor-earned amounts meet the following requirements:

    a. Such amounts are earned under the terms of the Subcontracts and the Work complies with the terms of the Contract Documents;
    b. Such amounts are properly requested, documented and permitted under the terms of the Subcontract(s) and the Contract Documents.
    c. Total cost to Owner of Direct Costs of Construction (labor, equipment, materials), Markup, and costs of bonds, insurance, and taxes, conform to contract limitations (i.e., totals paid by Owner do not exceed the 20% Markup limitation.).

1.07 MEASUREMENT AND PAYMENT OF MARKUP (COST COMPONENT 2)

A. Markup Percentages for Changed Work (Component 2):

1. Markup on Direct Cost of labor and materials for extra Work shall be 15%. Markup on Direct Cost of equipment for extra Work shall be 15%.
2. When extra Work is performed by Subcontractors, regardless of the number of tiers, total Markup on “Component 1” Direct Costs shall not exceed 20%. Contractor and its Subcontractors shall divide the 20% as they may agree.
3. Under no circumstances shall the total Markup on any extra Work exceed 20 percent, stated as a percent of the Direct Cost of labor, equipment, and materials. This limitation shall apply regardless of the actual number of subcontract tiers.
4. On proposals covering both increases and decreases in Contract Sum, Markup shall be allowed on the net increase only as determined above. When the net difference is a deletion, no percentage for Markup shall be allowed, but rather an appropriate percentage deduction shall be issued in the amount of the net difference.

B. Measurement and Payment of MarkUp (Component 2):

1. Mark Up (Component 2) provides complete compensation to Contractor for:

    a. All Contractor profit;
    b. All Contractor home-office overhead;
    c. All Contractor assumption of risk assigned to Contractor under the Contract Documents;
    d. Subject to the qualifications below regarding self-performed work, all General Conditions and General Requirements.

2. Profit. Compensation for profit included within Component 2 (Mark Up), includes without limitation: Fees of all types, nature and description; and Profit and margins of all types, nature and description.
3. Home Office Expenses. Compensation for home office expenses included within Component 2 (Mark Up), includes without limitation: Salaries and other compensation of any type of Contractor’s personnel (management, administrative, and clerical), and all

direct and indirect operating, travel, payroll, safety, storage, quality control, maintenance, and overhead costs of any nature whatsoever, incurred by Contractor at any location other than the Project-specific site office, including without limitation, Contractor's principal or branch offices; insurance premiums other than those for Project-specific insurance directed by the Owner in a change order; all hardware, software, supplies and support personnel necessary or convenient for Contractor's capture, documentation and maintenance of its costs and cost accounting data and cost accounting and control systems and work progress reporting.

4. Assumption of Risk. Compensation for Contractor's assumption of risk under the Contract Documents, included within Component 2 (Mark Up), includes without limitation loss, cost, damage, expense, or liability resulting directly or indirectly from any of the following causes ("**Unallowable Costs**"), for Contractor and subcontractors of any tier: noncompliance with the Contract Documents, fault or negligence, defective or non-comforming Work, by Contractor or any Subcontractor or Vendor of any tier or anyone directly or indirectly employed by any of them, or for whose acts or omissions any of them are responsible or liable at law or under the Contract Documents; cost overruns of any type; costs in excess of any lump sum, not to exceed amount or Guaranteed Maximum Price (GMP); costs resulting from bid or "buy out" errors, unallocated scope, or incomplete transfer of scope or contract terms to subcontractors; any costs incurred by Contractor relating to a Change in the Work without a Change Order in accordance with the Contract Documents; costs for work or materials for which no price is fixed in the Contract Documents, unless it is expressly specified that such work or material is to be paid for as extra Work.
5. General Conditions and Division 01 General Requirements. Compensation for Contractor's General Conditions and General Requirements Costs included within Component 2 (Mark Up), includes compensation to Contractor for: Contractor's direct costs, without overhead or profit, for salaries and related forms of compensation and employer's costs for labor and personnel costs, of Contractor's employees and Subconsultant's employees (if any), while and only to the extent they are performing Work at the Project Site. Personnel and Work compensated by this Component include without limitation: All required Project management responsibilities; all on-site services; monthly reporting and scheduling; routine field inspection of Work; general superintendence; general administration and preparation of cost proposals, schedule analysis, change orders and other supporting documentation as necessary; salaries of project superintendent, project engineers, project managers, safety manager, other manager, timekeeper, and secretaries; all cost estimates and updates; development, validation, and updates to the project schedule; surveying; and estimating. Compensation for Contractor's General Requirements Costs included within Component 2 (Mark Up), compensates Contractor for its "General Requirements" Costs, including without limitation: all scheduling hardware, software, licenses, equipment, materials, and supplies; purchase, lease or rental, build out, procurement, supporting equipment and maintenance of temporary on-Site facilities, Project field and office trailers and other temporary facilities, office equipment and supporting utilities; platforms, fencing, cleanup and jobsite security; temporary roads, parking areas, temporary security or safety fencing and barricades; all Contractor's motor vehicles used by any Contractor's personnel, and all costs thereof; all health and safety requirements, required by law or Owner procedures; all surveying; all protection of Work; handling and disposal fees; final cleanup; repair or maintenance; other incidental Work; all items, activities and function similar to any of those described above; all travel, entertainment, lodging, board.
6. Personnel compensated by the Markup Component do not include workers of foreman level or below in the case of self-performed work; rather, such personnel shall be treated as a Direct Cost of Construction. Costs compensated by the Markup component do not include temporary measures specifically required by the changed work, not otherwise required or ongoing in the prosecution of the Work, that commence specifically to support the changed work and conclude with the completion of the changed work. Such costs shall be treated as Direct Costs of Construction. Examples of General Requirements costs that this component may not cover are the following: temporary barricades or fencing of specific

areas required specifically for the changed work; cranes required specifically for the changed work; extra security required specifically for the changed work.

1.08 **MEASUREMENT AND PAYMENT OF BONDS INSURANCE TAXES (COMPONENT 3)**

A. Measurement of Bonds, Insurance, Taxes (Component 3):

1. Component 3 (Bonds, Insurance, Taxes) consists of the cost of bonds, insurance and taxes, also referred to as **"BIT".** All State sales and use taxes, applicable County and applicable City sales taxes, shall be included. Federal and Excise tax shall not be included.
2. There is no mark up on BIT.

1.09 **EFFECT OF PAYMENT**

A. Change Order Compensation is All Inclusive.

1. Except as provided expressly below regarding changes that extend the Contract Time, payment of calculated cost of extra work constitutes full and complete compensation for costs or expense arising from the extra Work, and is intended to be all inclusive.
2. Payment for Direct Cost of Construction (Component 1 or LEMS) is intended to be all-inclusive. Any costs or risks not delineated within cost of labor, equipment, or materials herein, shall be deemed to be within the costs and risks encompassed by the applicable Markups and unallowable in any separate amount.
3. Payment of Markup (Component 2) is intended to be all-inclusive. Contractor waives claims for any further or different payment of cost and risk items delineated herein, other than the allowable percentage markup on costs set forth in the Contract Documents; such separate, further or different cost or risk items shall be unallowable, waived and liquidated within the allowable percentage markup.
4. Contractor shall recover no other costs or markups on extra work of any type, nature or description.

B. Exception for Changes Extending the Contract Time.

1. Where a change in the Work extends the Contract Time, Contractor may request and recover additional, actual direct costs, provided Contractor can demonstrate such additional costs are (i.) actually incurred performing the Work, (ii.) not compensated by the Markup allowed, and (iii) directly result from the extended Contract Time. Contractor shall make such request and provide such documentation following all required procedures, documentation and time requirements in the Contract Documents, and subject to all contract limitations of liability. Contractor may not seek or recover such costs using formulas (e.g., Eichleay).

C. Limits of Liability / Accord and Satisfaction.

1. The foregoing limits of compensation apply in all cases of claims for changed Work, whether calculating Cost Proposals or Change Orders, or calculating claims and/or damages of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including strict liability or negligence. Contractor may recover no other costs arising out of or connected with the performance of extra Work, of any nature.
2. Under no circumstances may Contractor claim or recover special, incidental, or consequential damages against Owner, its representatives or agents, whether arising from breach of contract, negligence, strict liability or other tort or legal theory, unless specifically and expressly authorized in the Contract Documents.
3. No change in Work shall be considered a waiver of any other condition of Contract Documents. No claim shall be made for anticipated profit, for loss of profit, for damages, or for extra payment whatever, except as expressly provided for in Contract Documents.
4. Accord and Satisfaction: Every Change Order and accepted CP shall constitute a full accord and satisfaction, and release, of all Contractor (and if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay and any other type of claim. Contractor may elect to reserve

its rights to disputed claims arising from or relating to the changed Work at the time it signs a Change Order or approves a CP, but must do so expressly in a writing delivered concurrently with the executed Change Order or approved CP, and must also submit a Claim for the reserved disputed items pursuant to Article 12 of Document 00 7200 (General Conditions) no later than 30 days after Contractor's first written notice of its intent to reserve rights. Execution of any Change Order or CP shall constitute Contractor's representation of its agreement with this provision.

1.010 **MISCELLANEOUS REQUIREMENTS**

A. Owner-Furnished Materials.

1. Owner reserves right to furnish materials as it deems advisable, and Contractor shall have no claims for costs and Markup on such materials.

B. Records And Certification.

1. All charges shall be recorded daily and summarized in Cost Proposal form attached hereto. Contractor or authorized representative shall complete and sign form each day. Contractor shall also provide with the form: the names and classifications of workers and hours worked by each; an itemization of all materials used; and a list by size type and identification number of equipment and hours operated.
2. Owner shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor's claims for modification of Contract, including CP Work. This right shall be specifically enforceable, and any failure of Contractor to voluntarily comply shall be deemed an irrevocable waiver and release of all claims then pending that were or could have been subject to Article 12 of Document 00 7200 (General Conditions).

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

COST PROPOSAL AND RFI FORMS INCLUDED ON FOLLOWING PAGES
(Electronic forms are available upon request)

COST PROPOSAL (CP)

Project Name _____
Project Number _____

CP Number: _____
Date: _____
In Response To _____
IB#, etc.

To: Rosamond Community Services District
Attention: **[**_____**]**
3179 35th Street West
Rosamond, California 93560
Phone: (661) 256-3411
Fax: (661) 256-2557

From: [*Insert Contractor's Name/Address*]
_____
_____

This Cost Proposal is in response to the above-referenced _____ **[*Insert RFP, etc. as applicable*]**.
Brief description of change(s): _____
_____

ITEM DESCRIPTION	PRIME CONTRACTOR	SUB 1	SUB 2	SUB 3	SUB 4	TOTAL
LABOR						
EQUIPMENT						
MATERIAL						
Other (Specify)						
TOTAL COST						
Subcontractor's Overhead & Profit 15 percent max.						
Contractor's Overhead & Profit 15 percent max.						
Overhead & Profit to Contractor for Subcontractor's Work						
(percent of Total Cost above not including any Overhead & Profit – may not exceed 20%)						
GRAND TOTAL						
REQUESTED CHANGE IN CONTRACT TIME (DAYS) (Time Impact Evaluation Enclosed)						

_____

By Contractor: Signature: Date:

REQUEST FOR INFORMATION (RFI)

PROJECT:	WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS	**RFI NO.:**
OWNER:	Rosamond Community Services District 3179 35th Street West Rosamond, CA 93560	**DATE:**
CONTRACTOR:		
PROJECT NO.:		

Send all RFI's to Owner's Representative

DRAWING REFERENCE:	**SPECIFICATION REFERENCE:**

BRIEF TITLE:

DESCRIPTION OF CLARIFICATION REQUIRED (attach sheets as necessary):

CONTRACTOR'S PROPOSED SOLUTION:

INITATOR:	**SIGNATURE:**
DATE RESPONSE REQUIRED:	

OWNER ACTIONS

RECEIVED ON: _____

FORWARDED TO: _____ ***DATE:*** _____

RESPONSE:

REFER TO INSTRUCTION BULLETIN NO. _____ ***ATTACHED.***

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SECTION 01 3000

ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes description of requirements and procedures for submittals, project meetings and other project documentation requirements.

1.02 SUBMITTALS

A. Schedule of Submittals.

1. Contractor shall prepare a schedule of submittals (also referred to as a submittal register) required to complete the Work for Owner review and use. Schedule of submittals will include, for each submittal: the specification or drawing reference requiring the submittal, if applicable; the material, item, or process for which the submittal is required; the submittal number and identifying title of the submittal; and a preliminary submission schedule.

2. The technical specifications may list several individual items required to be submitted for Owner review. The Schedule of Submittals shall list each individual item required to be submitted so that all required submittals can be tracked by Contractor and Owner.

3. Preparation by Contractor of schedule of submittals does not excuse Contractor of obligation to supply, schedule and coordinate all submittals required by the Contract Documents.

4. Schedule of Submittals shall be provided in Microsoft Excel format or, if Contractor utilizes Project Management software platform, through said software platform. Contractor shall provide Owner access to the platform at no additional cost to the Owner.

B. Contractor to Submit Shop Drawings, Product Data and Submittals

1. Contractor shall review for compliance with Contract Documents, approve and submit to Owner Shop Drawings, Product Data, Samples and similar submittals required by Contract Documents. Contractor shall provide documents electronically, by providing an electronic copy in portable document format (pdf) for Owner for review, unless otherwise directed by Owner. Samples submitted for Owner's consideration shall be delivered to Owner in accordance with the individual Technical Specifications. Submittals and re-submittals shall be transmitted via electronic mail, unless otherwise directed by Owner.

2. Contractor's approval shall be indicated by a stamp or written statement on the cover sheet of the submittal with submittal identifying number clearly labeled: "This submittal is approved by <Contractor's Name> for conformance with the contract requirements for <project name>". Approval shall be signed and dated by Contractor's representative.

3. Contractor shall schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Contractor shall include certifications to be submitted with the pertinent drawings and product information at the same time.

4. Contractor shall coordinate scheduling, sequencing, preparing and processing of all submittals with performance of work so that work will not be delayed by submittal processing.

5. Submittals shall specifically identify any work depicted that does not conform to the Contract Documents with and explanation for the deviation on a separate sheet entitled "Submittal Exceptions to Contract Documents."

C. Owner Review of Shop Drawings, Product Data and Submittals

1. Schedule submittals at least 3 weeks before dates reviewed submittals will be needed. Except as may be provided in other specification sections, a submittal will be returned in no more than 21 calendar days, as each is accepted or not accepted. When a submittal cannot be returned within that period, Owner will, within a reasonable time after receipt of submittal, give notice of the date by which that submittal will be returned.

2. After review by Owner of each submittal, Owner will return an electronic scan in portable document format (pdf) of the reviewed submittal via electronic mail to Contractor with actions defined as follows:

    a. NO EXCEPTIONS TAKEN - Accepted subject to its compatibility with general design concept of the Work, future Submittals and additional partial Submittals for any portions of the Work not covered in this Submittal. Does not constitute acceptance or deletion of specified or required items not shown on the Submittal.

    b. MAKE CORRECTIONS NOTED (NO RESUBMISSIONS REQUIRED) - Same as item (a) above, except that minor corrections as noted shall be made by Contractor.

    c. REVISE AS NOTED AND RESUBMIT - Rejected because of major inconsistencies or errors that shall be resolved or corrected by Contractor prior to subsequent review by Owner.

    d. REJECTED - RESUBMIT - Submitted material does not conform to drawings and/or specifications in major respect, i.e.: wrong size, model, capacity, or material.

    Contractor shall print out and distribute reviewed submittals at his discretion. Contractor shall also provide a hard copy of submittals designated “NO EXCEPTIONS TAKEN” and “MAKE CORRECTIONS NOTED” to Owner or Owner’s representative at the project site for reference. An electronic copy of the reviewed submittal may be provided to Owner or Owner’s representative in lieu of a hard copy if it can be demonstrated that retrieval can be facilitated at the job site.

3. Favorable review will not constitute acceptance by Owner of any responsibility for the accuracy, coordination, or completeness of the Submittals. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including responsibility to back-check comments, corrections, and modifications from Owner’s review before fabrication. Contractor, subcontractors, or suppliers may prepare submittals, but Contractor shall ascertain that submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. Owner’s review will be only to assess if the items covered by the Submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed project as indicated by the Contract Documents. Favorable review of Submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by Owner, or any officer or employee thereof, and Contractor shall have no claim under Contract Documents on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that Owner has no objection to Contractor using, upon Contractor’s own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.

4. Unless otherwise specified, Owner’s review will not extend to the means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

5. Contractor shall perform no portion of the Work for which the Contract Documents require Submittal and review of Shop Drawings, Product Data, Samples or similar submittals until

the respective submittal has been favorably reviewed by the Owner; otherwise, any such work is at Contractor's sole risk."

1.03 PROJECT MEETINGS

A. Preconstruction Conference. Owner will call for and administer Preconstruction Conference at time and place to be announced (usually the week prior to start of Work at the Site). Contractor shall attend Preconstruction Conference and shall invite Subcontractor's at Contractors discretion. Agenda may include, but not be limited to, the following items:

1. Schedules
2. Personnel and vehicle permit procedures
3. Use of premises
4. Location of the Contractor's on-Site facilities
5. Security
6. Housekeeping
7. Submittal and RFI procedures
8. Inspection and testing procedures, on-Site and off-Site
9. Utility shutdown procedures
10. Control and reference point survey procedures
11. Injury and Illness Prevention Program
12. Contractor's Initial Progress Schedule
13. Contractor's Schedule of Values
14. Contractor's Schedule of Submittals
15. Jurisdictional agency requirements
16. Owner will distribute copies of minutes to attendees. Attendees shall have 7 Days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of Preconstruction Conference.

B. Periodic Project Meetings. Contractor shall coordinate and administer biweekly progress meetings throughout duration of Work unless otherwise directed by Owner. Meetings shall be held at the project site, unless otherwise specified in Contract Documents.

1. Contractor shall prepare agenda and distribute it 4 Calendar Days in advance of meeting to Owner and anticipated meeting participants.
2. Participants with agenda items shall present them.
3. The Architect/Engineer and other responsible entities shall attend meetings unless otherwise specified in Contract Documents or provided by Owner.
4. Contractor shall record and distribute the meeting minutes. Minutes shall be distributed by the Contractor to the Owner and attendees within 3 Working Days after the meeting. Contractor shall distribute the minutes to those affected by decisions made at meeting. Attendees shall have five (5) Working Days to submit comments or additions to the minutes. .
5. Progress meetings shall be attended by Contractor's personnel, Owner, and others as appropriate to agenda topics for each meeting.
6. Agenda may contain, but not be limited to the following items, as appropriate:
    a. Review, revise as necessary, and approve previous meeting minutes
    b. Review of Work progress since last meeting
    c. Status of Progress Schedule, delivery schedules, adjustments
    d. Submittal, RFI, Instruction Bulletin and Change Order status
    e. Review of the Contractor's safety program activities and results, including report on all serious injury and/or damage accidents
    f. Other items affecting progress of Work

C. Progress Schedule And Billing Meetings

1. A meeting will be held on approximately the 20th of each month to review the schedule

update submittal and progress payment application.

2. At this meeting, at a minimum, the following items will be reviewed:

   a. Percent complete or quantity installed of each activity;
   b. Time impact evaluations for Change Orders and Time Extension Request;
   c. Actual and anticipated activity sequence changes;
   d. Actual and anticipated duration changes; and
   e. Actual and anticipated Contractor delays.

3. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, Contractor's General Superintendent and Scheduler shall attend these meetings.

D. Pre-Installation Conferences

1. When required by a Technical Specification Section, schedule an on-site meeting prior to the actual installation. Attending shall be the Contractor, Installers and others whose Work may be affected by the installation. The Owner will schedule attendees as appropriate.

2. Notify Owner at least four (4) Working Days in advance of meeting date.

3. Contractor shall prepare the agenda and conduct the meeting to cover the following topics:
   a. Review in detail manufacturer's requirements, Specifications, Drawings, installation details, relationships with other components, and other related Work. Anticipated or discovered conflicts, incompatibilities, and inadequacies shall be reviewed and resolved at the meeting.
   b. Review in detail job conditions, environmental requirements, schedule, construction sequence, coordination with other Work, requirements for installation and quality of completed Work, and protection of adjacent Work and property.
   c. Review in detail the means of protecting the completed Work during the remainder of the construction period.

4. The Contractor shall take meeting notes and distribute them within two (2) Working Days after the pre-installation conference to participants, with three (3) copies to the Owner, conference attendees and those affected by decisions made. Attendees taking exception to anything in the meeting notes shall state it in writing to Contractor within five (5) Working Days following receipt of meeting notes.

1.04 PROGRESS REPORTS

A. Daily Log

Contractor shall document the daily construction activities in a daily log. The log shall include, but not be limited to, the following items:

1. Date
2. Observed Weather Conditions (sunrise time, rain/sunny/cloudy, wind speed, temperature, humidity)
3. Scheduled Work (tie to schedule)
4. Daily Construction Report
5. Manpower – Contractor forces and subcontractor forces identified by company name
6. Equipment
7. Deliveries
8. Visitors
9. Productivity including quantities completed
10. Inspections and Testing
11. Accidents and Safety Violations
12. Delays
13. Notes
14. Photographs

B. Monthly Report

Contractor shall combine daily logs in a monthly report summarizing construction progress and submit with monthly progress payment application.

1.05 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in file name for each image.
2. Maintain one set of images accessible at Project site, available at all times for reference. Identify images in the same manner as those submitted to Owner's Representative.

C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Owner's Representative

1. Flag construction limits before taking construction photographs.
2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take photographs daily, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

E. Directed Construction Photographs: From time to time, Owner's Representative will instruct Contractor about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.

F. Time-Lapse Sequence Construction Photographs: Take photographs as indicated, to show status of construction and progress since last photographs were taken.

1. Frequency: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment.
2. Vantage Points: Following suggestions by Owner's Representative, Contractor to select vantage points. During each of the following construction phases, take not less than two of the required shots from same vantage point each time to create a time-lapse sequence.

G. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as project record documents. Owner's Representative will inform Contractor of desired vantage points.

1. Do not include date stamp.

H. Additional Photographs: Owner's Representative may request photographs in addition to periodic photographs specified.

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:

    a. Special events planned at Project site.
    b. Immediate follow-up when on-site events result in construction damage or losses.
    c. Substantial Completion of a major phase or component of the Work.
    d. Extra record photographs at time of final acceptance.
    e. Owner's request for special publicity photographs.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01 3216

CONSTRUCTION AND PROGRESS SCHEDULES

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes description of requirements and procedures for submitting Critical Path Method ("**CPM**") progress schedules.

B. Contractor shall follow the requirements of Section 8 of the Standard Specifications.

1.02 CONTRACTOR TO SUBMIT PROGRESS SCHEDULES

A. Contractor shall submit proposed Baseline Progress Schedule within 14 days after execution of the Agreement. Within 28 days after execution of the Agreement Contractor shall submit Baseline Progress Scheduling addressing Owner provided comments.

B. Baseline Progress Schedule shall show Contractor's construction and procurement activities, including but not limited to, equipment procurement and delivery (Contractor and Owner supplied), activities with Subcontractors and suppliers, major submittal reviews, commissioning of systems, use of major equipment on site, and necessary interface with Owner and third parties required to complete the Work in a timely manner and in accordance with Contract Time.

1.03 SCHEDULE REQUIREMENTS.

A. Unless Owner agrees in writing otherwise, progress schedule shall be produced with Microsoft Project or Primavera P6, as Owner may specify, which Contractor shall prepare and supply to Owner, with all datapoint entries completed for start dates, necessary work activities, durations (not longer than 21 calendar days), and logic ties. There shall be no activities without predecessors, successors, and logic ties other than start of construction and completion.

B. Contractor's progress schedule shall be in the form of a CPM Gantt diagram or, if Owner, in its sole discretion, agrees in writing, an arrow diagram. The hard copies of the schedule supplied to Owner shall indicate the critical path of the Work in red and shall show a logical progression of the Work through completion within Contract Time.

C. Unless Owner agrees in writing otherwise, progress schedule shall also show early and late start and finish dates and total available float (float to the successor activity's late start date) for each activity. The contract completion date shall be shown as the final completion date on the Contractor's CPM schedule. Owner has no obligation to accept an early completion schedule.

1.04 MONTHLY UPDATES

A. Contractor's progress schedule shall be updated monthly to reflect actual progress. The schedule shall be subject to Owner's review and acceptance for use in monitoring Contractor's Work and evaluating Applications for Payment.

B. Contractor shall supply Owner with an electronic copy of the updated progress schedule with each monthly payment application. Contractor shall provide Owner with two-week lookahead schedules weekly, showing in detail any activities and resources scheduled for the immediate two-week period.

1.05 RECOVERY SCHEDULE

A. Owner may request a recovery schedule if Contractor falls 21 or more Days behind any schedule Milestone. The recovery schedule shall show Contractor's plan and resources committed to retain Contract completion dates.

B. The recovery schedule shall show the intended critical path. If Owner requests, Contractor shall also:

1. Secure and demonstrate appropriate Subcontractor and supplier consent to the recovery schedule.

C. Submit a narrative explaining trade flow and construction flow changes and man-hour loading assumptions for major Work activities and/or Subcontractors. All costs associated with development and implementation of the recovery schedule, including inspection outside of normal working hours, shall be at the Contractor's expense.

1.06 TIME IMPACT EVALUATION ("TIE") FOR CHANGE ORDERS, TIME EXTENSIONS AND DELAYS:

A. When Contractor requests a time extension for any reason, Contractor shall submit a TIE that includes both a written narrative and a schedule diagram depicting how the changed Work or other impact affects other schedule activities. The schedule diagram shall show how Contractor proposes to incorporate the changed Work or other impact in the schedule and how it impacts the current Schedule update critical path or otherwise. Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram shall be tied to the main sequence of scheduled activities to enable Owner to evaluate the impact of changed Work to the scheduled critical path.

B. Contractor is responsible for all costs associated with the preparation of TIEs, and the process of incorporating TIEs into the current schedule update. Contractor shall provide Owner with four copies of each TIE.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section describes Testing and Inspecting to be provided by the Contractor, plus cooperation required from the Contractor with the Owner's selected testing agency and others responsible for testing and inspecting the Work.

1.02 SECTION INCLUDES

A. Related documents.

B. Quality Assurance.

C. Related Work.

D. References.

E. Samples.

F. Mock-up.

G. Selection of testing laboratory.

H. Contractor's convenience testing.

I. Code compliance testing.

J. Manufacturers' field services and reports.

K. Submittals.

L. Air Balance Contractor.

M. Tests and Inspections.

1.03 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 00 and Division 01 Specification Sections, apply to Work of this Section.

1.04 QUALITY ASSURANCE – CONTROL OF INSTALLATION

A. Contractor shall be present at the Project Site at all times during the execution of the Work.

B. Contractor shall monitor the quality of Work performed by his own forces and subcontractors and shall monitor suppliers, manufacturers, products, services, and site conditions to produce Work of specified quality in accordance with the requirements of the Contract Documents.

C. Work shall be performed by qualified, skilled, and experienced workers.

D. Contractor shall be responsible for the coordination of the Work for all trades and subcontractors under this Contract.

E. Inspection: Inspect each items of materials or equipment immediately prior to installation. Reject damaged and defective items.

F. Dimensions: Recheck measurements and dimensions of the Work, as an integral step of starting each installation.

G. Manufacturers' Instructions: Unless specified otherwise, comply fully with Manufacturers' printed instructions, following each requirement and step in proper sequence. Do not omit any preparatory steps or installation procedures unless specifically modified or exempted in writing. Should manufacturer's instructions conflict with Contract Documents, request written interpretation of requirements from the Architect/Engineer before proceeding.

H. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

I. Secure products in place with position anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.05 RELATED WORK

A. Requirements for testing may be described in various Sections of these Specifications.

B. Where no testing requirements are described, but the Owner decides that testing is required, the Owner may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described in this Section.

1.06 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the Reference Standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to the latest edition of Reference Standards as specified in the individual Specification Sections, except where a specific date is established by codes.

C. Obtain copies of Reference Standards where required by product Specification Sections.

D. No Contractual relationship, duty, or responsibility of the parties in Contract, nor those of the Architect/Engineer, shall be altered from the Contract Documents by mention or inference otherwise in any reference documents.

1.07 SAMPLES

A. Take field Samples at the site as required by individual Specifications Sections for review.

B. Acceptable Samples represent a quality level for the Work.

C. Where field Samples are specified in individual Sections to be removed, clear area after field Sample has been accepted by Architect/Engineer.

D. Report samples taken but not tested and special sampling operations as required.

1.08 MOCK-UP

A. Schedule construction and review of the Mock-ups so as not to delay the progress of the Work.

B. Materials and finish shall be as specified in appropriate Sections and Divisions.

C. Test will be performed under provisions identified in this Section and identified in the respective product Specification Section.

D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

E. Accepted Mock-ups are representative of the quality required for the Work.

F. Where Mock-up has been accepted by the Architect/Engineer and is specified in product Specification Sections to be removed; remove mock-up and clear area when directed to do so.

G. Protect and maintain Mock-ups in clean, undamaged condition until such time as it is incorporated in the Work or removed from the Site.

1.09 SELECTION OF TESTING LABORATORY

A. Owner will appoint, employ and pay for specified initial services of an independent firm to perform inspecting and testing on earthwork, concrete, steel, welding, grout, anchors, bolts and any other items as deemed necessary.

B. The independent firm will perform inspections, tests and other services specified in individual Specification Sections and as required by Architect/Engineer or the Owner.

C. Inspecting, testing, and source quality control may occur on or off the project site. Provide access for off-site inspecting or testing as required by the specifications. Any off-site testing requested to be performed outside normal business hours, Saturday, Sunday or Contract Holidays (unless specified) will cause the Contractor to pay all overtime inspection and testing costs, as determined by the Owner.

D. Reports will be submitted by the independent firm to the Architect/Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, concrete design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations.
2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor’s use.
3. Provide access to the Work at all times and at all locations where the Work is in progress.
4. Provide facilities for access to enable the laboratory to perform its functions properly.

F. Testing or inspecting does not relieve the Contractor of the responsibility to perform the Work to Contract requirements.

G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for retesting will be charged to Contractor by deducting inspecting or testing charges from the Contract Sum/Price.

H. Unnecessary tests and inspections costs due to Contractor's poor scheduling will be deducted by the Owner from the Contract Sum.

I. The Owner and Architect/Engineer reserve the right to demand for tests, or special examination, any material, item or workmanship or part thereof to assure compliance with specifications and my reject for satisfactory replacement any material, Work or part judged defective or nonconforming as a result thereof. If such tests or examinations indicate the Work does not comply, then the cost of these tests and examinations shall be paid by the Contractor.

J. Limitations of authority of testing laboratory; Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of Work.
3. Perform any duties of Contractor.

1.10 CONTRACTOR'S CONVENIENCE TESTING

A. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor, including payment of convenience testing.

1.11 CODE COMPLIANCE TESTING

A. Inspections and tests required by codes or ordinances and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.12 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual Specification Sections, require material or product suppliers of manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up equipment, test, and adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of Observer to the Architect/Engineer 15 days in advance of required observation. Observer is subject to approval of the Architect/Engineer.

C. Report observations and site decisions or instructions given to applications or installers that are supplemental or contrary to manufacturers written instructions.

D. Submit report in duplicate within 30 days of observation to the Architect/Engineer for information.

1.13 SUBMITTALS

A. The independent testing agency will furnish copies of licensed Civil Engineer signed test reports to Architect/Engineer, Contractor and Owner's Representative, indicating sampling and testing in accordance with Title 24 and stipulating whether results comply or do not comply with Contract Documents, noting actual results compared to specified design strength.

B. Test Report Content:

1. Date of issue.
2. Project title and number.
3. Name, address and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Designation of the Work and test method.

7. Identification of product and Specification Section.
8. Complete inspection or test data.
9. Test results and interpretations of test results.
10. Ambient conditions at the time of sample taking and testing
11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements and the requirements CCR.T24.
12. Name and signature of laboratory Inspector
13. Recommendations on testing.

1.14 AIR BALANCE CONTRACTOR

A. If required by the project, an air balance-testing agency acceptable to the Architect/Engineer on this project shall be hired by the Contractor to conduct air balance testing on the complete Work of the Contractor. Provide information to Architect/Engineer for his review concerning air balance testing agency credentials.

B. HVAC Subcontractor on this project shall not perform or select that Air Balancing testing Contractor or be associated financially with Air Balance Contractor.

1.15 TEST AND INSPECTIONS

A. Provide all tests and inspections required by government agencies having jurisdiction, required by provisions of the Contract Documents, and such other tests and inspections as are directed by the Architect/Engineer.

B. Reports: Shall be executed immediately upon conclusion of each procedure and forwarded to Architect/Engineer, Owner, Contractor, Sub-Contractor, and Governing Agency

PART 2 – PRODUCTS

(Not applicable)

PART 3 – EXECUTION

3.01 INSPECTION

A. The Work of construction in all stages of progress shall be subject to the personal observation of the Owner's Representative. The Owner's Representative shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Owner's Representative reasonable facilities for obtaining such information as may be necessary to keep the Owner's Representative fully informed respecting the progress and manner of the Work and the character of the material. Owner's Representative observation of the Work shall not relieve the Contractor from any obligations to fulfill this Contract.

3.02 TESTING

A. Cooperation with Testing Laboratory: Representatives of the Testing Laboratory shall have access to the Work at all times. Provide facilities for such access in order that the laboratory may properly perform its functions.

B. Schedules for Testing:

1. Establishing schedule:

a. By advance discussion with Testing Laboratory selected by Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.

b. Provide all required time within the Construction schedule.

2. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate all changes of schedule with Testing Laboratory as required.
3. Adherence to Schedule: When the Testing Laboratory is ready to test according to the incompleteness of the Work, all extra costs for testing attributable to the delay will be deducted by Owner from the Contract Sum.

C. Taking Specimens: All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the Testing Laboratory or the Owner.

D. Testing at the Source of Supply:

1. Contractor shall notify the Owner a sufficient time in advance of the manufacture of material to be supplied by the Contractor under the Contract Documents, which by terms of Contract must be tested, so Owner may arrange for testing material at source of supply.
2. Any material shipped by Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job.

3.03 SOIL INSPECTING AND TESTING

A. The testing laboratory will perform required inspections and tests including, but not necessarily limited to:

1. Visually inspect on-site and imported fill and backfill, making such tests and retests as necessary to determine compliance Contract requirement compliance and suitability.
2. Make field density tests on samples from in-place material as required.
3. Inspect and test the scarifying and recompacting of cleaned subgrade; inspect the progress of excavating, filling, and grading; make density tests and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction.

B. Make and distribute necessary reports and certificates.

3.04 CONCRETE INSPECTING AND TESTING

A. Portland cement (Provided by concrete supplier):

1. Provide cement manufacturer Certificates of Compliance and deliver to testing lab
2. The Certificates of Compliance shall positively identify cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with specified standards.
3. If so required by the Architect/Engineer, promptly provide such other specific physical and chemical data as requested.

B. Aggregate (Provided by concrete supplier):

1. Provide one test unless character of material changes, material is substituted, or additional test is requested by the Architect/Engineer.
2. Sample from conveyor belts and batching gates at the ready-mix plant:

a. Sieve analysis to determine compliance with specified standards and grading;
b. Specific gravity test for compliance with specified standards.

C. Laboratory design mix (Provided by concrete supplier):

1. After approval of aggregate, and whenever character or source of materials is changed, provide mix design in accordance with ACI 613.
2. Provide designs for all mixes prepared by a licensed Civil Engineer.

D. Molded concrete cylinders (Performed by Testing Lab):

1. Provide 3 test cylinders for each 50 cu. yds, or fraction thereof, of each class of concrete of each day's placement.
2. Test 1 cylinder at 7 days, 1 at 28 days, and 1 when so directed.
3. Report the mix, slump, gage, location of concrete in the structure, and test results.
4. Take specimens and make tests in accordance with the applicable ASTM Standard Specifications.

E. Core Tests (Performed by Testing Lab):

1. Provide only when specifically so directed by the Architect/Engineer because of low cylinder test results, per Section 2-2604, (d), Title 24.
2. Cut from locations directed by the Architect/Engineer, securing in accordance with ASTM C42, and prepare and test in accordance with ASTM C39.

F. Placement Inspections (Performed by Testing Lab):

1. On concrete over 2000 psi, provide continuous or other inspection as required by governmental agencies having jurisdiction.
2. Throughout progress of concrete placements, make slump tests to verify conformance with specified slump.
3. Using all required personnel and equipment, throughout progress of concrete placement Contractor shall verify that finished concrete surfaces will have the level of slope that is required by the Contract Documents.

3.05 CONCRETE REINFORCEMENT INSPECTING AND TESTING

A. Prior to use, test all reinforcement steel bars for compliance with Specific Standards (provided by steel supplier).

1. Material identified by mill test report, and certified by the testing laboratory, does not require additional testing. Require the supplier to furnish mill test reports to the testing laboratory for certification.
2. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.

B. Unidentified Steel (performed by testing lab):

1. Testing laboratory shall select two samples, each 18 in. long of each size.
2. Testing laboratory shall make one tensile test and one bend test for each 2-1/2 tons or fraction thereof of each size of unidentified steel.

C. Provide continuous inspection for all welding of reinforcement steel.

3.06 STRUCTURAL STEEL INSPECTING AND TESTING

A. Prior to use, test all structural steel for compliance with the specified standards (performed by steel supplier).

1. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing. Require the supplier to furnish mill test reports to the laboratory for certification.
2. Tag identified steel at the suppliers shop. When steel arrives at the job site without such tags, Owner may require that it is tested as unidentified steel by the testing lab.

B. Unidentified steel:

1. The testing laboratory shall make one tensile test and one bend test for each 5 tons of fraction thereof of each shape and size of unidentified structural steel.

C. Shop Welding (inspection provided by testing lab):

1. Provide qualified testing laboratory inspector approved by Owner.
2. On single pass welds, inspect after completion of welding and prior to painting.
3. On multiple pass welds, and on butt welds with cover pass on the back side, provide continuous inspection.

D. Field Welding (inspection provided by testing lab): Provide continuous inspection by a qualified testing laboratory inspector approved by Owner.

3.07 POWDER DRIVEN CONCRETE FASTENERS

A. Use of Powder Driven Concrete Fasteners for tension loads is limited is limited to support of minor loads like acoustical ceilings, duct work, conduit.

B. Allowable loads:

1. In general, loads should be limited to less than 100 pounds. Greater loads may be permitted for special cases when approved by the checking supervisor or field engineer.

C. Testing:

1. The operator, tool, and fastener shall be pre-qualified by the Owner's Representative, who shall observe the testing of the first 10 fastener installations. A test "pull-out" load of not less than twice the design load, or 200 pounds, whichever is greater, shall be applied to the pin in such a manner as not to resist the spalling tendency of the concrete surrounding the pin. Thereafter, random test under the Owner's Representative supervision shall be made of approximately 1 in 10 pins, except that when the design load exceeds 100 pounds, one half of the pins shall be tested. Should failure occur on any pin tested, all installations must be tested and any pins failing shall be replaced and retested.

3.08 REJECTED WORK

A. The Owner and its representatives shall at all times have access for the purpose of inspection to all parts of the Work and the shops wherein the Work is in preparation.

B. The Owner and its representatives shall have the right to reject materials and workmanship which are defective or to require their correction.

C. The Owner and its representatives, at any time prior to final acceptance of the entire Work, may make an examination of completed Work by requesting the Contractor to furnish all necessary facilities, labor and materials to remove or tear out completed Work.

D. Work found meeting the requirements of the Contract after removal or tearing out, shall result in additional costs for labor and material being paid by the Owner.

E. Rejected workmanship shall be removed for the project, without charge to the Owner, for examination, reconstruction, and removal.

E. Rejected workmanship not corrected by the Contractor within a reasonable time, fixed by written notice, may be corrected by Owner and expense will be deducted by the Owner from the Contract Sum.

3.09 REPAIR AND PROTECTION

A. Comply with requirements of Section 01705 Cutting and Patching.

B. Upon completion of inspection, testing, sample-taking and similar services repair damaged construction and restore substrates and finishes to eliminate deficiencies.

C. Protect repaired construction and Work exposed by or for quality control service activities.

D. Repair and protection is the Contractors responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

F. Work performed by the Contractor which is not in accordance with the Contract Documents and which requires remedial action or changing of the final locations of parts of the Work shall require the following action steps:

1. Contractor confirms finding of Owner within seven days after receipt of Owner's notice.
2. Contractor hires an independent Consultant to review the construction problem and propose an alternated solution within 14 days after step number 1.
3. Contractor agrees to compensate the Owner for any expense the Owner incurs to evaluate the proposed solution.
4. Contractor makes the correction or accepts a negotiated reduction in the Contract sum upon Owner's approval of non-conforming Work.

3.10 UNCOVERING AND CORRECTION OF WORK

A. If a portion of the Work is covered contrary to the Architect/Engineer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect/ Engineer, be uncovered for the Architect/Engineer's observation and be replaced at the Contractor's expense without change in the Contract sum or time.

B. Contractor shall promptly correct Work rejected by the Architect/Engineer and bear costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect/Engineer's services and expenses made necessary due to the correction.

END OF SECTION

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SECTION 01 4100

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. **Section includes:**

1. Regulatory requirements applicable to Contract Documents
2. Required provisions under Local Agency Disputes Act
3. Required references under federal law

1.02 GENERAL

A. **Compliance with Laws**

1. Conform to all applicable codes, Laws, ordinances, rules, and regulations, which shall have full force and effect as though printed in full in these Specifications. Codes, laws, , rules, regulations, and ordinances ("**Regulatory Requirements**") are not furnished to Contractor, because Contractor is assumed to be familiar with these requirements.
2. Any listing of Regulatory Requirements for Work in the Contract Documents is supplied to Contractor as a courtesy and shall not limit Contractor's responsibility for complying with all applicable Regulatory Requirements having application to the Work. Where conflict among the Regulatory Requirements or with these Specifications occurs, the most stringent requirements shall be used.
3. Specific reference in the Specifications to applicable Laws and Regulatory Requirements shall mean the latest adopted edition by the regulatory agency in effect at the time of the opening of Bids, except as may be otherwise specifically stated in the Contract Documents.

B. **Precedence**

1. Where specified requirements differ from Regulatory Requirements, the more stringent requirements shall take precedence. Where Drawings or Specifications require or describe products or execution of better quality, higher standard, or greater size than required by Regulatory Requirements, then Drawings and Specifications shall take precedence so long as such increase is in compliance with Laws and Regulatory Requirements. Where no requirements are identified on Drawings or in Specifications, Contractor shall comply with all Regulatory Requirements of governing authorities having jurisdiction.
2. Should any conditions develop not covered by the Contract Documents wherein the finished Work will not comply with current codes, a Change Order detailing and specifying the required Work shall be submitted to and approved by Owner before proceeding with the Work.

1.03 REGULATORY REQUIREMENTS

A. **Applicable Codes**

1. Codes that apply to Contract Documents include all current Codes adopted by the Rosamond Community Services District and the County of Kern Building Inspection Department or authority having jurisdiction, applicable to construction, including, but not limited to, the following:

    a. California Building Code (as amended by applicable local ordinances for all construction work.

b. California Green Building Standards Code as amended by applicable local ordinances for all construction work.

c. California Electrical Code as amended by applicable local ordinances for all construction work.

d. California Plumbing Code as amended by applicable local ordinances for plumbing, sewage disposal, and health requirements.

e. California Mechanical Code as amended by applicable local ordinances for all construction work.

f. International Fire Code as amended by applicable local ordinances for all construction work.

g. California Administrative Code Titles 15, 19 and 24 (with California amendments), and Americans with Disabilities Act (ADA) accessibility guidelines, whichever is more stringent.

h. All State laws and City and County Ordinances, rules of the State or City or County Health Departments, rules of the National Board of Fire Underwriters and National Fire Protection Associations, and local utility company regulations for mechanical and electrical work.

B. **Applicable Laws, Statutes, Ordinances, Rules, And Regulations**

1. During prosecution of Work to be done under Contract Documents, Contractor shall comply with applicable codes, laws, orders, ordinances, rules, and regulations, including, but not limited to, the following:

a. Federal:

1) Americans With Disabilities Act of 1990
2) 29 CFR, Section 1910.1001, Asbestos
3) 40 CFR, Subpart M, National Emission Standards for Asbestos
4) Executive Order 11246
5) Federal Endangered Species Act
6) Clean Water Act

b. State of California:

1) California Code of Regulations, Titles 5, 8, 17, 19, 21, 22, 24 and 25
2) California Public Contract Code
3) California Health and Safety Code
4) California Government Code
5) California Labor Code
6) California Civil Code
7) California Code of Civil Procedure
8) CPUC General Order 95, Rules for Overhead Electric Line Construction
9) CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems
10) Cal/OSHA
11) OSHA: Hazard Communications Standards
12) California Endangered Species Act
13) Water Code
14) Fish and Game Code

c. State of California Agencies:

1) Regulatory Requirements of State and Consumer Services Agency
2) Regulatory Requirements of Office of the State Fire Marshall
3) Regulatory Requirements of Office of Statewide Health Planning and Development
4) Regulatory Requirements of Department of Fish and Game

5) Regulatory Requirements of all Air Quality Management Districts with jurisdiction

6) Regulatory Requirements of Department of Water Resources
7) Regulatory Requirements of all Regional Water Quality Control Boards with jurisdiction
8) Regulatory Requirements of the Division of the State Architect (if having jurisdiction)

d. Regulatory Requirements of all Local Agencies with jurisdiction (including, without limitation, cities, counties, and fire departments)

C. **Change Orders and Claims:**

1. The California Public Contract Code, including but not limited to Section 7105(d)(2), and the California Government Code section 930.2 et seq., apply to all contract procedures for changes, time extensions, change orders (time or compensation), and claims. Federal law (*U.S. v. Holpuch* 326 U.S. 234) shall supplement California law on the enforceability of these requirements.
2. Any change, waiver, or omission to implement contract change order and claim procedures shall have no legal effect unless expressly permitted in a fully executed change order approved by Contractor and Owner and approved as to form by their respective legal counsel.

D. **Required Provisions On Contract Claim Resolution**

1. The California Public Contract Code specifies required provisions on resolving contract claims less than $375,000, which are set forth below, and constitute a part of this Contract.
2. For the purposes of this Section 01 4100, **"Claim"** means a separate demand by Contractor of $375,000 or less for (1) a time extension, (2) payment or money or damages arising from Work done by or on behalf of Contractor arising under the Contract Documents and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (3) an amount the payment of which is disputed by Owner. In order to qualify as a Claim, the written demand must state that it is a Claim submitted under paragraph 12 of Document 00 7200 (General Conditions) and be submitted in compliance with all requirements of Document 00 7200 (General Conditions), paragraph 12. Separate Claims which total more than $375,000 do not qualify as a "separate demand of $375,000 or less," as referenced above, and are not subject to this Section 01 4100,.
3. A voucher, invoice, payment application, or other routine or authorized form of request for payment is not a Claim for purposes of this Section 01 4100. If such request is disputed as to liability or amount, then the disputed portion of the submission may be converted to a Claim under this Section 01 4100, by submitting a separate Claim in compliance with Contract Documents claim submission requirements.
4. Caution. This Section 01 4100, does not apply to tort claims and nothing in this Section 01 4100, is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 and Chapter 2 of Part 3 of Division 3.6 of Title 1 of the California Government Code.
5. Procedure:

a. The Claim must be in writing, submitted in compliance with all requirements of Document 00 7200 (General Conditions), paragraph 12, including, but not limited to, the time prescribed by and including the documents necessary to substantiate the Claim, pursuant to Document 00 7200 (General Conditions), paragraph 12.3. Claims must be filed on or before the day of final payment. Nothing in this Section 01 4100, is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth in Document 00 7200 (General Conditions), paragraph 12 or elsewhere in the Contract Documents.

b. For Claims of $50,000 or less, Owner shall respond in writing within 45 days of receipt of the Claim, or Owner may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims Owner may have against claimant. If additional information is thereafter required, it shall be requested and provided in accordance with this Section 01 4100, upon mutual agreement of Owner and claimant. Owner's written response to the Claim, as further documented, shall be submitted to claimant within 15 days after receipt of further documentation or within a period of time no greater than taken by claimant in producing the additional information, whichever is greater.

c. For Claims over $50,000 and less than or equal to $375,000: Owner shall respond in writing within 60 days of receipt of the Claim, or Owner may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims Owner may have against claimant. If additional information is thereafter required, it shall be requested and provided in accordance with this Section 01 4100, upon mutual agreement of Owner and claimant; Owner's written response to the Claim, as further documented, shall be submitted to claimant within 30 days after receipt of further documentation or within a period of time no greater than taken by claimant in producing the additional information, whichever is greater.

d. Meet and Confer: If claimant disputes Owner's written response, or Owner fails to respond within the time prescribed above, claimant shall notify Owner, in writing, either within 15 days of receipt of Owner's response or within 15 days of Owner's failure to timely respond, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon demand Owner will schedule a meet and confer conference within 30 days for settlement of the dispute.

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

E. **Compliance With Americans With Disabilities Act**

1. Contractor acknowledges that, pursuant to the Americans with Disabilities Act ("**ADA**"), programs, services and other activities provided by a public entity to the public, whether directly or through a Contractor, must be accessible to the disabled public. Contractor shall provide the services specified in the Contract Documents in a manner that complies with the ADA and any and all other applicable federal, state, and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits, or activities provided under the Contract Documents and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents, or assigns shall constitute a material breach of the Contract Documents.

F. **Compliance With IRCA**

1. Contractor acknowledges that Contractor, and all subcontractors hired by Contractor to perform services under this Agreement, are aware of and understand the immigration Reform and Control Act ("**IRCA**"). Contractor is and shall remain in compliance with the IRCA and shall ensure that any subcontractors hired by Contractor to perform services under this Agreement are in compliance with the IRCA. In addition, Contractor agrees to indemnify, defend, and hold harmless Owner, its agents, officers and employees, from any liability, damages, or causes of action arising out of or relating to any claims that Contractor's employees, or employees of any subcontractor hired by Contractor, are not authorized to work in the United States for Contractor or its subcontractor and/or any other claims based upon alleged IRCA violations committed by Contractor or Contractor's

subcontractors.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

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SECTION 01 4216

DEFINITIONS

PART 1 - GENERAL

1.01 SUMMARY

A. **Section Includes:**

1. Reference standards, abbreviations, symbols, and definitions used in Contract Documents.
2. Full titles are given in this Section for standards cited in other Sections of Specifications.

1.02 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES

A. **References**

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code, or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.
2. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual, or code or of any instruction of any supplier, Contractor shall report it in writing at once to Owner's Representative and Architect/Engineer, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by Owner.

B. **Precedence**

1. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order or Instruction Bulletin, 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 such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
   b. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).
2. No provision of any standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of Owner, Owner's Representative, Architect/Engineer or Contractor, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to Owner, Architect/Engineer, or any of their consultants, agents, representatives, or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

C. **Referenced Grades, Classes, and Types:**

1. Where an alternative or optional grade, class, or type of product or execution is included in a reference but is not identified in Drawings or in Specifications, Contractor shall provide

the highest, best, and greatest of the alternatives or options for the intended use and prevailing conditions.

D. **Edition Date of References:**

1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of opening Bids.
2. All amendments, changes, errata and supplements as of the effective date shall be included.

E. **AWWA, ASTM and ANSI References:** Specifications and Standards of the American Water Works Association, American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision, or amendment. It is presumed that Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.03 DEFINITIONS

A. **Meaning of Words and Phrases**

Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth. Where abbreviations and symbols are used, such abbreviations and symbols shall be given their common meaning in the construction industry. In the Contract Documents, the neuter gender includes the feminine and masculine, and the singular number includes the plural.

While Owner has made an effort to identify all defined terms with initial caps, the following definitions shall apply regardless of case unless the context otherwise requires:

1. Addenda: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct, or change the bidding requirements or the Contract Documents. Addenda shall not include the minutes of the Pre-Bid Conference and/or Site Visit.
2. Agreement (Document 00 5200): Agreement is the basic Contract Document that binds the parties to construction Work. Agreement defines relationships and obligations between Owner and Contractor and by reference incorporates Conditions of Contract, Drawings, and Specifications and contains Addenda and all Modifications subsequent to execution of Contract Documents.
3. Alternate: Work added to or deducted from the base Bid, if accepted by Owner.
4. Application for Payment: Written application for monthly or periodic progress or final payment made by Contractor complying with the Contract Documents.
5. Approved Equal: Approved in writing by Owner as being of equivalent quality, utility and appearance.
6. Architect/Engineer: If used elsewhere in the Contract Documents, “Architect/Engineer” shall mean a person (or that person’s firm) holding a valid California State Architect’s or Engineer’s license representing the Owner in the administration of the Contract Documents. Architect/Engineer may be an employee of or an independent consultant to Owner. When Architect/Engineer is referred to within the Contract Documents and not an employee of Owner, Architect/Engineer shall be construed to include employees of Architect/Engineer and/or employees that Architect/Engineer supervises. When the designated Architect/Engineer is an employee of Owner, his or her authorized representatives on the Project will be included under the term Architect/Engineer. If Architect/Engineer is an employee of Owner, Architect/Engineer is the beneficiary of all Contractor obligations to Owner, including without limitation, all releases and indemnities. Architect/Engineer may also be referred to as Architect or Engineer.

7. 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 OSHA or Cal/OSHA.
8. Bid: The offer or proposal of the Bidder submitted on the prescribed form(s) setting forth the prices for the Work to be performed.
9. Bidder: One who submits a Bid.
10. Bidding Documents: All documents comprising the Project Manual (including all documents and Specification Sections listed in Document 00 0110 [Table of Contents]), including documents supplied for bidding purposes only and Contract Documents.
11. BIT – Component 3 of a Cost Proposal addressing Measurement and Payment of Bonds, Insurance and Taxes. See Document 01 2050 Modification Procedures.
12. BMP (Best Management Practices) – Related to implementation of a SWPPP, the measures and methods undertaken to implement a Stormwater Pollution and Prevention Plan on a project site.
13. Board: The governing body of the Owner.
14. Business or Working (Work) Day: Any Day other than Saturday, Sunday, and the following days that have been designated as holidays by Owner. If a holiday falls on a Saturday, the preceding Friday will be the holiday. If a holiday falls on a Sunday, the following Monday will be the holiday.

    a. New Year's Day, January 1;
    b. Martin Luther King Jr.'s Birthday, third Monday in January;
    c. Lincoln's Birthday, February 12;
    d. Presidents' Day, third Monday in February;
    e. Cesar Chavez Day, March 31;
    f. Memorial Day, last Monday in May;
    g. Independence Day, July 4;
    h. Labor Day, first Monday in September;
    i. Columbus Day, second Monday in October;
    j. Veterans' Day, November 11;
    k. Thanksgiving Day, as designated by the President;
    l. The Day following Thanksgiving Day;
    m. Christmas Day, December 25; and
    n. Each day appointed by the Governor of California and formally recognized by the Governing Board as a day of mourning, thanksgiving, or special observance.

15. By Others: Work that is outside scope of Work to be performed by Contractor under this Contract, which will be performed by Owner, other contractors, or other means.
16. By Owner: Work that will be performed by Owner or its agents at the Owner's expense.
17. Change Order ("**CO**"): A written instrument prepared by Owner and signed by Owner and Contractor, stating their agreement upon all of the following:

    a. a change in the Work;
    b. the amount of the adjustment in the Contract Sum, if any; and
    c. the amount of the adjustment in the Contract Time, if any.

18. Code: All Codes specified by law or applicable governing agency.
19. Code Inspector: A local or state agency responsible for the enforcement of applicable codes and regulations.
20. Concealed: Work not exposed to view in the finished Work, including within or behind various construction elements.
21. Contract Amount: a change order price, line item price, Contract Sum, or other price assigned to a scope of work.

22. Contract Conditions or Conditions of the Contract: Consists of two parts: General Conditions and Supplementary Conditions.
    a. General Conditions are general clauses that are common to the Owner Contracts, including Document 00 7200 (General Conditions).
    b. Supplementary Conditions modify or supplement General Conditions to meet specific requirements for Contract Documents.
23. Contract Documents and Contract: Contract Documents and Contract shall consist of the documents identified as the Contract Documents in Document 00 5200 (Agreement), plus all changes, Addenda, and modifications thereto.
24. Contract Modification: Either:
    a. a written amendment to Contract signed by Contractor and Owner; or
    b. a Change Order; or
    c. a written directive for a minor change in the Work issued by Owner.
25. Contract Sum: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by Owner to Contractor for performance of the Work and the Contract Documents. The Contract Sum is also sometimes referred to as the Contract Price or the Contract Amount.
26. Contract Time: The number or numbers of Days or the dates stated in the Agreement to achieve Final Completion of the Work or designated Milestones; and/or to achieve Final Completion of the Work so that it is ready for final payment and is accepted.
27. Contractor: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neutral in gender. The term “Contractor” means the Contractor or its authorized representative.
28. Contractor’s Employees: Persons engaged in execution of Work under Contract as direct employees of Contractor, as Subcontractors, or as employees of Subcontractors.
29. Cost Proposal: A cost estimate for an increase or decrease in Contract Sum relative to a Contract Modification. All cost proposals shall be submitted on the form included in Document 01 2050.
30. Day: One calendar day of 24 hours measured from midnight to the next midnight, unless the word “day” is specifically modified to the contrary.
31. Defective: An adjective which, when modifying the word “Work,” refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including but not limited to approval of Samples and “or equal” items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by Owner). Unapproved substitutions are defective. Owner is the judge of whether Work is Defective.
32. Division of State Architect: A division of the State of California providing, design and construction oversight for K–12 schools and community colleges, and developing and maintaining accessibility standards and codes utilized in public and private buildings throughout the State of California.
33. Drawings: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.
34. Equal: Equal in opinion of Owner. Burden of proof of equality is responsibility of Contractor.
35. Exposed: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.
36. Final Acceptance or Final Completion: Owner’s acceptance of the Work as satisfactorily completed in accordance with Contract Documents. Requirements for Final Acceptance/Final Completion include, but are not limited to:

a. Final cleaning is completed.
b. All systems having been tested and accepted as having met requirements of Contract Documents.
c. All required instructions and training sessions having been given by Contractor.
d. All Project Record Documents having been submitted by Contractor, reviewed by Owner, and accepted by Owner.
e. All punch list Work, as directed by Owner, having been completed by Contractor.
f. Generally all Work, except Contractor maintenance after Final Acceptance/Final Completion, having been completed to satisfaction of Owner.

37. Force Account: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials, equipment, taxes, and other costs, plus a specified percentage for overhead and profit.
38. Furnish: Supply only, do not install.
39. Indicated: Shown or noted on the Drawings.
40. Install: Install or apply only, do not furnish.
41. Instruction Bulletin ("**IB**"): A document consisting of supplementary details, instructions, or information issued by Owner that clarifies or supplements Contract Documents, and with which Contractor shall comply. Instruction Bulletins may also order alterations or Modifications that do not result in change in Contract Sum or Contract Time, and do not substantially change Drawings or Specifications. Instruction Bulletins do not constitute changes in Contract Sum or Contract Time except as otherwise agreed in writing by Owner.
42. Latent: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under Document 00 7200 (General Conditions).
43. Law: Unless otherwise limited, all applicable laws including without limitation all federal, state, and local laws, statutes, standards, rules, regulations, ordinances, and judicial and administrative decisions.
44. LEMS: Component 1 of a Cost Proposal addressing Measurement and Payment of Labor, Equipment, Material and Subcontractors. See Document 01 2050 Modification Procedures.
45. Material: This word shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.
46. Milestone: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Final Completion of all Work.
47. Modification: Same as Contract Modification.
48. Not in Contract or "NIC": Work that is outside the scope of Work to be performed by Contractor under Contract Documents.
49. Notice of Completion: Shall have the meaning provided in California Civil Code §3093, and any successor statute.
50. Off Site: Outside geographical location of the Project.
51. Owner: Owner is defined in Document 00 5200 (Agreement).
52. Owner-Furnished, Contractor Installed: Items furnished by Owner at its cost for installation by Contractor at its cost under Contract Documents.
53. Owner's Representative(s): See Document 00 5200 (Agreement).
54. Partial Utilization: Use by Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Final Completion of all of the Work.
55. PCBs: Polychlorinated biphenyls.

56. Phase: A specified portion of the Work (if any) specifically identified as a Phase in Document 00 5200 (Agreement) or Document 01 1000 (Summary).
57. Product Data: That information (brochures, catalog sheets, manufacturer's cut sheets, etc.) supplied by vendors having technical and commercial characteristics of the supplied equipment or materials and accompanying commercial terms such as warranties, instructions, and manuals.
58. Progress Report: A periodic report submitted by Contractor to Owner with progress payment invoices accompanying progress schedule. See Document 00 7200 (General Conditions).
59. Progress Schedule (schedule):
    a. Baseline Progress Schedule: The first progress schedule submittal from the Contractor and reviewed by Owner, with no exceptions taken.
    b. Progress Schedule: All subsequent schedule submissions after the Baseline Progress Schedule.
60. Project: Total construction of which Work performed under Contract Documents may be whole or part.
61. Project Manager: If used elsewhere in the Contract Documents, "Project Manager" shall mean a person representing the Owner in the administration of the Contract Documents. Project Manager may be an employee of or an independent consultant to Owner. When Project Manager is referred to within the Contract Documents and no Project Manager has in fact been designated, then the matter shall be referred to Owner. The term Project Manager shall be construed to include employees of Project Manager and/or employees that Project Manager supervises. When the designated Project Manager is an employee of Owner, his or her authorized representatives on the Project will be included under the term Project Manager. If Project Manager is an employee of Owner Project Manager is the beneficiary of all Contractor obligations to Owner, including without limitation, all releases and indemnities.
62. Project Manual: Project Manual consists of Bidding Requirements, Agreement, Bonds, Certificates, Contract Conditions, Drawings, and Specifications.
63. Project Record Documents: All Project deliverables required under the Contract Documents, including without limitation, as built drawings; Installation, Operation, and Maintenance Manuals; and Machine Inventory Sheets.
64. Provide: Furnish and install.
65. Request for Information ("**RFI**"): A document prepared by Contractor requesting information regarding the Project or Contract Documents. The RFI system is also a means for Owner to submit Contract Document clarifications or supplements to Contractor.
66. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
67. Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
68. Shown: As indicated on Drawings.
69. Site: The particular geographical location of Work performed pursuant to the Contract Documents.
70. Specifications: The written portion of the Contract Documents consisting of requirements for materials, equipment, construction systems, standards, and workmanship for the Work; performance of related services.
71. Specified: As written in Specifications.

72. Standard Specifications: The most recent edition of the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, insofar as the same may apply and in accordance with the Specifications.
73. Subcontractor: A person or entity that has a direct contract with Contractor to perform a portion of the Work at the Site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and neutral in gender and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.
74. SWPPP (Storm Water Pollution and Prevention Plan) – Plan to mitigate storm water quality and discharges from the construction site.
75. Testing and special inspection agency: An independent entity engaged to inspect and/or test the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes.
76. Time Impact Evaluation ("**TIE**"): An evaluation of the impact of an issue to the project schedule.
77. Underground Facilities: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities that have been installed underground to furnish any of the following services or materials: Electricity, gases, chemicals, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems, or water.
78. Unit Price Work: Shall be the portions of the Work for which a unit price is provided in Document 00 5200 (Agreement) or Section 01 1000 (Summary).
79. Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents within the Contract Time. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents including everything shown in the Drawings and set forth in the Specifications. Wherever the word "work" is used, rather than the word "Work," it shall be understood to have its ordinary and customary meaning.

B. **Other Defined Terms**

The following terms are not necessarily identified with initial caps; however they shall have the meaning set forth below:

1. Wherever words "as directed," "as required," "as permitted," or words of like effect are used, it shall be understood that direction, requirements, or permission of Owner is intended. Words "sufficient," "necessary," "proper," and the like shall mean sufficient, necessary, or proper in judgment of Owner. Words "approved," "acceptable," "satisfactory," "favorably reviewed," or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by Owner.
2. Wherever the word "may" or "ought" is used, the action to which it refers is discretionary. Wherever the word "shall" or "will" is used, the action to which it refers is mandatory.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

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SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section describes construction facilities and temporary controls required for the Work.

1.02 SECTION INCLUDES

A. Temporary Utilities

B. Construction Facilities: sanitary facilities, parking, progress cleaning.

C. Dust control.

D. Noise control.

E. Pollution control.

F. Protect installed Work.

G. Security.

H. Nothing in this Section is intended to limit types and amount of temporary Work required. No omission from this Section will be recognized by Architect/Engineer that such activity is not required for successful completion of the Work and compliance with requirements of Contract Documents

1.03 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 00 and Division 01 Specification Sections, apply to Work of this Section.

1.04 TEMPORARY UTILITIES

A. Temporary Sanitary Facilities:

1. Provide and maintain required facilities and enclosures. Comply with all minimum requirements of all public agencies having jurisdiction in regards to temporary restroom and hand wash stations.

1.05 TEMPORARY CONTROLS

A. Barriers:

1. Provide barricades, scaffolds, tarpaulins, canopies, warning signs, steps, etc., and other temporary construction required by governing authorities to comply with pertinent safety and other regulations.

B. Fencing, as required to secure Project Area:

1. Construction: Commercial grade chain link fence.

C. Protection of Installed Work:

1. Provide temporary and removable protection for installed Products. Control activity in immediate Work area to minimize damage.

1.06 CONSTRUCTION FACILITIES

A. Access Roads: Where required.

1. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
2. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic low.
3. Provide and maintain access to fire hydrants, free of obstructions.

B. Parking:

1. Coordinate with County of Kern regarding available parking location.
2. Do not allow vehicle parking on constructed pavement.

C. Progress Cleaning:

1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition on a daily basis.
2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
3. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust. Remove waste material, debris, and rubbish from site periodically and dispose off-site.

1.09 DUST CONTROL

A. Conduct construction operations to minimize the generation of dust and dirt, and prevent dust and dirt from interfering with the progress of the Work and from accumulation in Work and adjacent areas as required by authorities having jurisdiction.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere and into existing facility. This facility is to remain operation during the construction.

1. Periodically water construction areas to minimize the generation of dust and dirt.
2. To additionally minimize the generation of dust and dirt, hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins.
3. Prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drain systems.

C. Dust and debris that may be generated during construction will be mitigated in accordance with the standards established by the Kern County Air Pollution Control District (KCUAPCD), Rule 42 Fugitive Dust/PM_{10} pertaining to construction and demolition activities for the control of Fugitive Dust of fine particulate matter (PM_{10}).

1.10 NOISE CONTROL

A. Provide methods, means, and facilities as required to minimize noise from the Work and noise produced by construction operations.

1.12 POLLUTION CONTROL

A. Comply with applicable regulatory requirements and anti-pollution ordinances during the conduct of construction and disposal operations.

1.13 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

1.15 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition on a daily basis.

B. Collect and remove waste materials, debris, and rubbish from site daily and dispose offsite.

1.16 MAINTENANCE

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.

PART 2 – PRODUCTS

(Not applicable)

PART 3 – EXECUTION

3.01 REMOVAL

A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work.

B. Remove all such temporary facilities and controls prior to final payment.

3.02 CONTRACTOR'S OPERATIONS

A. During the course of construction, do not interfere with other buildings or portions of buildings, which are to remain, occupied. Maintain free and safe passage to and from other buildings which are occupied

B. In occupied areas, attempt to do all jackhammer and other particularly noisy Work after normal working hours and on weekends. In all cases, schedule this Work in advance with the Owner's Representative. Minimize construction noise by adequate mufflers and other means.

END OF SECTION

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SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. Product requirements, transportation and handling of products, storage and protection of products, product options, and substitutions procedures.

1.2 SECTION INCLUDES

A. Definitions.

B. Products.

C. Transportation and handling.

D. Storage and protection.

E. Product options.

F. Substitutions.

1.3 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 00 and Division 01 Specification Sections, apply to Work of this Section.

1.4 DEFINITIONS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Named products: Items identified by manufacturer’s product name, including make and model as identified in published product literature current as of Contract Document date.

C. Materials: Products substantially shaped, cut or worked or otherwise fabricated, processed, or installed to form a part of the Work.

D. Equipment: Product with operational parts, motorized or manual, that requires service connections.

1.5 PRODUCTS

A. New and in a condition acceptable to the Owner and the Architect/Engineer. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

B. In conformance with EPA Codes and Regulations.

C. No material or equipment shall be used for any purpose other than that for which it is designed or specified.

D. Provide interchangeable components of the same manufacture, for components being replaced.

E. No material shall contain asbestos or polychlorinated biphenals (PCBs).

F. No materials or products shall contain formaldehyde in excess of the amount recommended by OSHA Regulations (Standards -29 CFR).

G. No lead containing powder driven anchors are permitted. Wherever powder driven anchors are Indicated or Specified, provide equivalent strength non-lead containing powder driven anchors.

H. Pursuant to the Resource Conservation & Recovery Act (RCRA) 6002 and to the extent that new recyclable material maybe utilized for construction of the building expansion with the approval of Architect/Engineer.

1.6 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Deliver manufactured products in the manufacturer's original, unbroken containers or packaging, with identifying labels intact and legible.

C. Immediately on delivery, inspect shipments to assure compliance with the requirements of the Contract Documents and accepted Submittals, quantities are correct and to verify that products are properly protected and undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damaging the product and their packaging.

E. Promptly remove damaged and defective products from the Site and replace at no increase in Contract Sum.

F. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

G. Protect finished surfaces, including jambs and soffits and openings used as passageways, through which equipment and material are handled.

H. Schedule delivery to minimize long term storage at the site and to prevent overcrowding of construction storage space.

I. Coordinate delivery with installation time to minimize holding time for flammable, hazardous, easily damaged, or other losses.

J. Inspect products upon delivery to ensure compliance with Contract Documents, products are not damaged and they are properly protected.

1.7 STORAGE AND PROTECTION

A. Except as otherwise approved by the Architect/Engineer, store and protect products in accordance with manufacturers' instructions, with seals and labels intact and legible.

B. Store products that are subject to damage by the elements, under cover in a weather-tight, climate controlled enclosures.

C. Maintain temperature and humidity within the ranges required by manufacturers.

D. For exterior storage of fabricated products, place on sloped supports, above ground, to prevent soiling and staining.

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 avoid condensation or potential degradation of product.

G. Store less granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect products to ensure that products are maintained under specified condition and free from damaged and deterioration.

J. In event of damage to the product, promptly replace to the approval of the Architect/Engineer and at no additional cost to the Owner.

K. Additional time required to secure replacements will not be considered by the Architect/Engineer for any extension in the contract time of completion.

L. Protection after Installation:

1. Provide substantial coverings as necessary to protect installed products from damage from traffic and construction operations. Remove coverings when no longer needed.
2. Maintain temperature and humidity conditions for interior equipment and finish products in accordance with the manufacturers' printed instruction.

1.8 PRODUCT OPTIONS

A. For products Indicated or Specified by Reference Standards or by descriptive requirements only, select any product by any manufacturer meeting description and that is recommended by manufacturer for the application Indicated.

B. For products Indicated or Specified by Performance Requirements only, select any product by any manufacturer meeting requirements and that is recommended by manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application. Manufacturer's recommendations may be contained in published literature or by manufacturer's written certification of performance.

C. For products Indicated or Specified by Naming One Product and Manufacturer: Products of manufacture named and meeting specifications, no options or substitution are allowed. This option shall only apply to products matching others in use on a particular public improvement either completed or in the course of completion.

D. For products indicated or specified by naming several products or manufactures select, any one of the products or manufacturers named which complies with the Specified requirements. When the naming of one or more products is followed by "or accepted equal", a substitute product may be offered for consideration. Submit a request for substitution for any manufacturer not named in accordance with the following articles.

1.9 SUBSTITUTIONS

A. Refer to Section 00 2113 (Instruction to Bidders), Article 6, Paragraph 6.07.

- END OF SECTION-

DOCUMENT 01 6000-A

SUBSTITUTION REQUEST FORM

To: **The Rosamond Community Services District, Owner**

(661) 256-3411

PROJECT: WWTP Grit Removal System Improvements **Owner Project No:**	**Contractor:**

Substitution Request By:	Firm:

Transmittal Record	**Attn:**	**Firm:**	**Date Sent:**	**Date Rec'd:**	**Date Due:**
Contractor to Owner					
Contractor to Architect					
Owner / Architect to Consultant					
Architect to Owner Representative					
Owner Representative to Contractor					

We hereby submit for your consideration the following product instead of the specified item for the Project:

Section / Drawing	**Article**	**Specified Item**
Proposed Substitution:		

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

Contractor to complete questions that follow and certifies to the accuracy of all answers:

A.	Does the substitution affect dimensions shown on Drawings? Yes __ / No __. If Yes, please explain proposed mitigation and why substitution is equivalent to originally specified item:
B.	Will the undersigned pay for changes to the design, including engineering and detailing costs caused by the requested substitution? Yes __ / No __. If No, please state reasons explain why substitution is equivalent to originally specified item:
C.	What effect does the substitution have on other trades? No effect: __ / Some effect__. If substitution will affect other trades, please explain the effect and why substitution is equivalent to originally specified item:
D.	Will substitution cause change to Project Schedule, or to critical delivery dates? Add? Shorten? If the substitution will add to schedule dates or affect critical activities, please explain why substitution is equivalent to originally specified item:
E.	Please describe differences between proposed substitution and specified item? Please explain and identify any and all differences, and please explain why substitution is equivalent to originally specified item:
F.	What is the Cost Differential to Contractor in original specified item and proposed substitution including all mark-ups? [If substitution requested during bid period, skip this question.]
G.	Are Manufacturer's guarantees for the proposed item the same as for item specified? Yes ____; No____. If No, please explain why substitution is equivalent to originally specified item:

H.	Contractor accepts full responsibility for delays caused by redesign of other items of the Work necessitated by substitution? Yes __ / No __. If No, please state reasons and explain why substitution is equivalent to originally specified item:
I.	Contractor states that the function, appearance and quality are equivalent or superior to the specified item? Yes __ / No __. If No, please explain why substitution is equivalent to originally specified item:

We certify that the function, appearance, and quality of the proposed substitution are equivalent or superior to those of the specified item, except as we may specifically state otherwise in this request.

Contractor:

Submitted by:_____ Signature: _____

Firm:_____ Date: _____

Address:_____ Phone/ Fax: _____

Remarks:_____

Proposed Substitution Manufacturer

Submitted by:_____ Signature: _____

Firm:_____ Date: _____

Address:_____ Phone/ Fax: _____

Remarks:_____

Consultant Response:	**Owner Representative Response:**
o Accepted	o Accepted
o Not Accepted	o Not Accepted
o Accepted As Noted	o Accepted As Noted
o Received Too Late	o Received Too Late

Remarks:_____ **Remarks:**_____

_____ _____

By:_____ **By:**_____

END OF DOCUMENT

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SECTION 01 7000

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

A. **Section describes requirements and procedures for:**

1. Preparation for Contract Closeout
2. Punch List Development.
3. Final Completion
4. Warranties

1.02 PREPARATION FOR CONTRACT CLOSEOUT

A. **Removal of Temporary Construction Facilities and Project Cleaning.**

1. Prior to closeout procedures: remove temporary materials, equipment, services, and construction; clean all areas affected by the Work; clean and repair damage caused by installation or use of temporary facilities; restore permanent facilities used during construction to specified condition.

B. **Permitting and Reporting.**

1. Prior to closeout procedures, Contractor shall demonstrate or provide evidence that all outstanding permit requirements have been met, including reporting, certifications, and commissioning. Where Owner is required to certify to any permit compliance, Contractor shall prepare such certification documents for Owner execution.
2. Contractor shall schedule all necessary site visits from all authorities having jurisdiction to meet permit compliance.
3. Contractor shall provide all required commissioning documents and reports as required by Laws and Regulatory Requirements.

1.03 PUNCH LIST DEVELOPMENT

A. **Punch List Readiness Determination.**

1. When Contractor considers Work or designated portion of the Work as ready for punch list review, Contractor shall submit written notice to the Owner to review Project readiness with Inspector. Contractor and Inspector shall review the Work and, if Inspector identifies items needing correction prior to punch list review, Contractor shall make such corrections prior to scheduling the punch list walk.

B. **Punch List Walk and Corrections.**

1. When Contractor considers Work or designated portion of the Work as ready for punch list walk, submit written notice to Owner. Within reasonable time, Owner will schedule the punch list walk to determine status of completion. The attendees for the punch list walk will include the Architect/Engineer, Inspector, Owner, and Owner's Representatives. Consultant disciplines may schedule individual punch list walks as necessary. Contractor shall attend the punch list walk with personnel he deems necessary to accomplish Final Completion.
2. Should Owner determine that status of Work does not meet the Contract requirements for Final Completion, Owner will promptly notify Contractor in writing, listing all defects and omissions (the "**Punch List**").

3. Contractor shall be aware that the generation of a Punch List does not limit the Owner's ability to identify other deficiencies not previously identified on the Punch List and that the Contractor is responsible for all corrections required to meet the Contract requirements.
4. Contractor shall remedy deficiencies to the satisfaction of the Owner. Contractor shall provide Project Record Documents and evidence that all permit requirements have been satisfied.

C. **Final Walk.**

1. After Contractor performs all corrections identified on the Punch List, performs corrections of subsequent items added after the punch list walk and provides Project Record Documents and evidence of permit compliance, Contractor shall submit written notice to Owner. Within a reasonable time, Owner will schedule the final walk to determine status of completion. Owner's attendees will be personnel involved in Punch List generation. Contractor shall provide all personnel he deems necessary to accomplish Project Completion.
2. The Punch List examination will be performed at the final walk. One follow-up review of Punch List items for each discipline will be provided. If further site visits are required to review Punch List items due to incompleteness of the Work by Contractor, Contractor will reimburse Owner for costs associated with these visits.
3. If Owner deems work has been completed in accordance with the Contract requirements, or in Owner's judgment minor corrections may be completed which do not hinder Final Completion, Contractor shall prepare for Final Completion.

1.04 FINAL COMPLETION

A. **Requirements**

1. Final Completion occurs when Work meets requirements for Owner's Final Acceptance.

B. **Procedure**

1. When Contractor and Owner consider Work to be Complete, Contractor shall submit written certification that:
    a. Contractor has inspected Work for compliance with Contract Documents, and all Punch List requirements have been met.
    b. Except for Contractor maintenance after Final Acceptance, Work has been completed in accordance with Contract Documents and deficiencies listed in the Punch List have been corrected. Equipment and systems have been tested in the presence of Owner, and are operative.
2. Project Record Documents are completed and turned over to Owner, Work is complete and certificate of occupancy is obtained. (3) copies of Project Record Documents shall be provided in PDF format on electronic media to the Owner.
3. In addition to submittals required by Contract Documents, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.
4. Upon Contractor completion of all closeout procedures and Owner's Final Acceptance, Owner will file the Notice of Completion.

C. **Final Adjustments of Accounts:**

1. Submit a final statement of accounting to Owner, showing all adjustments to the Contract Sum and complete and execute Document 00 5200 (Agreement and Release of Claims).
2. If so required, Owner shall prepare a final Change Order for submittal to Contractor, showing adjustments to the Contract Sum that were not previously made into a Contract Modification.

D. **Turn-In.** Contract Documents will not be closed out and final payment will not be made until all keys issued to Contractor during prosecution of Work and letters from property owners, pursuant to Contract Documents, are turned in to Owner.

E. **Release of Claims.** Contract Documents will not be closed out and final payment will not be due or made until Document 00 5200 (Agreement and Release of Claims) is completed and executed by Contractor and Owner.

F. **Fire Inspection Coordination.** Coordinate fire inspection and secure sufficient notice to Owner to permit convenient scheduling (if applicable).

G. **Building Inspection Coordination.** Coordinate with Owner a final inspection for the purpose of obtaining an occupancy certificate (if applicable).

1.05 WARRANTIES

A. **Warranty Documents**

1. Contractors shall assemble and provide warranty documents, executed or supplied by Subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in 8½ inches by 11 inches three-ring binder with durable plastic cover, appropriately separated and organized. Assemble in specification section order. Additionally, Contractor shall provide to Owner all documents in the warranty document package in an electronic file, portable document format (pdf). Provide one copy on four individual flash drives.
2. Submit warranty documents in accordance with Document 01 3000 (Administrative Requirements) and prior to final Application for Payment. For equipment put into use with Owner's permission during construction, submit warranty documents within 14 Days after first operation. For items of Work delayed materially beyond the date of Final Completion, provide updated warranty documents within 14 Days after acceptance, listing date of acceptance as start of warranty period.
3. Warranty Forms: Submit drafts to Owner for review prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents. Warranty shall be countersigned by manufacturers. Where specified, warranty shall be countersigned by Subcontractors and installers.
4. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse requirements or interpretations of Contract Documents.
5. Term of Warranties: For materials, equipment, systems, and workmanship, warranty period shall be one year minimum from date of Final Completion of entire Work except where:

    a. Detailed Specifications for certain materials, equipment or systems require longer warranty periods.
    b. Materials, equipment or systems are put into beneficial use of Owner prior to Final Completion as agreed to in writing by Owner.
    c. Materials, equipment, or systems delayed from beneficial use of Owner as of the date of Notice of Completion, as agreed to in writing by Owner.

B. **Warranty of Title:**

1. No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to Owner free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this paragraph, however, shall defeat or

impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of Owner.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

Preventive Maintenance and Operating Requirement Sheets

<table>
<tr><td colspan="2">Preventive Maintenance Program</td><td colspan="2">Equipment Record Number</td></tr>
<tr><td colspan="2">EQUIPMENT DESCRIPTION</td><td colspan="2">ELECTRICAL OR MECHANICAL DATA</td></tr>
<tr><td colspan="2">Name:</td><td colspan="2">Size:</td></tr>
<tr><td colspan="2">Serial No.:</td><td colspan="2" rowspan="2">Model:</td></tr>
<tr><td colspan="2">Vendor:</td></tr>
<tr><td colspan="2" rowspan="2">Vendor Address:</td><td colspan="2">Type:</td></tr>
<tr><td colspan="2">Mfr.:</td></tr>
<tr><td colspan="2">Vendor Rep:</td><td>Voltage:</td><td>Amps:</td></tr>
<tr><td colspan="2">Phone:</td><td>Phase:</td><td>rpm:</td></tr>
<tr><td colspan="3">Maintenance Work to be Done</td><td>Frequency*</td></tr>
<tr><td colspan="3"></td><td></td></tr>
<tr><td colspan="4">OPERATING REQUIREMENTS AND REFERENCE</td></tr>
</table>

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name: Influent Pump No. 1 Tag No.: P01-1	Size: 15 hp	
Serial No.: 123456ABC Vendor: ABC Pump Co.	Model: 140T Frame Serial No. 987654ZY Class F Insulation W/Space Heater	
Vendor Address: 1111 Pump Circle Newport Beach, CA 92663	Type: Mfr.: DEF Motors, Inc.	
Vendor Rep: XYZ Equipment, Inc.	Voltage: 460	Amps: 20
Phone: 714/752-0505	Phase: 3	rpm: 1,800
Maintenance Work to be Done		Frequency*
1. Operate all valves and check such things as a) bearing temperature, b) changes in running sound, c) suction and discharge gauge readings, d) pump discharge rate, and e) general condition of the drive equipment. 2. Check packing. 3. Checking pumping unit for any dust, dirt, or debris. (Continued on attached sheet)		D D W
OPERATING REQUIREMENTS AND REFERENCE		
For manufacturer's instructions regarding installation, operation, maintenance, and trouble shooting of this equipment, see Volume ____, Section _____.		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name:	Size:	
Serial No.:	Model:	
Vendor:		
Vendor Address:	Type:	
	Mfr.:	
Vendor Rep:	Voltage:	Amps:
Phone:	Phase:	rpm:
Maintenance Work to be Done		Frequency*
4. Lubricate bearing frame and motor bearings (consult manufacturer's instructions for type of grease or oil).		Q
5. Disassemble and change or repair the following: a) impeller, b) shafts, c) shaft sleeve, d) rotary seals, and e) sleeve bearings.		A
OPERATING REQUIREMENTS AND REFERENCE		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

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SECTION 01 7050

CUTTING AND PATCHING

PART 1 – GENERAL

1.01 SUMMARY

A. This Section establishes General Requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:

1. Make the several parts fit properly.
2. Uncover Work to provide for installing, inspection, or both, of ill-timed Work.
3. Remove and replace Work not conforming to requirements of the Contract Documents.
4. Remove and replace defective Work.

B. Requirements and limitations for cutting and patching of Work.

1.02 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 0 and Division 1 Specification Sections, apply to Work of this Section.

1.03 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural Work in a manner that would result in a reduction of load carrying capacity or of load deflection ration. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:

1. Foundation construction.
2. Structural concrete.
3. Stair systems.
4. Miscellaneous structural metals.
5. Exterior curtain wall construction.
6. Equipment supports.
7. Piping, ductwork, vessels and equipment.

B. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, to increase maintenance, or to decrease operational like or safety.

C. Visual Requirements:

1. Do not cut and patch construction exposed on the exterior or in its occupied spaces, without consulting the Engineer/Architect.
2. Remove and replace Work cut and patched in a visually unsatisfactorily manner.

D. Employ skilled workers for cutting and patching. Wherever practicable, employ original installer or fabricator providing Work under this Contract to perform cutting and patching for new:

1. Weather-exposed and moisture-resistant products.
2. Fireproofing.
3. Finished surfaces exposed to view.

E. Individual Product Specification Sections:

1. Cutting and patching incidental to Work of the Section.
2. Advance notification to other Sections of openings required in Work of those Sections.
3. Limitations on cutting structural members.

1.04 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of Owner or separate contractor.
6. Cost estimate and type of reimbursement review by Architect/Engineer. Review does not waive Architect/Engineer's right to later require complete removal and replacement of any part of Work found to be unsatisfactory.

B. Include in Request:

1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work, entities to perform Work, products to be used, dates when Work is to be performed.
5. Alternatives to cutting and patching.
6. Effect on Work of Owner or separate Contractor.
7. Written permission of affected separate Contractor.
8. Describe anticipated results in terms of changes to existing construction.
9. List utilities to be disturbed or relocated or temporarily out of service. Indicate length of service disruption.
10. Where Work involves addition of reinforcement to structural elements, submit details and engineering calculations showing how new reinforcement integrates with original structure.
11. Date and time Work will be executed, to provide for Engineering/Architect observation.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Primary Products: Those required for original installation.

B. Product Substitution: Refer to Section 00 2113 (Instruction to Bidders), Article 6, Paragraph 6.07.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting, excavating, patching and backfilling.

B. After uncovering the Work, inspect conditions affecting of new Work.

C. If uncovered conditions are not as anticipated, immediately notify the Architect/Engineer and secure needed directions.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Provide required temporary supports including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Prior to cutting, employ a competent private utility locating service capable of locating positions and depths of underground and concealed structural reinforcements and utilities including, but not limited to electrical conduits, plumbing lines, and other utilities in the vicinity of the construction to be cut.

C. Perform cutting and patching using methods so as not to void existing warranties.

D. Provide protection from elements for areas which may be exposed by uncovering Work.

E. Maintain excavations free of water.

3.03 CUTTING

A. Perform required cutting and fitting to complete the Work under pertinent other Sections of these Specifications.

B. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.

C. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new Work.

D. Do not cut or alter structural members without prior consultation with the Engineer/Architect unless specifically indicated. Do not damage reinforcing or structural steel to remain.

E. Do not damage electrical conduits, plumbing lines, and other utilities to remain.

F. Cut existing construction to provide for installation of Work. Make new openings neat, as close as possible to profiles indicated and only to extent necessary for new Work.

G. Uncover Work to install improperly sequenced Work.

H. Remove and replace defective or non-conforming Work.

I. Remove samples of installed Work for testing when requested.

J. Provide openings in the Work for penetration of mechanical and electrical Work.

K. At concrete, masonry, paving, and other materials where edges of cuts and holes will remain exposed in the completed Work, make cuts using power-sawing and power-coring equipment; do not overcut at corners of cut openings. Saw overruns shall not be permitted. Pneumatic tools not allowed without prior approval.

L. Upon completion of cutting and coring, clean remaining surfaces of loose particles and dust.

3.04 PATCHING

A. Execute patching to complement adjacent Work.

B. Patch existing construction by filling repairing, refinishing, closing up and similar operations. Patching includes the insertion of projection of other products in or from a surface.

C. Perform fitting and adjusting of products together to integrate with other Work with the specified tolerance and finishes.

D. Perform Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

E. Restore Work with new Products in accordance with requirements of Contract Documents.

F. Fit Work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. Patch weather-exposed components in a manner that restores them to a weathertight condition.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.

I. Finish or refinish, as required, cut and patched surfaces to provide an even surface of uniform finish, color, texture, and appearance, matching existing adjacent. Finish complete surface plane, unless otherwise indicated. Over patched wall or ceiling surfaces, finish to nearest cutoff line for entire surface, such as intersection with adjacent wall or ceiling, beam, pilasters or to nearest opening frame, unless otherwise indicated. Finished surfaces shall not present a spotty, touched-up appearance. For an assembly, refinish entire unit.

3.05 PERFORMANCE

A. Execute Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

B. Employ original subcontractor to perform cutting and patching for weather exposed and moisture resistant elements.

C. Cut materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

D. Restore Work with new products in accordance with requirements of Contract Documents.

E. Fit Work tightly to pipes, sleeves, ducts, conduit, and other penetrations through surfaces, caulking where necessary to create water and air resistive barriers.

F. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400 (Firestopping) and Section 07 9200 (Joint Sealers), to full thickness of the penetrated element.

G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.06 PAYMENT FOR COSTS

A. In accordance with Section 00 7200 (General Conditions) and Section 01 2000 (Price and Payment Procedures).

END OF SECTION

SECTION 01 9113

STARTING OF SYSTEMS

PART 1 – GENERAL

1.01 SUMMARY

A. Administrative procedures for starting up of various systems.

1.02 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

1.03 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 0 and Division 1 Specification Sections, apply to Work of this Section.

1.04 QUALITY ASSURANCE

A. When specified in individual Sections, or when requested by Architect/Engineer, manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment installation prior to start-up; to supervise placing equipment in operations; and to provide a written report that equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connection lines or anchor bolts, and has been satisfactorily operated under full load conditions.

1.05 SUBMITTALS

A. Submit under pertinent provisions of the Section 00 7200 (General Conditions) and Section 01 3000 (Administrative Requirements).

B. Submit preliminary schedule listing times and dates for start-up of each item of equipment in sequence prior to proposed dates.

C. Submit manufacturer’s representative’s reports within one week after start-up, listing satisfactory start-up dates.

1.06 PROJECT CONDITIONS

A. Building enclosures complete and weather tight.

B. Excess packing and shipping bolts are removed.

C. Interdependent systems have been checked and are operational.

PART 2 – PRODUCTS

Grit removal system and Other Equipment

PART 3 – EXECUTION

3.01 INSPECTION

A. Verify that Project conditions comply with requirements.

B. Verify that status of Work meets requirements for starting of equipment and systems.

3.02 PREPARATION

A. Coordinate sequence for start-up of various items of equipment including Owner provided equipment.

B. Notify Architect/Engineer seven days prior to start-up of each item of equipment.

C. Provide Contract Documents, shop drawings, product data, and operation and maintenance data available during entire start-up process.

D. Verify that each piece of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence and other conditions which may cause damage.

E. Verify control systems are fully operational in automatic mode.

F. Verify that test, meter readings and specific electrical characteristics agree with those specified by electrical equipment manufacturer.

G. Verify wiring to motors and controls required by mechanical Work for operation smoke and fire protection demonstrations is completed.

H. Verify wiring and support systems for equipment installed under separate contracts is complete and checked.

I. Bearings: Inspect for cleanliness; Clean and remove foreign matter, Verify alignment; Take corrective measures.

J. Drives: Inspect for tension on belt drives, adjustment of varipitch sheaves and drives, alignment, proper equipment speed and cleanliness. Take corrective action.

K. Motors: Verify that motor amperage agrees with nameplate value. Inspect for conditions which procedure excessive current flow and which exist due to equipment malfunction. Take corrective action.

3.03 STARTING SYSTEMS

A. Execute start-up under supervision of responsible personnel.

B. Place equipment in operation in proper sequence.

C. Execute start-up under supervision of responsible Contractor’s personnel in accordance with manufacturers’ written instructions.

D. When specified in individual Specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up and to supervise placing equipment or system in operation.

E. Submit a written report in accordance with Section 01 4000 (Quality Requirements) that equipment or system has been properly installed and is functioning correctly.

3.04 DEMONSTRATION AND INSTRUCTIONS

A. Demonstration operation and maintenance of Products to Owner's personnel 2 weeks prior to date of Punch List Walk.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within 6 months, at no cost to the Owner.

C. Utilize 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, start-up, operation, control, adjustment, safety procedures, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed upon times, at equipment location.

E. Prepare and inset additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.05 TESTING, ADJUSTING, AND BALANCING

A. Contractor will appoint, employ, and pay for services of an independent firm to perform testing, adjusting and balancing.

B. Reports will be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance of noncompliance with specified requirements and with requirement of the Contract Documents.

END OF SECTION

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ROSAMOND COMMUNITY SERVICE DISTRICT
WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS PROJECT

TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

S010140 WORK SEQUENCE
S011100 COORDINATION OF WORK, PERMITS, AND REGULATIONS
S012000 MEASUREMENT AND PAYMENT
S013300 SUBMITTALS
S017410 CLEANING DURING CONSTRUCTION AND FINAL CLEANING
S019310 OPERATION AND MAINTENANCE MANUALS
S020120 PROTECTING EXISTING UNDERGROUND UTILITIES
S020130 CONNECTION TO EXISTING UNDERGROUND PIPES
S023219 SUBSURFACE UTILITY LOCATING (POTHOLING)
S030500 GENERAL CONCRETE CONSTRUCTION
S034220 PRECAST CONCRETE VAULTS
S050520 BOLTS, WASHERS, ANCHORS, AND EYEBOLTS
S055100 LADDERS, STAIRS, AND STAIR NOSINGS
S055200 HANDRAILS AND SAFETY CHAINS
S055300 GRATING, COVER PLATES, AND ACCESS HATCHES
S099000 PAINTING AND COATING
S099720 CHEMICAL RESISTANT COATINGS FOR CONCRETE
S099752 COLD-APPLIED WAX TAPE COATING
S099754 POLYETHYLENE SHEET ENCASEMENT (AWWA C105)
S099761 FUSION-BONDED EPOXY LININGS AND COATINGS
S260500 GENERAL ELECTRICAL REQUIREMENTS
S260519 WIRES AND CABLES LESS THAN 600 VOLTS
S260526 GROUNDING AND BONDING
S260534 CONDUIT BOXES AND FITTINGS
S260548 SEISMIC RESTRAINT FOR ELECTRICAL EQUIPMENT
S260573 ARC-FLASH STUDY
S262650 ELECTRIC MOTORS
S311100 CLEARING, STRIPPING, AND GRUBBING
S312300 EARTHWORK
S312316 TRENCHING, BACKFILLING, AND COMPACTING
S312323 GRAVEL AND CRUSHED ROCK BASE FOR STRUCTURES
S313219 FILTER FABRIC
S331220 BACKFLOW PREVENTERS AND DETECTOR CHECKS
S331300 DISINFECTION OF PIPING
S400500 GENERAL PIPING REQUIREMENTS
S400515 PRESSURE TESTING OF PIPING
S400520 MANUAL, CHECK, AND PROCESS VALVES
S400580 FABRICATED STAINLESS STEEL SLIDE GATES

S400722 FLEXIBLE PIPE COUPLINGS AND EXPANSION JOINTS
S400762 WALL PIPES, SEEP RINGS, AND PENETRATIONS
S400764 PIPE HANGERS AND SUPPORTS
S400775 EQUIPMENT, PIPING, DUCT, AND VALVE IDENTIFICATION
S402040 DUCTILE IRON PIPE
S402090 PVC PIPE, 3 INCHES AND SMALLER
S405000 PROCESS CONTROL AND INFORMATION SYSTEM (PCIS) GENERAL REQUIREMENTS
S409115 MAGNETIC FLOWMETERS
S409443 PROGRAMMABLE LOGIC PROCESS CONTROLLERS (AND NETWORK EQUIPMENT)
S409510 PACKAGED EQUIPMENT CONTROL PANELS
S444239 GRIT COLLECTING EQUIPMENT
S444240 GRIT CLASSIFIERS (DEWATERING SCREWS)

SECTION 010140 WORK SEQUENCE

PART 1 – GENERAL

1.01 CONTINUITY OF PLANT OPERATIONS:

A. The Contractor shall coordinate the Work to avoid any interference with normal operation and maintenance of the RCSD Wastewater Treatment Plant as well as any other routine or non-routine operation or maintenance activity undertaken at the RCSD Wastewater Treatment Plant by the Owner or any other contractor, supplier, agent or representative of the Owner.

B. Unless otherwise specified, the Contractor shall notify the Owner four (4) weeks in advance of the time it is necessary to take out of service any existing pipeline, channel, electrical circuit, equipment or structure as included on the Detailed Outage Plan submittal. The Contractor shall be responsible for providing whatever temporary piping, pumping, power and control facilities as are required to maintain continuous plant operation and complete treatment except as otherwise specified. All work requiring a shutdown, whether during normal working hours or outside of normal working hours, shall require the Contractor to provide the Owner four (4) weeks advance written notice.

C. All on-site activities performed by the Contractor under Work specified in this section shall be coordinated by the Contractor with the Owner. Work requested by the Contractor to be done outside of normal work hours shall be submitted to the Owner a minimum of fourteen (14) Calendar Days before the Work is scheduled to be performed. No Work outside of the normal work hours shall be performed without written approval by the Owner, except where specified herein.

1.02 SUBMITTALS:

A. The Contractor shall submit notices specified in Paragraphs 1.01.B and 1.01.C of this Section and outage plans specified in Paragraph 1.02.B of this Section. Submittals shall be done in accordance with Section 013000.

B. The Contractor shall submit a detailed outage plan and schedule for any operation requiring a tank, pipeline, channel, electrical circuit, equipment, or structure to be removed from service. The schedule shall be coordinated with the construction schedule specified in Section 013216 and shall meet the restrictions and conditions specified in this section. The detailed plan shall describe the Contractor's method for maintaining operation of treatment units, the length of time required to complete said operation, the necessary equipment which the Contractor shall provide in order to maintain operation of associated treatment units.

1.03 PROJECT CONSTRUCTION SEQUENCING AND CONSTRAINTS:

A. General Sequencing Requirements: The Contractor shall observe and satisfy the following sequencing requirements:
    1. No electrical interconnections to the existing electrical facilities shall be made that would cause any interruption in electrical service.

    2. The Owner will not provide temporary piping or pumping. Maximum downtime is limited to four (4) hours provided the detailed outage plan is submitted and approved by the Owner in accordance with Section 1.01.B.

    3. The existing grit removal facilities, Distribution Box No. 1, Aeration Basin No. 1, Aeration Basin No. 2, and associated process piping shall remain operational throughout construction except during approved outages.

    4. The Contractor shall maintain continuous wastewater treatment operations throughout construction.

    5. The following sequencing requirements are provided for the Contractor's use and consideration in developing the construction schedule. The sequence of construction provided herein shall not relieve the Contractor of responsibility for means, methods, sequencing, temporary facilities, or compliance with the Contract Documents.

The following sequencing requirements are provided for the Contractor’s use and consideration in developing the construction schedule. The sequence of construction provided herein shall not relieve the Contractor of responsibility for means, methods, sequencing, temporary facilities, or compliance with the Contract Documents.

B. Grit Removal System Construction Sequencing Requirements: The Contractor shall observe and satisfy the following sequencing requirements.

    1. The Contractors shall construct the new grit chamber, grit classifier, splitter box, valve vault, associated process piping, electrical facilities, instrumentation systems, and appurtenances to the maximum extent possible without interruption of existing plant operations.

    2. Contractor shall complete all excavation, concrete foundations, structures, underground piping, process piping, valves, electrical work, instrumentation, and SCADA integration associated with the new grit removal system prior to performing final tie-ins to existing process piping.

    3. Existing grit removal facilities shall remain in operation until the new grit removal system has been fully constructed, tested, and approved for service.

    4. Contractor shall complete all hydrostatic testing, leak testing, equipment startup testing, electrical testing, instrumentation testing, and control system testing prior to introducing flow into the new grit chamber.

5. Contractor shall coordinate all shutdowns and tie-ins to existing facilities with the Owner.

C. Splitter Box Construction Sequencing Requirements: The Contractor shall observe and satisfy the following sequencing requirements.

1. Contractor shall construct the new splitter box around the existing 24-inch Aeration Basin No. 2 influent (ABI-2) pipeline while maintaining the existing 24-inch ABI-2 pipeline in service.

2. The existing 24-inch ABI-2 pipeline shall remain operational throughout construction of the splitter box structure.

3. Prior to placement of concrete, Contractor shall weld wall sleeves, seep rings, or wall rings to the existing 24-inch ABI-2 pipeline at all locations where the pipeline penetrates the splitter box walls.

4. Contractor shall complete all concrete work, piping, valves, electrical work, instrumentation, and associated appurtenances of the splitter box prior to cutting or modifying the existing 24-inch ABI-2 pipeline.

5. Contractor shall complete construction and testing of the new grit chamber, grit classifier, splitter box, and associated piping systems prior to performing the final connection to the existing 24-inch ABI-2 pipeline.

6. During the outage required for the final connection of the splitter box to the existing 24-inch ABI-2 pipeline, all influent wastewater flow shall be directed to Aeration Basin No. 1 utilizing the existing flow distribution facilities as approved by the Owner.

7. Contractor shall minimize the duration of the outage and restore the existing process facilities to service as quickly as possible.

8. Upon completion of the tie-in work, Contractor shall verify proper operation of the splitter box, slide gate, process piping, and associated valves prior to returning the system to normal operation.

D. Raw Sewage Pipeline and Grit Chamber Startup Sequencing Requirements: The Contractor shall observe and satisfy the following sequencing requirements.

1. Contractor shall complete construction of the new grit chamber, grit classifier, splitter box, and associated facilities prior to connecting the new 12-inch raw sewage pipeline to the existing 20-inch RS process piping.

2. Contractor shall not perform the final connection of the proposed 12-inch raw sewage pipeline until all new grit removal facilities are complete and ready for service.

3. Following successful testing and approval by the Owner, Contractor shall connect

the new 12-inch raw sewage pipeline and place the new grit removal system into operation.

4. Existing grit removal facilities shall remain available for operation until successful startup and acceptance of the new grit removal system.

E. 6-inch and 10-inch RAS Pipeline Modification Sequencing Requirements: The Contractor shall observe and satisfy the following sequencing requirements:

1. The Contractor shall replace the new 6-inch and 10-inch motorized valves one at a time in the sludge pumping station. Under no circumstances shall both valves be removed from service simultaneously.

2. Contractor shall complete construction and startup of the new grit removal system prior to performing modifications to the existing 10-inch & 6-inch Return Activated Sludge (RAS) pipeline.

3. Contractor shall coordinate all RAS pipeline shutdowns and tie-ins with the Owner.

4. Contractor shall install the new 10-inch and 6-inch RAS piping, valves, fittings, and connections to the 12-inch pipeline and to the existing 24-inch ABI-2 pipeline during an approved outage period.

5. During the outage required for connection to the existing 24-inch pipeline, all wastewater flow shall be diverted to Aeration Basin No. 1. The existing sluice gates in the distribution chamber-1 directing flow to the Aeration Basin No. 2 pipeline shall remain closed until the 24-inch pipeline connection has been completed and the system has been returned to service.

6. Existing Waste Activated Sludge (WAS) piping shall remain operational throughout construction unless otherwise approved by the Owner.

7. Contractor shall verify proper operation of all RAS piping, valves, and associated appurtenances prior to returning the system to service.

F. Existing Demolishment Sequencing Requirements: The Contractor shall observe and satisfy the following sequencing requirements.

1. All demolition work shall be performed in accordance with the requirements, notes, and details indicated on Plan Sheet C-02.

2. Existing facilities designated for removal shall remain in service until replacement facilities have been installed, tested, and approved for operation.

3. Contractor shall not remove, abandon, or demolish any existing process piping, valves, structures, or equipment required for plant operation until authorized by the Owner.

4. Contractor shall cap, plug, or otherwise protect inactive piping and facilities during construction.

5. Materials resulting from demolition shall be removed from the site and disposed of in accordance with applicable regulations.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The suggested sequencing, constraints, and requirements identified herein are intended to provide guidance for the Contractor in the execution of the work. The sequencing requirements guidance shall not relieve the Contractor from compliance with any provision of the Contract Documents, including but not limited to, the means and methods used to accomplish the work, The Contractor's full compliance with the sequencing requirements identified herein shall be accomplished within the Contract Time. The Contractor shall include all costs associated with compliance with the sequencing requirements identified herein with their bid.

END OF SECTION

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SECTION 011100 COORDINATION OF WORK, PERMITS, AND REGULATIONS

1.01 DESCRIPTION

This section generally describes the project and includes work by others, work sequence and schedule, Contractor's use of premises, Owner occupancy, maintenance and operation of existing facilities, construction survey staking, permits, and regulations.

1.02 GENERAL NATURE OF WORK

The work involves the construction of a Grit removal facility that includes improving the grit removal process by adding a grit removal system along with the required electrical and instrumentation components. The work will consist of the construction of grit removal facilities, including the installation of equipment and the modification of existing piping.

Contractors shall visit the project area and familiarize themselves with the working conditions of the project, including but not limited to working space limitations and utilities, prior to placing a bid on the job.

1.03 LOCATION OF PROJECT SITE

The project site is located on RCSD’s Wastewater Treatment Plant located on 875 Patterson Road, Rosamond, CA 93560.

1.04 WORK SEQUENCE AND SCHEDULE

Contractor shall coordinate with Rosamond Community Service District prior to commencement of work and the connection of the Grit chamber inlet line to the existing RS line and Construction of a splitter box connecting to the existing 24” ABI line, and modification of 10” RAS line.

1.05 CONTRACTOR'S USE OF PREMISES

All work is to be completed within the Wastewater Treatment Plant. Before storing equipment or stockpiling materials, the Contractor shall obtain written permission from the district.

1.06 MAINTENANCE AND OPERATION OF EXISTING FACILITIES

The contractor shall always maintain access to nearby Plant facilities.

1.07 CONSTRUCTION SURVEY STAKING

A. The Contractor is responsible for construction staking.

B. A Licensed Land Surveyor must perform construction staking.

C. Contractor shall submit copies of all staking notes and cut sheets to the Owner.

1.08 PERMITS

Contact the permitting agencies listed above for current fees associated with each permit.

Name or Type of Permit	Name, Address, Telephone Number of Permitting Agency
State Water Resources Control Board (SWRCB) – Construction Activities	State Water Resources Control Board Sacramento, CA (916) 341-5536

A. The permits contain requirements that affect the cost of project work and some permanent permits require supplementary work permits and fees to execute construction. Comply with the permit requirements and obtain and pay the fees involved with the supplementary work permits.

END OF SECTION

SECTION 012000 MEASUREMENT AND PAYMENT

1.01 WORK LISTED IN THE SCHEDULE OF WORK ITEMS

A. Work under this contract will be paid on a unit price or lump-sum basis as outlined on the Bid Form for the quantity of work installed.

B. The unit prices and lump-sum prices include full compensation for furnishing the labor, materials, tools, and equipment and doing all the work involved to complete the work included in the contract documents.

C. The application for payment will be for a specific item based on the percentage completed or quantity installed. The percentage complete will be based on the value of the partially completed work relative to the value of the item when entirely completed and ready for service.

1.02 WORK NOT LISTED IN THE SCHEDULE OF WORK ITEMS

A. The General Provisions and items in the Special Provisions, general requirements, and specifications which are not listed in the schedule of work items of the Bid Form are, in general, applicable to more than one listed work item, and no separate work item is provided, therefore. Include the cost of work not listed but necessary to complete the project designated in the contract documents in the various listed work items of the Bid Form.

B. The bids for the work are intended to establish a total cost for the work in its entirety. Should the Contractor feel that the cost for the work has not been established by specific items in the Bid Form, include the cost for that work in some related bid item so that the Proposal for the project reflects the total cost for completing the work in its entirety.

1.03 MOBILIZATION AND TEMPORARY FACILITIES --BID ITEM 1

Payment for mobilization shall be made at the time of the first progress payment after the Contractor has purchased bonds and insurance and shall be equal to 75% of the bid amount shown for mobilization/demobilization.

Payment for demobilization shall be made with the final payment estimate and shall be equal to 25% of the bid amount shown for mobilization/demobilization.

1.04 CONSTRUCTION SEQUENCING --BID ITEM 2

Payment for Construction Sequencing shall be made at the Contract lump sum price and shall constitute full compensation for preparation and submission of a detailed Construction Sequencing Plan, including project phasing, shutdown procedures, bypass operations, temporary facilities, coordination with Owner operations, and all associated work required by the Contract Documents. Payment shall be made upon review and

approval of the Construction Sequencing Plan by the Owner's Representative prior to start of construction.

1.05 SITE IMPROVEMENTS –BID ITEM 3

Payment for site improvements, including erosion control, excavation, soil stabilization, backfill, grading, sheeting, shoring, bracing, and excavation safety measures for the protection of life and limb, in conformance with the applicable safety orders, shall be made at the contract lump sum price.

1.06 GRIT REMOVAL EQUIPMENT - BID ITEM 4

Payment for the Grit Removal Equipment shall be made at the pre-negotiated Contract lump sum price and shall constitute full compensation for furnishing the grit removal system equipment provided by the vendor, including but not limited to the vortex grit chamber, grit classifier, vendor-supplied control panels, instrumentation, local controls, wiring interconnections, factory testing, miscellaneous materials and appurtenances, and all labor, materials, equipment, and incidentals required for delivery to the site in accordance with the contract documents.

1.07 GRIT REMOVAL EQUIPMENT INSTALLATION - 12-INCH RS AND 20-INCH RS CONNECTIONS, DRAIN, 12-INCH & 20-INCH VALVES - BID ITEM 5

Payment for the Grit Removal Equipment Installation shall be made at the Contract lump sum price and shall constitute full compensation for furnishing, installing, testing, and placing into operation appurtenances needed for the complete grit removal system not provided by the vendor, including but not limited to dewatering, earthwork; reinforced concrete, ladder, railing, and safety cage; piping, valves, drains, cleanouts, connections to existing facilities, coatings, finishes, instrumentation, local controls, wiring interconnections, factory testing, miscellaneous materials and appurtenances, and all labor, materials, equipment, and incidentals required for a complete and operational installation in accordance with the contract documents.

1.08 SPLITTER BOX COMPLEX– BID ITEM 6

Payment for the splitter box complex shall include the splitter box, 16-inch motorized valve and valve vault, slide gate, 20-inch GRE, 16-inch GRE, and 24-inch ABI-2 connections shall be made at the contract lump-sum price and shall constitute full compensation for furnishing, installing, testing, and placing into operation the complete system, including but not limited to dewatering, earthwork; reinforced concrete, splitter box and valve vault, concrete fill, piping and fittings, valves, grating, access hatch, coating, finishes, 15-inch by 15-inch slide gate assembly; local control box, wiring interfaces, connection to existing and new facilities and pipelines testing, cleanup, and all other labor, materials, equipment, and incidentals required for a complete and operational installation in accordance with the contract documents.

1.09 RAS CONNECTIONS AND VALVES – BID ITEM 7

Payment for RAS connections and valves shall be made at the contract lump sum price and shall constitute full compensation for furnishing, installing, testing, and placing into operation all work associated with the 6-inch and 10-inch RAS piping modifications and connections, including but not limited to dewatering, connecting to the existing 6-inch and 10-inch RAS lines, installation of new 6-inch, 10-inch, and 16-inch manual plug valves; installation of piping and fittings; 12-inch piping connection to the existing 24-inch ABI-2 pipeline; interconnections to existing RAS, ABI-2, excavation, bedding, backfill, testing, coatings, and all other labor, materials, equipment, and incidentals required for a complete and operational installation in accordance with the contract documents.

1.10 MOTORIZED RAS VALVE INSTALLATIONS – BID ITEM 8

Payment for RAS valve installations shall be made at the contract lump sum price and shall constitute full compensation for furnishing, installing, testing, and placing into operation all work associated with the 6-inch and 10-inch motorized plug valves, piping modifications and connections, including but not limited to dewatering, removal of the existing 6-inch and 10-inch plug valves and delivery to the district; installation of new 6-inch and 10-inch motorized plug valves, local controls, and wiring interfaces; and all other labor, materials, equipment, and incidentals required for a complete and operational installation in accordance with the contract documents.

1.11 16-INCH ABI-2 CONNECTION AND 16-INCH MANUAL PLUG VALVE – BID ITEM 9

Payment for the 16-inch ABI-2 connection and 16-inch manual plug valve shall be made at the contract lump sum price and shall constitute full compensation for dewatering, furnishing and installing all work associated with the connection to the existing 16-inch ABI-2 pipeline, including the 16-inch manual plug valve, and all labor, materials, equipment, and incidentals required for a complete and operational installation in accordance with the contract documents.

1.12 2-INCH WATER LINE WITH BACKFLOW PREVENTION ASSEMBLY – BID ITEM 10

Payment for the 2-inch Water Line with Backflow Prevention Assembly shall be made at the Contract lump sum price and shall constitute full compensation for furnishing and installing the water service line, backflow prevention assembly, including but not limited to connection to existing water line, furnishing and installing a duplex AC outlet in weather resistant box including wiring and connection to power system, valves, fittings, and all other labor, materials, equipment, and incidentals required for a complete and operational installation in accordance with the contract documents.

1.13 8-INCH MAGNETIC FLOW METER – BID ITEM 11

Payment for the 8-inch Magnetic Flow Meter shall be made at the Contract lump sum price and shall constitute full compensation for furnishing and installing the magnetic flow meter, transmitter, supports, wiring interfaces, testing, calibration, and all

appurtenances required for a complete and operational installation in accordance with the contract documents.

1.14 ELECTRICAL CONNECTIONS – BID ITEM 12

Payment for Electrical Connections shall be made at the Contract lump sum price and shall constitute full compensation for furnishing and installing all electrical equipment, conductors, conduit, junction boxes, MCC modifications, grounding, power connections, testing, and all associated electrical work, labor and material required for a complete and operational installation in accordance with the contract documents.

1.15 INSTRUMENTATION AND SCADA PROGRAMMING – BID ITEM 13

Payment for Instrumentation and SCADA Programming shall be made at the Contract lump sum price and shall constitute full compensation for furnishing and installing instrumentation, PLC programming, SCADA integration, communication wiring, graphics development, testing, and all associated work required for complete and operational installation in accordance with the contract documents.

1.16 STARTUP AND COMMISSIONING – BID ITEM 14

Payment for Startup and Commissioning shall be made at the Contract lump sum price and shall constitute full compensation for startup services, field testing, functional testing, performance testing, operator training, O&M Manual and final acceptance of the Work.

END OF SECTION

SECTION 013300 SUBMITTALS

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Operation and Maintenance Manuals: 019310.

1.02 SHOP DRAWINGS

A. Submit shop drawings in accordance with General provisions and with this section

B. The use of contract drawing reproductions for shop drawings is subject to rejection.

A. Submit electronic (PDF) copy of shop drawings. Clearly indicate the equipment tag or identification number, specification section, and drawing number to which each shop drawing is referenced.

B. If the Contractor submits shop drawings of equipment by manufacturers other than those listed in the specifications, provide the following information with the submittal:

1. The name and address of at least three companies or agencies that are currently using the equipment.

2. The name and telephone number of at least one person at each of the above companies or agencies whom the Owner's Representative may contact.

3. A description of the equipment that was installed at the above locations. The description shall be in sufficient detail to allow the Owner's Representative to compare it with the equipment that is proposed to be installed in this project.

C. For materials originating outside of the United States for which tests are required, provide recertification and retesting by an independent domestic testing laboratory.

1.03 SAMPLES

A. Furnish samples of the various materials, together with the finish thereon, as specified for and intended to be used on or in the work. Send samples to the office of the Owner's Representative, carriage prepaid.

B. Submit samples before purchasing, fabricating, applying, or installing such materials and finishes.

C. Submit samples, other than field samples, in duplicate. A cover letter shall accompany the sample and shall list all items being transmitted, designating their particular usage and location in the project. One sample marked "Resubmittal Not Required" will be returned to the Contractor; rejected samples will not be returned.

D. Samples shall be submitted and resubmitted until acceptable. Materials, finishes, and workmanship in the completed project shall be equal in every respect to that of the samples so submitted and accepted.

E. Samples shall conform to materials, fixtures, equipment, surface textures, colors, etc., as required by drawings and specifications or as requested by the Owner's Representative.

F. Identify sample as to product, color, manufacturer, trade name, lot, style, model, etc., location of use, and contract document reference, as well as the names of the Contractor, supplier, project, and Owner's Representative.

G. Samples shall be 8 inches by 10 inches in size and shall be limited in thickness to a minimum consistent with sample presentation. In lieu thereof, submit the actual full-size item.

H. Samples of value may be returned to the Contractor for use in the project after review, analysis, comparison, and/or testing as may be required by the Owner's Representative.

I. Furnish one 8-inch by 10-inch sample of the finally reviewed materials, colors, or textures to the Owner's Representative for final record. Such material samples shall carry on the back all identification as previously described including, if paint sample, manufacturer, mix, proportion, name of color, building, Contractor, subcontractor, and surfaces to which applied.

1.04 SUBMITTAL REGISTER

Designate in a submittal register/schedule, coordinated with the construction schedule, the date for submission and the date the reviewed shop drawings, product data, and samples will be needed. The submittal register shall be on 8-1/2-inch by 11-inch or 11-inch by 17-inch sheets in a format acceptable to the Owner’s Representative. The submittal register shall include the submittal description, specification section, date to be submitted, date reviewed, and date acceptable submittal is required.

1.05 SUBMITTAL REQUIREMENTS

A. Make submittals promptly in accordance with the submittal register/schedule and in such sequence as to cause no delay in the work. Schedule submission a minimum of 30 calendar days before reviewed submittals will be needed.

B. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. Contract identification.

4. The names of:

    a. Contractor.

    b. Supplier.

    c. Manufacturer.

5. Identification of the product, with the specification section number.

6. Field dimensions clearly identified as such.

7. Relationship to adjacent or critical features of the work or materials.

8. Identification of deviations from contract documents.

9. Identification of revisions on resubmittals.

10. A 5-inch by 5-inch blank space for stamps of the Owner's Representative.

11. Contractor's stamp, initialed or signed, shall certify Contractor's review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal that the product meets the requirements of the work and of the contract documents.

1.06 SUBMITTAL FORMAT

A. Each submittal shall have a transmittal form. A sample transmittal form is included at the end of this section. Every page in a submittal shall be numbered in sequence. Each copy of a submittal shall be collated and stapled or bound, as appropriate. Copies not collated will be rejected.

B. Where product data from a manufacturer is submitted, clearly mark which model is proposed, with all pertinent data, capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Present a sufficient level of detail for assessment of compliance with the contract documents.

C. Each submittal shall be assigned a unique number. Submittals shall be numbered sequentially. The submittal numbers shall be clearly noted on the transmittal. Original submittals shall be assigned a numeric submittal number. Resubmittals shall bear an alphanumeric system which consists of the number and specification section number assigned to the original submittal for that item followed by a letter of the alphabet to represent that it is a subsequent submittal of the original. For example, if Submittal 25 requires a resubmittal, the first resubmittal will bear the designation "25-A"and the second resubmittal will bear the designation "25-B" and so on.

D. Disorganized submittals that do not meet the requirements above will be returned without review.

1.07 RESUBMITTALS

Resubmittal of submittals will be reviewed and returned in the same review period as for the original submittal. It is considered reasonable that the Contractor shall make a complete and acceptable submittal by the second submission of a submittal item. The Owner’s Representative reserves the right to withhold monies due to the Contractor to cover additional costs of any review beyond the second submittal.

1.08 CONTRACTOR'S JOBSITE DRAWINGS

Provide and maintain on the jobsite one complete set of prints of all drawings which form a part of the contract. Immediately after each portion of the work is installed, indicate all deviations from the original design shown in the drawings either by additional sketches or ink thereon. Upon completion of the job, deliver this record set to the Owner's Representative.

SHOP DRAWING SUBMITTAL NO. _____

AECOM

ATTN: _____ **ATTN:** _____

PROJECT

AECOM PROJECT NO. **OWNER PROJECT NO.** **CONTRACTOR PROJECT NO.**

ITEM NO.	COPIES	DESCRIPTION	PREVIOUS SUBMITTAL NO.	SPEC. SECTION NO.	PLAN SHEET NO.

SUBMITTED BY: _____ _____

CONTRACTOR **DATE**

SUBMITTAL RETURN (TO BE COMPLETED BY ENGINEER)

ITEM NO.	COPIES	RESUBMIT		COMMENTS
		YES	NO	

COPY:

RETURNED BY: _____ _____

ENGINEER **DATE**

END OF SECTION

SECTION 017410 CLEANING DURING CONSTRUCTION AND FINAL CLEANING

1.01 GENERAL

A. This section includes cleaning during construction and final cleaning on completion of the work.

B. At all times maintain areas covered by the contract and adjacent properties and public access roads free from accumulations of waste, debris, and rubbish caused by construction operations.

C. Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws. Do not burn or bury rubbish or waste materials on project site. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

D. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

1.02 CLEANING DURING CONSTRUCTION

A. During execution of work, clean site, adjacent properties, and public access roads and dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

C. Provide containers for collection and disposal of waste materials, debris, and rubbish.

D. Cover or wet excavated material leaving and arriving at the site to prevent blowing dust. Clean the public access roads to the site of any material falling from the haul trucks.

1.03 FINAL CLEANING

A. At the completion of work and immediately prior to final inspection, clean the entire project site as follows.

B. Clean, sweep, wash, and polish all work and equipment including finishes.

C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces.

D. Repair, patch, and touch up marred surfaces to match adjacent surfaces.

E. Broom clean paved surfaces; rake clean landscaped areas.

F. Remove from the site temporary structures and materials, equipment, and appurtenances not required as a part of, or appurtenant to, the completed work.

END OF SECTION

SECTION 019310 OPERATION AND MAINTENANCE MANUALS

1.01 GENERAL

Submit six copies of all manufacturer's operation and maintenance manuals and data pertinent to equipment supplied for the project. **Manuals shall be delivered as a single complete submittal and not in multiple packages.** Prepare and organize the material in three-ring binders with divider tabs and labels. Include a table of contents. Include a USB flash drive of all catalog data in pdf format and all drawings in both pdf and CADD formats. All pdf files shall be formatted to allow word search.

1.02 SUBMITTALS

A. Submittals shall include:

1. List of equipment furnished for project with name, address, and telephone number of each vendor.

2. List of serial numbers of equipment furnished.

3. A copy of shop drawings for mechanical, electrical, and instrument equipment in final form.

4. Manufacturer's operation and maintenance instructions and parts lists.

5. Tabulation of motor nameplate horsepower, nameplate current, field-measured current, overload relay setting, and catalog number for polyphase motors.

6. List of fuses, lamps, seals, and other expendable equipment and devices. Specify size, type, and ordering description. List name, address, e-mail address, website address, fax number, and telephone number of vendor.

B. Provide manuals for each piece of equipment, including individual components and subsystems of complete assemblies. Line out non-applicable text and illustrations. The section of the manual on operation shall describe the functions and limitations of each component and its relationship to the system of which it is a part. Where several models, options, or styles are described, the manual shall identify the items actually provided.

C. Each manual shall contain the following:

1. Manufacturer's identification, including order number, model, and serial number.

2. Blue line prints or reviewed shop drawings and diagrams of all systems.

3. Certified equipment drawings or reviewed shop drawing data clearly marked for equipment furnished.

4. Complete operating and maintenance instructions for each and every item of equipment, setting forth in detail and step-by-step the procedure for starting, stopping, operating, and maintaining the entire system as installed. Include a schedule of recommended maintenance intervals.

5. Complete parts list of replaceable parts, their part numbers, and the name and address of their nearest vendor.

6. A complete valve tag list including the name and function of the pipe in which the valve is mounted.

7. Any special emergency operating instruction and a list of service organizations (including addresses and telephone numbers) capable of rendering emergency service to the various parts of the system.

8. Copy of manufacturer's equipment guarantees and warranties.

D. Brochures shall be loose leaf with durable plastic or fiberboard covers. Each sheet shall be reinforced to prevent tearing from continued use, and each brochure shall have the following information clearly printed on its cover:

1. Project name, name of Owner, and address.

2. Name and address of Owner's Representative.

3. Name and addresses of contractors and subcontractors and department to contact.

4. Telephone number of contractors, including night and emergency numbers.

5. Major equipment vendors' names and telephone numbers.

E. Submit complete manuals at least four weeks before the date of the instructions required by the subsections on "Manufacturer's Services" in the various specification sections.

F. Operation and maintenance manuals specified herein are in addition to any operation, maintenance, or installation instructions required by the Contractor to install, test, and start up equipment.

1.03 EQUIPMENT DATA SHEETS

Provide six sets of equipment data sheets, bound in three-ring binders, summarizing the equipment manufacturer's maintenance instructions and recommendations. A blank data sheet and a sample data sheet are attached.

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name:	Size:	
Serial No.:	Model:	
Vendor:		
Vendor Address:	Type:	
	Mfr.:	
Vendor Rep:	Voltage:	Amps:
Phone:	Phase:	rpm:
Maintenance Work to be Done		Frequency*
OPERATING REQUIREMENTS AND REFERENCE		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name: Influent Pump No. 1 Tag No.: P01-1	Size: 15 hp	
Serial No.: 123456ABC Vendor: ABC Pump Co.	Model: 140T Frame Serial No. 987654ZY Class F Insulation W/Space Heater	
Vendor Address: 1111 Pump Circle Newport Beach, CA 92663	Type: Mfr.: DEF Motors, Inc.	
Vendor Rep: XYZ Equipment, Inc.	Voltage: 460	Amps: 20
Phone: 714/752-0505	Phase: 3	rpm: 1,800
Maintenance Work to be Done		Frequency*
1. Operate all valves and check such things as a) bearing temperature, b) changes in running sound, c) suction and discharge gauge readings, d) pump discharge rate, and e) general condition of the drive equipment. 2. Check packing. 3. Checking pumping unit for any dust, dirt, or debris. (Continued on attached sheet)		D D W
OPERATING REQUIREMENTS AND REFERENCE		
For manufacturer's instructions regarding installation, operation, maintenance, and trouble shooting of this equipment, see Volume _____, Section _____.		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name:	Size:	
Serial No.:	Model:	
Vendor:		
Vendor Address:	Type:	
	Mfr.:	
Vendor Rep:	Voltage:	Amps:
Phone:	Phase:	rpm:
Maintenance Work to be Done		Frequency*
4. Lubricate bearing frame and motor bearings (consult manufacturer's instructions for type of grease or oil).		Q
5. Disassemble and change or repair the following: a) impeller, b) shafts, c) shaft sleeve, d) rotary seals, and e) sleeve bearings.		A
OPERATING REQUIREMENTS AND REFERENCE		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

END OF SECTION

SECTION 020120 PROTECTING EXISTING UNDERGROUND UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and procedures for protecting existing underground utilities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Connections to Existing Underground Pipes: 020130.

B. Trenching, Backfilling, and Compacting: 312316.

C. Subsurface Utility Locating (Potholing): 023219.

PART 2 - MATERIALS

2.01 REPLACEMENT IN KIND

Except as indicated below or as specifically authorized by the Owner's Representative, reconstruct utilities with new material of the same size, type, and quality as that removed.

2.02 VITRIFIED CLAY SEWER PIPE AND COUPLINGS

For sewer pipe 8 inches and less in diameter, replacement shall consist of plain-end pipe conforming to ASTM C700. Compression couplings shall conform to ASTM C594, band seal couplings or equal. Use at least two lengths of pipe in crossing the trench section or as shown on the details in the drawings.

PART 3 - EXECUTION

3.01 GENERAL

A. Replace in kind street improvements, such as curbs and gutters, barricades, traffic islands, signalization, fences, signs, etc., that are cut, removed, damaged, or otherwise disturbed by the construction.

B. Where utilities are parallel to or cross the construction but do not conflict with the permanent work to be constructed, follow the procedures given below. Notify the utility owner 48 hours in advance of the crossing construction and coordinate the construction schedule with the utility owner's requirements. For utility crossings not shown in the

drawings, refer to the General Provisions and the instructions of the Owner's Representative for guidance.

C. Determine the true location and depth of utilities and service connections which may be affected by or affect the work. Determine the type, material, and condition of these utilities. In order to provide sufficient lead-time to resolve unforeseen conflicts, order materials and take appropriate measures to ensure that there is no delay in work.

D. Expose utilities with potential conflicts with the proposed improvements prior to commencement of installation of the sewer pipe.

E. Expose utilities in advance of the pipeline construction.

3.02 PROCEDURES

A. Protect in Place: Protect utilities in place, unless abandoned, and maintain the utility in service, unless otherwise specified in the drawings or in the specifications.

B. Cut and Plug Ends: Cut abandoned utility lines and plug the ends. Plug storm drains and sewers with an 8-inch wall of brick and mortar. Cap waterlines with a cast-iron cap or install a 3-foot-long concrete plug. Dispose of the cut pipe as unsuitable material.

C. Remove and Reconstruct: Where so indicated in the drawings or as required by the Owner's Representative, remove the utility and, after passage, reconstruct it with new materials. Provide temporary service for the disconnected utility.

3.03 COMPACTION

A. Utilities Protected in Place: Backfill and compact under and around the utility so that no voids are left.

B. Utilities Reconstructed: Prior to replacement of the utility, backfill the trench and compact to an elevation 1 foot above the top of the ends of the utility. Excavate a cross trench of the proper width for the utility and lay, backfill, and compact.

C. Alternative Construction-Sand-Cement Slurry: Sand-cement slurry consisting of one sack (94 pounds) of portland cement per cubic yard of sand and sufficient moisture for workability may be substituted for other backfill materials to aid in reducing compaction difficulties. Submit specific methods and procedures for the review of the Owner's Representative prior to construction.

3.04 THRUST BLOCKS ON WATERLINES

A. The Contractor's attention is called to thrust blocks for waterlines throughout the project whose thrust is in the direction of the new excavation and, therefore, may be affected by the construction. These waterlines are owned and operated by the Owner. Protect thrust blocks in place or shore to resist the thrust by a means approved by the utility owner and reconstruct. If the thrust blocks are exposed or rendered to be ineffective in the opinion

of the Owner's Representative, reconstruct them to bear against firm unexcavated or backfill material.

B. Provide firm support by backfilling that portion of the trench for a distance of 2 feet on each side of the thrust block to be reconstructed from the pipe bedding to the pavement subgrade, with either:

1. Sand-cement slurry (94 pounds of cement per cubic yard).

2. The native material compacted to a relative compaction of 95%.

3. Then excavate the backfill material for the construction of the thrust block.

4. Test compaction of the backfill material before pouring any concrete thrust block. Use Class A concrete per Section 030500 for reconstruction.

END OF SECTION

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SECTION 020130 CONNECTIONS TO EXISTING BURIED PIPELINES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of hot-tap connections to existing buried ductile-iron pipelines and line stopping and replacement of existing piping.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Protecting Existing Underground Utilities: 020120.

B. Painting and Coating: 099000.

C. Cold-Applied Wax Tape Coating: 099752.

D. Polyethylene Sheet Encasement: 099754.

E. Manual, Check, and Process Valves: 400520.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300

B. Submit the manufacturer's catalog data for tapping sleeves. Show coatings.

PART 2 - MATERIALS

2.01 TAPPING SLEEVES FOR DUCTILE-IRON, STEEL, AND PVC (CAST-IRON OUTSIDE DIAMETER) PIPES

A. Tapping sleeves shall comply with MSS SP-60, MSS SP-111, or AWWA C223, and MSS SP-113.

B. Tapping Sleeve for Ductile-Iron and PVC (Cast-Iron Outside Diameter) Pipes: Mueller H-615 or equal.

C. Tapping Sleeve for Asbestos Cement Pipe: Mueller H-619 or equal.

D. Pressure rating shall be at least 200 psi for piping 12 inches and smaller and at least 150 psi for piping 14 through 24 inches.

2.02 COATING FOR TAPPING SLEEVES

Coat with epoxy per Section 099000, System No. 21 and wax tape and polyethylene wrap per Sections 099752 and 099754.

2.03 TAPPING GATE VALVES

Type V-135 or V-137 per Section 400520.

2.04 CONNECTIONS TO EXISTING STEEL PIPES

Provide a fabricated steel collar with nozzle. Minimum thickness of collar plate and nozzle shell shall be 3/8 inch. Width of collar from the inside surface of the outlet to the outside edge of the collar shall be one-third to one-half of the diameter of the outlet. Collar may be oval or rectangular with rounded corners. An entire wrapper plate may be substituted for the collar. Steel material shall have a minimum yield stress of 30,000 psi.

2.05 LINE STOPPING FOR EXISTING WATER OR FORCE MAIN

A. Before beginning line stop installation, the Contractor shall coordinate work with the City Utilities Department.

B. The outside and inside diameters of the existing pipeline are required prior to ordering the tapping fitting and line stopper. Using the exposed portion of the pipeline, determine the outside diameter and inside diameter of the existing main for providing to the line stopping equipment manufacturer. Determine the pipe wall thickness by ultrasonic testing.

C. The line stop tapping fitting shall be a full encirclement split tee, Type 304 stainless steel, assembled with either a bolted or clamped connection. Bolts shall be steel, ASTM A325 heavy hex. Seal the line stop tapping fitting to the existing main with a nonasbestos synthetic rubber gasket. Construct the gasket from the following materials: Buna-N, Teflon, Kevlar aramid fiber, or acrylic fiber bound by nitrile. The split tee outlet flange shall be Class 125 per AWWA C115. Bolts and nuts for the flange shall be carbon steel, ASTM A307, Grade B. The Contractor has the option of either using a fully expandable rubber stopper rated to a minimum of 100 psi or carbon steel pivoting head with Buna-N sealing element rated to a minimum of 100 psi as the line stopping head mechanism. The temporary removable valve shall be a resilient wedge gate valve rated at 150 psi. The line stop and accessories shall be HYDRA-STOP, IPSCO, or equal.

PART 3 - EXECUTION

3.01 VERIFICATION OF PIPE OUTSIDE DIAMETER PRIOR TO INSTALLATION

Excavate the points of connection prior to submittal of shop drawings. Verify outside diameter prior to ordering materials.

3.02 WRAPPING OR COATING TAPPING SLEEVES

After installation, wrap the entire sleeve and tapping valve with cold-applied wax tape per Section 099752 and polyethylene sheet wrap per Section 099754.

3.03 INSTALLING CONNECTIONS TO EXISTING STEEL PIPES

A. Remove any existing coating to a point 3 inches beyond the area of the pipe that will be covered by the collar or wrapper.

B. Weld the collar to the pipe shell. Weld the entire circumference of the collar.

C. After installation, coat per Section 099000, System No. 21. Then wrap the entire connection and tapping valve with cold-applied wax tape per Section 099752 and polyethylene sheet wrap per Section 099754.

3.04 LINE STOPPING PROCEDURE

A. Install concrete and support thrust blocking before installing the temporary pressure tapping machinery and valve. After tapping and line stopping operations have been completed, seal the tee fitting with an ASTM A36 steel pin-locked completion plug with Buna-N O-ring seal. After the completion plug has been successfully installed, close the fitting with a blind flange meeting the requirements of AWWA C110.

B. Any damage that occurs due to the Contractor's work to the line stop fitting, accessories, or existing main shall be repaired at Contractor's expense.

C. Dispose of water or sewage and existing pipe at no additional cost to the Owner. Any violation of permit requirements shall be the sole responsibility of the Contractor.

D. In order to aid the Contractor in the construction of the replacement pipe or main, the upstream sewage lift stations may be temporarily shut down by coordinating with the Owner. A shutdown time period to be coordinated with the Owner and need approval from owner.

E. If a longer time period is needed by the Contractor than is outlined above to complete the connections to the existing pipe, then provide the means for conveying the sewage flow from the upstream pumping lift stations. The means may include bypass force main and/or tanker truck. Coordinate with the Owner.

END OF SECTION

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SECTION 023219 SUBSURFACE UTILITY LOCATING (POTHOLING)

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and procedures for performing pothole operations to locate existing underground utilities. Contractor to pothole as needed to identify buried lines for verification.

1.02 SUBMITTALS

A. Submit a traffic control/protection plan at least seven calendar days prior to the commencement of field activities.

B. Submit proposed method of potholing, including description of equipment to be used, and schedule for potholing for approval at least seven calendar days prior to the commencement of field activities. Obtain Owner's approval of pothole locations prior to commencement of field activities.

C. Submit field logs to the Owner within two working days after the completion of pothole excavations in each area. Include dates of potholing operations and any additional discovered information or pertinent data. Include for each pothole excavation field log:

1. Pothole number.

2. Date of pothole.

3. Depths to top and bottom of utility (measured from existing grade over utility at pothole).

4. Miscellaneous Contractor's notes.

D. Submit temporary steel cap and/or steel plate bridging shop drawings at least seven calendar days prior to the commencement of field activities.

E. Submit sand-cement slurry mix design at least seven calendar days prior to the commencement of field activities.

F. Submit asphalt concrete mix design at least seven calendar days prior to the commencement of field activities.

1.03 PROCEDURES

A. Subsurface utility-locating (potholing) services shall conform to CI/ASCE 38-02. For the purpose of this scope, "locate" means to obtain the horizontal and vertical position of the

utility line by excavating a circular test hole or narrow trench (where approved of and/or requested by the Owner). Construct test holes using vacuum excavation or comparable nondestructive equipment in a manner that will cause no damage to the utility.

B. Subsurface utility locating shall consist of test hole excavations at locations indicated on the pothole plans as approved by the Owner. Narrow trench excavations (slot potholes) may be required at locations approved by the Owner or to locate multiple parallel utilities.

1.04 TIME OF COMPLETION/SCHEDULE

The Contractor shall diligently prosecute the work to completion before the expiration of 30 working days immediately following the date of the project kick-off meeting.

1.05 STANDARD SPECIFICATIONS

Wherever reference is made to the state specifications, such reference shall mean to the State of California Department of Transportation Standard Specifications, 2024 edition.

PART 2 - MATERIALS

2.01 SAND-CEMENT SLURRY BACKFILL AT TEST HOLES AND AT EXPLORATORY TRENCHES

Sand-cement slurry backfill shall consist of two sacks of Type I or II Portland cement added per cubic yard of imported sand and sufficient water for workability.

PART 3 - EXECUTION

3.01 POTHOLING OPERATIONS

A. Backfill and repair test hole excavations immediately after obtaining the measurement data. Backfill and repair trench excavations requiring use of temporary steel plate bridging within four working days. Promptly provide notice to the Owner for scheduling field survey activities. Advise Owner of number of pothole excavations completed and number remaining.

B. Underground Service Alert Requirements: Comply with Underground Service Alert requirements for notification prior to excavation. Contact Underground Service Alert at 1-800-642-2444 (or dial 811) no less than two and no more than ten days prior to the start of exploratory excavation. Verify whether or not a representative of each utility or agency will be present during excavation, and coordinate with said individual(s). Take any precautions required by the utility owner.

C. Conduct potholing operations in a manner that minimizes the damage potential to existing underground utilities in order to ensure that the existing facilities will remain in operation without interruption.

D. Coordinate and cooperate with and facilitate field data collection by Owner's surveyor. Pothole excavations shall sufficiently expose subsurface utilities to allow surveyor to easily determine and measure the following data:

1. Elevation at top and bottom of utility.

2. Elevation of existing grade over utility at pothole.

3. Coordinates at surface.

4. Outside diameter of utility or width of duct banks.

5. Utility material and condition.

E. Location and Depiction of Existing Utilities: Pothole maps for subsurface utility locating shall be present and utilized during potholing activities. The plans shall be compared to utility/agency paint markings following Underground Service Alert notification as well as locations pre-marked by the Owner's surveyor. If discrepancies are found between the plans and paint markings, promptly notify the Owner prior to commencement of any excavation

3.02 EXCAVATION

A. Protect utilities or underground structures from damage during potholing. Immediately report any damaged utilities to the affected utility's owner and the Owner. Repair immediately any damaged utilities in accordance with the respective utility owner's requirements. Neatly cut and remove existing pavement. Excavate test holes in such a manner as to prevent any damage to wrappings, coatings, or other protective coverings, utilizing vacuum excavation or hand digging.

B. Methods: Backhoe excavation is not permitted except for trench excavations**.** Use the following methods for pothole excavations:

1. Hand Digging: Hand digging is the method of excavating a pothole by manual means with hand-held, non-mechanical equipment such as a shovel.

2. Vacuum Excavation: Vacuum excavation shall consist of air or water pressure to break up the soil and a vacuum device to collect the spoil. Determine if air or water vacuum excavation shall be used depending upon specific site and environmental characteristics. Soil type such as heavy clay may require water vacuum excavation. Utilize air vacuum excavators if mud from water vacuum excavators cannot be disposed properly. Use air vacuum excavators if damage to utilities, such as cutting through cables, will occur with the use of water vacuum excavators.

a. Air: Air vacuum excavators shall utilize a high velocity air stream to penetrate, expand, and break up the soil. Remove the loosened particles of soil and rock from the excavation through the use of a vacuum.

b. Water: Water vacuum excavation systems shall excavate the pothole using high-pressure water to reduce and loosen the soil. Remove the wet soil and mud slurry to a spoil tank using a vacuum.

C. Size of Test Hole Excavation: Maximum test hole size shall be 8 inches in diameter at surface, unless indicated otherwise by Owner.

D. Size of Exploratory Trench Excavation: Trench width and length shall be as approved by the Owner. Trench depth shall be as required to accurately locate subsurface utilities.

3.03 TEMPORARY STEEL PLATE BRIDGING, WITH A NON-SKID SURFACE (WHERE REQUIRED FOR APPROVED TRENCHES)

A. Provide steel plate-bridging with a nonskid surface and shoring to preserve unobstructed traffic flow. In such cases, the following conditions shall apply:

1. Steel plates used for bridging shall extend a minimum of 12 inches beyond the edges of the trench.

2. Install steel plate bridging to operate with minimum noise.

3. Shore the trench to support the bridging and traffic loads.

4. Use temporary paving with cold asphalt concrete to feather the edges of the plates if plate installation by Method 2 is used.

5. Secure bridging against displacement by using adjustable cleats, shims, or other devices.

B. Install steel plate bridging and shoring using the following method:

Attach approach plate(s) and ending plate (if longitudinal placement) to the roadway by a minimum of two dowels predrilled into the corners of the plate and drilled 2 inches into the pavement. Butt subsequent plates to each other. Compact fine graded asphalt concrete to form ramps, maximum slope 8.5% with a minimum 12-inch taper to cover all edges of the steel plates. When steel plates are removed, backfill the dowel holes in the pavement with either graded fines of asphalt concrete mix or concrete slurry.

C. Maintain the steel plates, shoring, and asphalt concrete ramps.

D. Unless specified, use of steel plate bridging at any given location shall not exceed four consecutive working days in any given week. Cover backfilling of excavation with a minimum of 3 inches of temporary layer of cold mix asphalt concrete.

E. The following table shows the required minimal thickness of steel plate bridging required for a given trench width:

Trench Width (feet)	Minimum Plate Thickness (inches)
1	1/2
1 1/2	3/4

F. The Contractor may use standard steel plate with known coefficient of friction equal or exceeding 0.35.

G. Use a “Rough Road” sign (W8-8) with black lettering on an orange background in advanced of steel plate bridging. This is to be used along with any other required construction signing.

3.04 POTHOLE REPAIR

A. After excavating a test hole or trench, provide and install a temporary steel cap (over test hole) or temporary steel plate bridging (over trench) to facilitate data gathering by Owner’s surveyor.

B. Following data gathering by surveyor, remove temporary steel caps and/or steel plate bridging, and backfill excavation with approved material as follows:

1. Test Hole Excavations: Sand-cement slurry backfill per Part 2 of this section. Bring to grade with asphalt cement pavement per Part 2 of this section. Match existing pavement thickness plus 1 inch.

2. Exploratory Trenches: Backfill per Part 2 of this section. Match existing pavement thickness plus 1 inch.

C. The finished surface of the repair shall be of like material and constructed to the same finished grade as the adjacent pavement. The finished surface shall be such that it does not allow water to pond. There shall be no discernable difference in surface level at the joint between the existing pavement and the completed repair.

3.05 DISPOSAL OF CUTTINGS

Dispose of cuttings off-site.

END OF SECTION

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SECTION 030500 GENERAL CONCRETE CONSTRUCTION

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of formwork, reinforcing steel, joints, concrete, and finishing and curing for general concrete construction.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Wall Pipes, Seep Rings, and Penetrations: 400762.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Prepare mix designs in accordance with ACI 301, Section 4, except as modified herein. Submit mix design in writing for review by the District at least 15 days before placing of any concrete.

C. Provide certification that cement to be used complies with ASTM C150 or ASTM C595 and these specifications.

D. Provide certification that aggregates comply with ASTM C33. Submit gradation analysis with concrete mix designs.

E. Submit manufacturer's catalog data and descriptive literature for form ties, spreaders, corner formers, form coatings and curing compound, bond breakers, joint sealant, backing rod, joint filler, control joints, expansion joint dowels, epoxy bonding compound, color additive, and epoxy anchor adhesive.

F. Submit mill test certificates identifying chemical and physical analyses of each reinforcing steel delivered. If mill test reports are unavailable and the quantity of steel for a structure exceeds 5 tons, provide a laboratory test to prove conformance with the specified ASTM standard.

G. Submit reinforcing bending lists and placing drawings for all reinforcing. Placing drawings shall indicate all openings (mechanical, electrical, equipment, and architectural) including additional reinforcing at openings and corner bar arrangements at intersecting beams, walls, and footings indicated in the typical detail and structural drawings. Placing drawings shall be coordinated with the concrete placing schedule. Each bending list and placing drawing submitted shall be complete for each major element of a structure (grade slabs, footings, floor slabs) including dowels and corner

bars. Furnishing such lists shall not be construed that the lists will be reviewed for accuracy. The Contractor shall be wholly and completely responsible for the accuracy of the lists and for furnishing and placing reinforcing steel in accordance with the details shown in the drawings and as specified. Placing drawings shall be prepared by the Contractor and shall not incorporate photocopies of the contract drawings.

H. Submit report from a testing laboratory verifying that aggregate material contains less than 1% asbestos by weight or volume and conforms to the specified gradations or characteristics.

I. Submit manufacturer's specifications and instructions for all admixtures and curing materials. Include manufacturer's certification of compatibility of all admixtures.

1.04 QUALITY ASSURANCE

A. Concrete not meeting the minimum specified 28-day design strength shall be cause for rejection and removal from the work.

B. Perform concrete work in conformance with ACI 301 unless otherwise specified.

C. Do not place concrete until design mix, material tests and trial concrete batch mix compression and shrinkage test results are approved by the Engineer.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Provide in conformance with Section 01 66 10 and as specified herein.

B. Deliver concrete to discharge locations in watertight agitator or mixer trucks without altering the specified properties of water- cementitious materials ratio, slump, air entrainment, temperature and homogeneity.

C. Reject concrete not conforming to specification, unsuitable for placement, exceeding the time or temperature limitations or not having a complete delivery batch ticket.

1.06 SITE CONDITIONS:

A. Do not place concrete until conditions and facilities for making and curing control test specimens are in compliance with ASTM C 31 and as specified herein.

PART 2 - MATERIALS

2.01 FORMWORK

A. Design forms according to ACI 347.

B. Class I Forms: Use steel forms, ply form, or smooth-surface plywood 3/4-inch minimum thickness for straight surfaces and 1/2-inch minimum thickness for curved surfaces.

C. Class II Forms: Use plywood in good condition, metal, or smooth-planed boards free from large or loose knots with tongue and groove or ship lap joints.

D. Class II forms may be used for exterior concrete surfaces that are 1 foot or more below finished grade. Use Class I forms for all other surfaces.

E. Coat forms with form release agent.

2.02 BOND BREAKER

Bond breaker shall be a nonstaining type which will provide positive bond prevention, such as Clean Lift 90 W.B., as manufactured by Edoco Burke; Silcoseal 97EC, as manufactured by Nox-Crete; or approved equal.

2.03 FORM RELEASE AGENT

A. Form release agent shall not bond with, stain, or adversely affect concrete surfaces and shall not impair subsequent treatments of concrete surfaces. Form release agent shall be a ready-to-use water-based material formulated to reduce or eliminate surface imperfections and containing no mineral oil or organic solvents.

B. Certified as meeting the requirement of ANSI/NSF 61 for contact with potable water.

C. For steel forms, release agent shall prevent discoloration of the concrete due to rust.

2.04 REINFORCING STEEL

A. Reinforcement shall conform to ASTM A615 or ASTM A706, Grade 60.

B. Fabricate reinforcing in accordance with the current edition of the Manual of Standard Practice, published by the Concrete Reinforcing Steel Institute. Bend reinforcing steel cold.

C. Deliver reinforcing steel to the site bundled and with identifying tags.

2.05 WELDED WIRE REINFORCEMENT

Welded wire reinforcement shall conform to ASTM A1064/A1064M.

2.06 FORM TIES

A. Locate form ties on exposed surfaces in a uniform pattern. Place form ties so they remain embedded in the concrete except for a removable portion at each end. Form ties shall have conical or spherical type inserts with a maximum diameter of 1 inch (25.4 mm). Construct form ties so that no metal is within 1-1/2 inch (38.1 mm) of the

concrete surface when the forms, inserts, and tie ends are removed. Do not use wire ties. Ties shall withstand all pressures and maintain forms within acceptable deflection limits.

B. Flat bar ties for panel forms shall have plastic or rubber inserts having a minimum depth of 1-1/2 inch (38.1 mm) and sufficient dimensions to permit patching of the tie hole.

C. Tapered form ties shall be tapered through-bolts or through-bolts that utilize a removable tapered sleeve.

D. Water Stop Ties: For water-holding structures, basements, pipe galleries, and accessible spaces below finish grade, furnish one of the following:

1. Integral steel water stop 0.103 inch thick and 0.625 inch in diameter tightly and continuously welded to tie.

2. Neoprene water stop 3/16-inch thick and 15/16 inch diameter whose center hole is one-half diameter of tie, or molded plastic water stop of comparable size.

2.07 BAR SUPPORTS

Bar supports in beams and slabs exposed to view after form stripping shall be galvanized and plastic coated. Use concrete supports for reinforcing in concrete placed on grade.

2.08 BAR COUPLERS

Reinforcing steel bar splicing couplers shall be a mechanical type as manufactured by Dayton Superior, Barsplice Products Inc., or equal. Use couplers that do not reduce tensile or ultimate strength of bars. Couplers shall develop a minimum of 125% of the yield strength of the bar.

2.09 JOINT SEALANT FOR CONCRETE STRUCTURES

A. Joint sealant shall be a multipart, gray, nonstaining, nonsagging, gun grade polyurethane sealant, which cures at ambient temperature to a firm, flexible, resilient, tear-resistant rubber. Sealant shall comply with ASTM C920, Type M, Grade P, Class 25 for horizontal joints and Grade NS, Class 25 for vertical joints and be recommended by the manufacturer for continuous immersion in water.

Characteristic or Parameter	Technical Requirements
Pot life	1 to 3 hours
Hardness	35 Shore A, ±5, ASTM D2240
Elongation	650%, ASTM D412
Tensile strength	200 psi, ASTM D412
Peel strength on concrete	No adhesion loss at 25 pounds
Temperature service range	40°F to 167°F
Immersion in water	Continuous

B. Sealant shall be Tremco Vulkem 227 or Sikaflex-2CNS (for Grade NS, Class 25), Sikaflex-2CSL of Sika Corporation or Vulkem 245 (for Type M, Grade P, Class 25), or approved equal. Troweling of sealants into joints will not be permitted.

2.10 BACKING ROD FOR EXPANSION JOINTS

Backing rod shall be an extruded closed-cell polyethylene foam rod, such as Minicel backer rod, manufactured by Industrial Systems Department, Plastic Products Group of Hercules, Inc., Middletown, Delaware; Ethafoam SB, as manufactured by Dow Chemical Company, Midland, Michigan; or approved equal. The rod shall be 1/4 inch larger in diameter than the joint width. Where possible, provide full-length sections for the joint; minimize splices. Apply backup rod and bond breaker tape in expansion joints.

2.11 BOND BREAKER TAPE

Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape that will adhere to the premolded joint material or concrete surface. The tape shall be the same width as the joint. The tape shall be compatible with the sealant.

2.12 PREFORMED CONTROL JOINT

Preformed control joint shall be a one-piece, flexible, PVC joint former, such as Kold-Seal Zip-Per Strip KSF-150-50-50, manufactured by Vinylex Corp., Knoxville, Tennessee, or a one-piece steel strip with preformed groove, such as Keyed Kold Retained Kap, manufactured by Burke Concrete Accessories, Inc., San Mateo, California, or equal. Provide the preformed control joint material in full-length unspliced pieces.

2.13 PREMOLDED JOINT FILLER

Joint filler shall be preformed, nonextruded type constructed of closed-cell neoprene conforming to ASTM D1752, Type I, as manufactured by W. R. Grace Company of Cambridge, Massachusetts; W. R. Meadows, Inc., Elgin, Illinois; or equal.

2.14 CEMENT

A. Use domestic portland cement that conforms to ASTM C150, Type II/V, or blended hydraulic cement conforming to ASTM C595, Type IP.

B. Use only one brand of cement in any individual structure. Use no cement that has become damaged, partially set, lumpy, or caked. Reject the entire contents of the sack or container that contains such cement. Use no salvaged or reclaimed cement.

C. Maximum tricalcium aluminate shall not exceed 8%. The maximum percent alkalies shall not exceed 0.6%.

2.15 AGGREGATES

Aggregates shall be natural rock, sand, or crushed natural rock, shall comply with ASTM C33, and shall contain less than 1% asbestos by weight or volume. For each aggregate used in concrete, the expansion result determined in accordance with ASTM C1293 shall not exceed 0.04 percent at 1 year.

2.16 WATER AND ICE

Use water and ice that is clean and free from objectionable quantities of organic matter, alkali, salts, and other impurities that might reduce the strength, durability, or otherwise adversely affect the quality of the concrete. Water shall not contain more than 500 mg/L of chlorides or more than 500 mg/L of sulfate.

2.17 COLOR ADDITIVE FOR EXTERIOR ELECTRICAL DUCT ENCASEMENT

For exterior electrical duct concrete encasements, use a color additive for identification purposes: brick red "Colorfull" as manufactured by Owl Manufacturing Company, Arcadia, California; coral red "Chromix C-22" as manufactured by L. M. Scofield Company, Los Angeles, California; or equal. Add the color additive while the concrete is being mixed using the quantity per cubic yard of concrete recommended by the manufacturer for the class of concrete indicated.

2.18 CONCRETE ADMIXTURES

A. Class A concrete shall contain an air-entraining admixture conforming to ASTM C260. Admixtures shall be Master Builders MB-AE 90, Sika AER, or approved equal.

B. Class A concrete shall contain a water-reducing admixture conforming to ASTM C494, Type A. It shall be compatible with the air-entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations. Admixture shall be Master Builders Pozzolith polymer-type normal setting, Plastocrete 161 or Plastiment, Sika Chemical Corporation, or equal.

C. Mineral Admixture: Class A concrete may contain a mineral admixture, fly ash Class F, conforming to ASTM C618, not to exceed or replace more than 15% by weight of the cement material required without the mineral admixture.

D. Do not use any admixture that contains chlorides or other corrosive elements in any concrete. Admixtures shall be nontoxic after 30 days.

2.19 GROUT

A. Nonshrink grout shall conform to ASTM C1107 and to these specifications. Use a nongas-liberating type, cement base, premixed product requiring only the addition of water for the required consistency. Grout shall be UPCON High Flow, Master Flow 928, or equal. Components shall be inorganic.

B. Ordinary type grout (dry pack) shall consist of one part portland cement to two parts sand (100% passing a No. 8 sieve). Add sufficient water to form a damp formable consistency.

C. Expansive Grout: Premixed, cementitious mixture with a minimum 28-day strength of 3,500 psi. Provide air-entraining admixture as recommended by the manufacturer.

D. Epoxy Grout:

1. Mix the two components of epoxy bonding compound in compliance with the manufacturer's instructions.

2. Use sand that is oven dry and meets the following gradation requirements for epoxy grout:

Sieve Size	**No. 8**	**No. 50**	**No. 100**
% Passing	100	30 ±15	5 ±5

2.20 REPAIR MORTAR

A. Mortar used for repair of minor concrete voids shall be made of the same materials as used for concrete, except that the coarse aggregate shall be omitted or the mortar shall consist of not more than one part cement to two and one-half parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing.

B. Materials for repair of major defects or cracks shall be in accordance with “Repair of Defects and Cracks” specified in Part 3.

2.21 BONDING COMPOUND

A. Epoxy bonding compound shall be Sikadur 32 Hi-Mod, Sika Chemical Corporation, Lyndhurst, New Jersey; Concresive by BASF; Euco Epoxy 452 by Euclid Chemical Company; or equal.

B. Nonepoxy bonding compound shall be Weldcrete by Larsen Products Corp., Link by Sta-Dry Manufacturing Corp., Euco Weld by Euclid Chemical Co., or equivalent. The compound shall be rewettable for up to two weeks.

2.22 CONCRETE MIX DESIGN

A. Conform to ASTM C94, except as modified by these specifications.

B. Air content as determined by ASTM C231 shall be:

1. 5 ± 1 1/2 percent for concrete using 1-1/2 inch maximum aggregate size.

2. 6 ± 1 1/2 percent for concrete using 3/4 inch maximum aggregate size.

C. Maximum water-cement ratio for Class A concrete = 0.45 by weight.

D. Use classes of concrete as described in the following table:

Class	**Type of Work**	**28-Day Compressive Strength (in psi)**	**Minimum Cement Content (in lbs per C.Y.)**
A	Concrete for all structures and concrete not otherwise specified. Concrete fill at structure foundations, cradle, supports across pipe trenches, and reinforced pipe encasement.	4,000	564
C	Miscellaneous unreinforced concrete.	2,000	376

E. Measure slump in accordance with ASTM C143. Slump shall be as follows:

Slab on grade or heavy sections wider (in plan view) than 3 feet	3 inches maximum
Footings	4 inches maximum
Class C	6 inches maximum

Proportion and produce the concrete to have a maximum slump as shown. A tolerance of up to 1 inch above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit. Concrete of lower than usual slump may be used provided it is properly placed and consolidated.

F. Aggregate size shall be 3/4 inch maximum for slabs and sections 8 inches thick and less. Aggregate size shall be 1 inch maximum for slabs and sections greater than 8 inches and less than 17 inches. Aggregate size shall be 1 1/2 inches maximum for all larger slabs and sections.

G. Combined aggregate grading shall be as shown in the following table:

Sieve Sizes	**Maximum Aggregate Size**		
	1 1/2"	**1"**	**3/4"**
	Percent Passing		
2"	100	---	---
1 1/2"	90 - 100	100	---
1"	50 - 86	90 - 100	100
3/4"	45 - 75	55 - 100	90 - 100
3/8"	38 - 55	45 - 75	60 - 80
No. 4	30 - 45	35 - 60	40 - 60
No. 8	23 - 38	27 - 45	30 - 45
No. 16	17 - 33	20 - 35	20 - 35
No. 30	10 - 22	12 - 25	13 - 23
No. 50	4 - 10	5 - 15	5 - 15
No. 100	1 - 3	1 - 5	0 - 5
No. 200	0 - 2	0 - 2	0 - 2

H. Combined aggregate grading shall be as shown in the following table:

	Maximum Aggregate Size			
	1 1/2"	**1"**	**3/4"**	**3/8"**
Aggregate Grade per ASTM C33	467	57	67	8

I. Mix design for pumped concrete shall produce a plastic and workable mix. The percentage of sand in the mix shall be based on the void content of the coarse aggregate.

2.23 SLURRY CEMENT BACKFILL

A. Slurry cement backfill shall consist of a fluid, workable mixture of aggregate, cement, and water.

B. Aggregate shall be either:

1. Material selected from excavation, imported material, or a combination thereof, free from organic matter and other deleterious materials and meeting the following gradation:

Sieve Size	Percentage Passing
1 1/2 inches	100
1 inch	80 to 100
3/4 inch	60 to 100
3/8 inch	50 to 100
No. 4	40 to 80
No. 100	10 to 40

2. Commercial quality concrete sand.

C. Proportion the aggregate, cement, and water by either weight or volume. Include at least 188 pounds of cement per cubic yard produced. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

D. Thoroughly machine-mix the materials for the slurry cement backfill in pugmill, rotary drum, or other mixer. Continue the mixing until the cement and water are thoroughly dispersed throughout the material. Place slurry cement backfill within one hour after mixing.

2.24 CURING COMPOUND

A. Curing compound shall conform to ASTM C309, Type 2, Class A.

B. Curing compound shall be compatible with required finishes and coatings and shall meet the State of California Clean Air Quality Standards which limit the quantity of volatile organic compounds to 350 grams per liter.

2.25 MATS, PAPER, AND SHEETING FOR CURING

A. Burlap mats shall conform to AASHTO M182.

B. Sisal-kraft paper and polyethylene sheets shall conform to ASTM C171.

2.26 REINFORCING DOWEL ADHESIVE

Dowel anchor adhesive shall be HIT-RE 500 V3 by Hilti; SET-3G by Simpson; Pure 110+ by Dewalt; or approved equal.

PART 3 - EXECUTION

3.01 FORM TOLERANCES

A. Failure of the forms to produce the specified concrete surface and surface tolerance shall be grounds for rejection of the concrete work. Rejected work shall be repaired or replaced at no additional cost to the District.

B. The following table indicates tolerances or allowable variations from dimensions or positions of structural concrete work:

	Maximum Tolerance (inch)
Sleeves and inserts	+1/4 -1/4
Projected ends of anchors	+1/4 -0.0
Anchor bolt setting	+1/4 -1/4
Finished concrete, all locations	+1/4 -1/4 in 10 feet
	Max ±1-inch in total length

The planes or axes from which the above tolerances are to be measured shall be as follows:

Sleeves and inserts:	Centerline of sleeve or insert.
Projected ends of anchors:	Plane perpendicular to the end of the anchor as located in the drawings.
Anchor bolt setting:	Centerline of anchor bolt.
Finish concrete:	The concrete surface as defined in the drawings.

Where equipment is to be installed, comply with manufacturer's tolerances if more restrictive than above.

3.02 FORM SURFACE PREPARATION

A. Clean form surfaces to be in contact with concrete of foreign material prior to installation.

B. Coat form surfaces in contact with concrete with a release agent prior to form installation.

3.03 FORM REUSE

Reuse only forms that provide a uniform surface texture on exposed concrete surfaces. Apply light sanding or other surface treatment between uses for uniform texture. Plug unused tie rod holes with corks, shave flush, and sand the concrete surface side. Do not patch forms other than filling tie rod holes, except in the case of Class II forms. Do not use metal patching discs on Class I forms.

3.04 REMOVAL OF FORMS

A. The following table indicates the minimum allowable time after the last cast concrete is placed before forms may be removed:

Sides of footings and encasements, walls	24 hours

B. Do not remove forms from concrete that has been placed with outside air temperature below 50°F without first determining if the concrete has properly set without regard for time. Do not apply heavy loading on green concrete. Immediately after forms are removed, the surface of the concrete shall be carefully examined and any irregularities in the surface shall be repaired, cured and finished as specified.

3.05 FORMED OPENINGS

Openings shall be of sufficient size to permit final alignment of pipes or other items without deflection or offsets of any kind. Provide formed openings with reinforcement as indicated in the typical structural details. Reinforcing shall be at least 2 inches clear from the opening surfaces and encased items.

3.06 EMBEDDED ITEMS

Set anchor bolts and other embedded items accurately and hold securely in position until the concrete is placed and set. Check all special castings, channels, or other metal parts that are to be embedded in the concrete prior to and again after concreting. Check nailing blocks, plugs, and strips necessary for the attachment of trim, finish, and similar work prior to concreting.

3.07 BEVELED EDGES (CHAMFER)

Form 3/4-inch beveled edges on exposed concrete edges and corners, and where indicated in the drawings. Reentrant corners in concrete members shall not have fillets, unless otherwise shown in the drawings. The top edges of slabs, walkways, and equipment pads may be beveled with an edging trowel in lieu of using chamfer strips.

3.08 CONSTRUCTION JOINTS

A. Provide construction joints where shown in the drawings.

B. Layout of construction joints shall be as shown in the drawings and according to the following guidelines:

1. Provide horizontal construction joints at top of foundation members and slabs-on-grade.

C. For slabs-on-grade, use formed construction joints.

D. Construction joints shall be keyed, unless otherwise detailed. Form keyways by beveled strips or boards placed at right angles to the direction of shear. Except where otherwise shown in the drawings or specified, keyways shall be at least 1 1/2 inches in depth over at least 25% of the area of the section.

E. When it is necessary to make a joint because of an emergency, furnish and place reinforcing dowels across the joint normal to the face of joint created if not normal to specified reinforcement and at the centerline of the concrete section being terminated. Carefully remove set concrete to a plane but rough surface near normal to adjacent formed or finish surfaces. Embed and extend dowels 48 bar diameters each side of the joint. Size and spacing of dowels shall match the largest reinforcing in the member but no closer than 6 inches on center. Furnishing and placing such reinforcing steel shall be at the Contractor's expense.

F. After a concrete placement pour has been completed to the construction joint and the concrete has hardened, thoroughly clean the entire surface of the joint of surface laitance, loose or defective concrete, and foreign material prior to the next concrete placement. Expose clean aggregate by sandblasting and thoroughly cleaning the surface of construction joints before placing the new concrete.

G. In case of emergency, place additional construction joints. (An interval of 45 minutes constitutes cause for an emergency construction joint.)

3.09 INSTALLATION OF PREMOLDED JOINT FILLER

Install in joint accurately as shown. Attach to concrete with a bonding agent recommended by the joint sealant and joint filler manufacturer for compatibility.

3.10 INSTALLATION OF JOINT SEALANTS

A. Immediately before installing the joint sealant, clean the joint cavity by sandblasting or power wire brushing. Install bond breaker tape per manufacturer's instructions.

B. After the joints have been prepared as described above, apply the joint sealant. Apply the primer, if required, and joint sealant only with the equipment and methods recommended by the joint sealant manufacturer. Application criteria for the sealant materials, such as

temperature and moisture requirements and primer cure time, shall be in accordance with the recommendations of the sealant manufacturer.

C. Apply masking tape along the edges of the exposed surface of the exposed joints. Trowel the joints smooth with a tuck pointing tool wiped with a solvent recommended by the sealant manufacturer.

D. After the sealant has been applied, remove the masking tape and any sealant spillage.

3.11 INSTALLATION OF STEEL EXPANSION JOINT DOWELS

Install parallel to slab face, perpendicular to the joint face, and in true horizontal position. Align dowels as indicated in the drawings. Secure tightly in forms with rigid ties. Orient dowels to permit joint movement.

3.12 PLACING REINFORCEMENT

A. Place reinforcing steel in accordance with the current edition of Recommended Practice for Placing Reinforcing Bars, published by the Concrete Reinforcing Steel Institute.

B. Place reinforcing in accordance with the following, unless otherwise indicated:

1. Reinforcement indicated in the drawings is continuous through the structure to the farthest extent possible. Terminate bars and hooks 2 inches clear from formed faces of concrete.

2. Splices may be used to provide continuity due to bar length limitations. Provide splice lengths as indicated on the drawings.

C. Reinforcing steel, before being positioned and just prior to placing concrete, shall be free from loose mill and rust scale and from any coatings that may destroy or reduce the bond. Clean reinforcing steel by sandblasting or wire brushing and remove mortar, oil, or dirt to remove materials that may reduce the bond.

D. Do not straighten or rebend reinforcing steel in the field.

E. Position reinforcing steel in accordance with the drawings and secure by using annealed wire ties or clips at intersections and support by concrete or metal supports, spacers, or metal hangers. Do not place metal clips or supports in contact with the forms. Bend tie wires away from the forms and slab surfaces to provide the specified concrete coverage. Bars, in addition to those shown in the drawings, which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at his own expense.

F. Place reinforcement a minimum of 2 inches clear of any metal pipe, conduits or fittings. Conduits in or through concrete shall be spaced with a minimum of 2 inches clear between them.

G. Secure reinforcing dowels in place prior to placing concrete. Do not press dowels into the concrete after the concrete has been placed.

H. Roll wire mesh used for reinforcement flat before placing concrete. Support and tie wire mesh to prevent movement during concrete placement.

3.13 SITE-MIXED CONCRETE

Conform to ACI 304.

3.14 READY-MIXED CONCRETE

Conform to ASTM C94.

3.15 PLACING CONCRETE

Conform to ACI 304.

3.16 PUMPING CONCRETE

Conform to ACI 304.2R-Latest edition.

3.17 WEATHER REQUIREMENTS

A. Conform to ACI 305 for placing during hot weather.

Hot weather is one or a combination of the following conditions that tends to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration, or otherwise causing detrimental results: high ambient temperature, high concrete temperature, low relative humidity, and high wind speed.

B. Conform to ACI 306 for placing during cold weather.

Cold weather is when air temperature has fallen to, or is expected to fall below, 40°F (4°C) during the protection period. Protection period is defined as the time recommended to prevent concrete from being adversely affected by exposure to cold weather during construction.

3.18 GROUTING MACHINERY FOUNDATIONS

Block out the original concrete or finish off a sufficient distance below the bottom of the machinery base to provide for the thickness of grout shown in the drawings. After the machinery has been set in position and placed at the proper elevation by steel wedges, fill the space between the bottom of the machinery base and the original pour of concrete with a pourable nonshrink grout. Grout and grouting procedure shall be in accordance with API 686, Chapter 4, paragraphs 3.6 and 3.7, and Chapter 5 and Section 432101.

3.19 PLACING SLURRY CEMENT BACKFILL

Place slurry cement backfill in a uniform manner that will prevent voids in, or segregation of, the backfill. Remove foreign material that falls into the excavation or trench. Do not commence backfilling over or place any material over the slurry cement backfill until at least four hours after placing the slurry cement backfill, except that when concrete sand is used for the aggregate and the in-place material is free draining, backfilling may commence as soon as the surface water is gone.

3.20 CONCRETE FINISHES

A. Complete concrete surfaces in accordance with the following schedule:

Finish Designation	Area Applied
F-1	Beams, columns, and exterior walls not exposed to view.
F-3	Beams, columns, and walls of structures exposed to view. Underside of formed floors or slabs.
F-4	Exterior and interior surfaces to be coated.
S-1	Slabs and floors to be covered with concrete or grout.
S-4	Slabs and floors of structures exposed to view or water bearing.
S-5	Slabs and floors at slopes greater than 10% and stairs.
E-1	Exposed edges. EXCEPTION: edges normally covered with earth.
E-2	Top of walls, beams, and similar unformed surfaces.

B. Finish F-1: Repair defective concrete, fill depressions deeper than 1/2 inch, and fill tie holes.

Finish F-3: In addition to Finish F-1, remove fins, fill depressions 1/4 inch or deeper, fill depressions and airholes with mortar. Dampen surfaces and then spread a slurry consisting of one part cement and one and one-half parts sand by damp loose volume, over the surface with clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap.

Finish F-4: Repair defective concrete, remove fins, fill depressions 1/16 inch or deeper, fill tie holes, remove mortar spatter, and remove bulges higher than 1/16 inch.

Finish S-1: Screed to grade without special finish.

Finish S-4: Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.

Finish S-5: Steel trowel finish without local depressions or high points. Apply a stiff bristle broom finish. Leave broom lines parallel to the direction of slope drainage.

Finish E-1: Provide chamfer or beveled edges.

Finish E-2: Strike smooth and float to an F-3 or F-4 finish.

3.21 CURING CONCRETE

A. Conform to ACI 308.

B. Water cure with burlap mats unless optional curing methods are permitted.

C. It is the responsibility of the Contractor to select the appropriate curing method in response to climatical and/or site conditions occurring at the time of concrete placement. Take appropriate measures as described in ACI 305 and 306 for protecting and curing concrete during hot and cold weather.

3.22 REPAIR OF DEFECTS AND CRACKS

A. Do not repair defects until concrete has been evaluated by the District's Representative.

B. Surface Defects:

1. Repair surface defects that are smaller than 1 foot across in any direction and are less than 1/2 inch in depth.

2. Repair by removing the honeycombed and other defective concrete down to sound concrete, cut or grind edges perpendicular to the surface and at least 3/8 inch deep, abrasive clean and thoroughly dampen the surface, work into the surface an epoxy bonding agent, and fill the hole with one part cement to one part fine sand. Match the finish on the adjacent concrete, and cure as specified.

C. Severe Defects:

1. Repair severe defects that are larger than surface defects but do not appear to affect the structural integrity of the structure.

2. Repair by removing the honeycombed and other defective concrete down to sound concrete, make edges of the repair area perpendicular to the surface, as required above, sandblast the sound concrete surface, coat the exposed surfaces with epoxy bonding compound, place nonshrink grout, match the finish on the adjacent concrete, and cure as specified.

D. Repair minor cracks in concrete structures that are wider than 1/10 inch by cutting out a square edged and uniformly aligned joint 3/8 inch wide by 3/4 inch deep, preparing exposed surfaces of the joint, priming the joint, and applying polyurethane joint sealant.

E. If the cracks are major, the District's Representative may require the concrete to be repaired by epoxy injection at no additional cost to the District.

F. Major Defects and Cracks: If the defects affect the structural integrity of the structure or if patching does not satisfactorily restore quality and appearance to the surface, the District's Representative may require the concrete to be removed and replaced, complete and at no additional cost to the District

3.23 ALUMINUM SURFACES IN CONTACT WITH CONCRETE

Coat aluminum surfaces in contact with concrete per Section 099000, System No. 54.

3.24 CONCRETE TESTS

A. Concrete quality testing will be performed on the concrete by an independent testing laboratory as follows:

1. Frequency of Sampling: Cast four concrete test cylinders from each 50 cubic yards, or fraction thereof, of each class of concrete placed in any one day. Sampling and curing of cylinders shall conform to ASTM C31.

2. Strength Testing: Test cylinders in accordance with ASTM C39. Test one cylinder at 7 days for information; test two cylinders at 28 days for acceptance; and hold one cylinder for verification. Strength acceptance will be based on the average of the strengths of the two cylinders tested at 28 days. If one cylinder of a 28-day test manifests evidence of improper sampling, molding, or testing, other than low strength, discard it and use the fourth cylinder for the test result.

3. Determine concrete slump by ASTM C143 with each strength test sampling and as required to establish consistency.

4. Determine air content of the concrete using ASTM C231 to verify the percentage of air in the concrete immediately prior to depositing in forms.

5. Every average of three consecutive concrete strength tests shall be equal to or greater than the specified 28-day strength. No test shall be less than 90% of the specified 28-day strength.

6. If the 28-day strength tests fail to meet the specified minimum compressive strength, the concrete will be assumed to be defective and one set of three cores from each area may be taken as selected by the District and in accordance with ASTM C42. If the average compressive strength of the set of three concrete cores

fails to equal 85% of the specified minimum compressive strength or if any single core is less than 75% of the minimum compressive strength, the concrete will be considered defective. The District may require additional coring, nondestructive load testing, or repair of defective concrete. Costs of coring, testing of cores, load testing, and required repairing pertaining thereto shall be paid by the Contractor at no extra cost to the district.

B. To facilitate concrete sampling and testing, the Contractor shall:

1. Furnish labor to assist the district in obtaining and handling samples at the project site.

2. Advise the District in advance of concrete placing operations to allow for scheduling and completion of quality testing.

3. Provide and maintain facilities for safe storage and proper curing of concrete test specimens on the project site, as required by ASTM C31.

END OF SECTION

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SECTION 034220 PRECAST CONCRETE VAULTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, design, and installation of precast concrete vaults and structures.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Ladders, Stairs, and Stair Nosings: 055100.

C. Grating, Cover Plates, and Access Hatches: 055300.

D. Earthwork: 312300.

E. Gravel and Crushed Rock Base for Structures: 312323.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit manufacturer's catalog data on precast concrete items. Show dimensions of vaults and thicknesses of walls, floors, and top slabs. Show reinforcing wire and steel. Show materials of construction by ASTM reference and grade.

C. Submit manufacturer's design calculations and certification signed and sealed by a professional civil or structural engineer registered in the state of California that vault design and construction comply with the specified design load conditions and the referenced ASTM specifications (e.g., ASTM C857 and C858).

PART 2 - MATERIALS

2.01 MANUFACTURERS

Precast concrete vaults shall be manufactured by Brooks Products Inc., Utility Vault Company, or equal.

2.02 PRECAST CONCRETE VAULTS

A. Precast concrete vaults shall comply with ASTM C858 except as modified herein.

B. Concrete and Reinforcing Steel shall conform to as per specifications 030500.

C. Design loads shall be in accordance with ASTM C857, except as modified herein. Traffic loads, unless otherwise stated, shall conform to Load Designation A-16 per Table 1. Soil lateral loads shall be as determined by ASTM C857 or loadings specified in the project soils report, whichever is greater. Alternate design by the strength design method shall include a load factor of 1.7 times the lateral earth or hydrostatic pressures.

D. Include the following load conditions in the design:

1. Vault roof removed while structure is backfilled to grade and subject to live and dead loads.

2. Vault roof in place and walls subject to simultaneous vertical and horizontal application of all live, impact, and dead loads. Include the case of an A-16-designated load placed directly above the wall.

E. Design shall also comply with the following restrictions:

1. The maximum reinforcement ratio allowed is one-half the reinforcement ratio that would produce a balanced strain condition.

2. Earth pressure shall be converted to a horizontal pressure using a coefficient of earth pressure at rest of 0.5 and not a coefficient of active earth pressure.

3. Include a live load surcharge of 2 feet of soil in the design of the walls.

F. Design all vaults to receive the specified traffic loading.

G. Precast vault construction shall be in the form of monolithic walls or horizontal wall sections; do not use panel walls.

H. Minimum wall thickness shall be 8 inches. Design knockout wall panels to accommodate loading pressures defined above.

I. Floor slab shall be as shown in the drawings.

J. Design joints using a butyl rubber sealant per ASTM C990.

2.03 SEALANTS AND MORTAR

Butyl rubber sealing compound shall comply with ASTM C990. Mortar shall comply with ASTM C387, Type S or use grout complying with Section 030500.

2.04 ACCESS HATCHES

A. Provide traffic-rated access hatches per Section 055300.

2.05 CEMENT

Cement shall be ASTM C150, Type II/V.

2.06 ADMIXTURES

Provide concrete admixtures as specified in Section 030500

2.07 CRUSHED ROCK BASE

Crushed rock base material shall comply with Section 312323.

PART 3 - EXECUTION

3.01 VAULT BASE

A. Excavate for the vault and install a crushed rock base per Section 312323, 12 inches thick.

B. Crushed rock base material shall extend 1 foot beyond the outside edge of the concrete vault base. Compact to 90%relative density.

3.02 SEALING AND GROUTING

Fill joints between precast sections with either a butyl rubber sealing compound or mortar.

3.03 INSTALLING VAULTS

A. After the excavation has been completed, level the area where the base section is to be installed. Fill and compact the base material and provide a level and solid foundation. Set the base such that water will drain toward the sumps.

B. Assemble the vault sections by lowering onto the preceding base or section. Set level and firmly position the base or preceding section before placing additional sections.

C. Set each precast concrete vault section plumb on a bed of sealant or cement mortar at least 1/2-inch thick to make a watertight joint with the concrete base and with the preceding unit. Remove foreign materials such as dirt, mud, and stones from joint surfaces. Apply grout or sealant such that no voids occur. Point the inside joint and wipe off the excess mortar or sealant.

D. If a misalignment of sections occurs during the installation, remove and reinstall the section. Do not reinstall damaged sections. If the sealing material is damaged, clean the joint surfaces before repairing or placing new sealing material.

3.04 BACKFILL AROUND VAULTS

Backfill and compact around the vaults using fill as specified in Section 312300.

END OF SECTION

SECTION 050520 BOLTS, WASHERS, ANCHORS, AND EYEBOLTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials and installation of anchor bolts, connecting bolts, washers, drilled anchors, epoxy anchors, screw anchors, eyebolts, and stainless-steel fasteners.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500

B. General Piping Requirements: 400500.

C. Pipe Hangers and Supports: 400764.

1.03 DESIGN CRITERIA

Structural Connections: AISC 360 – Specification for Structural Steel Buildings, latest edition, except that connection details are shown in the contract drawings.

1.04 SUBMITTALS

A. Submit manufacturer's catalog data and ICC reports for bolts, washers, and concrete anchors. Show dimensions and reference materials of construction by ASTM designation and grade.

PART 2 - MATERIALS

2.01 ANCHOR BOLTS

Anchor bolts shall be stainless steel conforming to ASTM F593, Type 316.

2.02 CONNECTION BOLTS

A. Steel connection bolts shall conform to ASTM A307, Grade A.

B. Provide galvanized bolts where shown in drawings. Galvanizing bolts, nuts, and washers shall be in accordance with ASTM F2329.

2.03 STAINLESS STEEL BOLTS

Stainless steel bolts shall be ASTM F593, Type 316. Use ASTM F594, Type 316 nuts with ASTM F593 bolts. Provide washer for each nut and bolthead. Washers shall be of the same material as the nuts.

2.04 LUBRICANT FOR STAINLESS STEEL BOLTS AND NUTS

Lubricant shall be chloride free and shall be RAMCO TG-50, Anti-Seize by RAMCO, Specialty Lubricants Corporation Husky™ Lube O'Seal, or equal.

2.05 HARDENED STEEL WASHERS

Washers for American Standard beams and channels shall be square or rectangular, tapered in thickness, smooth, hot-dipped galvanized, and conforming to ASTM F436.

2.06 PLAIN UNHARDENED STEEL AND STAINLESS-STEEL WASHERS

Washers shall comply with ASTM F844. Stainless steel washers shall be Type 316. Provide clipped washers where space limitations necessitate.

2.07 EPOXY ANCHORS

A. Epoxy anchors in concrete shall be Type 316 stainless steel threaded rod adhesive anchors. Adhesive shall be DeWalt Pure110+, Hilti HIT-RE 500 V3 (current standard), Simpson SET-3G, or approved equal. Epoxy anchor assemblies shall be ICC-ES approved and designed and installed in accordance with ACI 318 (Chapter 17 – Anchoring to Concrete).

PART 3 EXECUTION

3.01 STORAGE OF MATERIALS

Store material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 GALVANIZING

Zinc coating for carbon steel bolts and threaded parts shall be in accordance with ASTM F2329.

3.03 INSTALLING CONNECTION BOLTS

A. Use steel bolts to connect structural steel members. Use stainless steel bolts to connect structural stainless steel and structural aluminum members.

B. Install washers per AISC Specification for ASD.

C. Bolt holes in structural members shall be 1/16 inch in diameter larger than bolt size. Measure cast-in-place bolt locations in the field before drilling companion holes in structural steel beam or assembly.

D. Slotted holes, if required in the drawings, shall conform to AISC Specifications, Chapter J, Section J3, Table J3.1.

E. Drive bolts accurately into the holes without damaging the thread. Protect boltheads from damage during driving. Boltheads and nuts or washers shall rest squarely against the metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to the bolt axis, provide beveled washers to give full bearing to the head or nut. Where self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off.

F. Bolts shall be of the length that will extend entirely through but not more than 1/4 inch beyond the nuts. Draw boltheads and nuts tight against the work. Tap boltheads with a hammer while the nut is being tightened.

3.04 INSTALLING ANCHOR BOLTS

A. Preset bolts and anchors by the use of templates. For mechanical equipment (pumps, compressors, and blowers, etc), do not use concrete anchors set in holes drilled in the concrete after the concrete is placed.

B. For static items (storage tanks and heat exchangers, etc), use drilled anchors with ICC report data.

C. After anchor bolts have been embedded, protect projecting threads by applying grease and having the nuts installed until the time of installation of the equipment or metalwork.

D. Minimum depth of embedment of drilled mechanical anchors and screw anchors shall be as recommended by the manufacturer, but no less than that shown in the drawings.

E. Minimum depth of embedment of epoxy anchors shall be as recommended by the manufacturer, but no less than that shown in the drawings.

F. Prepare holes for drilled and epoxy anchors in accordance with the anchor manufacturer’s recommendations prior to installation.

G. Anchors subjected to seismic loads shall comply with ICC-ES seismic qualification (Category C, D, E, or F as applicable)

3.05 INSTALLATION OF STAINLESS STEEL BOLTS AND NUTS

Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

END OF SECTION

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SECTION 055100 LADDERS, STAIRS, AND STAIR NOSINGS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials, fabrication, and installation of ladders, stair nosings, and stair treads.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Bolts, Washers, Anchors, and Eyebolts: 050520.

C. Painting and Coating: 099000.

D. Grit Collecting Equipment: 444239.

1.03 DESIGN CRITERIA

Handrails, Walkways, Ladders, and Personnel Platforms: OSHA, State Safety Standards.

1.04 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit drawings of stairs, ladders, and stair nosings. Show dimensions and reference materials of construction by ASTM designation and grade.

PART 2 - MATERIALS

2.01 VERTICAL CAGE LADDERS

a. Fabricate ladder with cage as shown in the drawings. Ladder and cage shall be welded 304 stainless steel construction as indicated in the drawings. Minimum diameter of rungs shall be 1 inch. The distance between rungs, cleats, and steps shall not exceed 12 inches and shall be uniform throughout the length of the ladder. The minimum clear length of rungs or cleats shall be 18 inches.

b. The ladder shall be securely supported at the base and to the tank as shown on the Drawings.

2.02 WELDING ELECTRODES

A. Welding electrodes for stainless steel shall conform to AWS 5.4. Use Electrodes E308L for Type 304 stainless steel and E316 for Type 316 stainless steel.

PART 3 - EXECUTION

3.01 STORAGE OF MATERIALS

Store structural material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 INSTALLING LADDERS

Mount ladders to provide clearance in back of ladder so that the distance from the centerline of rungs, cleats, or steps to the nearest permanent object in back of the ladder shall be not less than 8 inches.

3.03 INSTALLING ANCHOR BOLTS

See Section 050520.

END OF SECTION

SECTION 055200 HANDRAILS AND SAFETY CHAINS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes the materials, fabrication, and installation of stainless-steel handrails and safety chains.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Grit Colleting Equipment: 444239.

1.03 DESIGN CRITERIA

Handrails, Walkways, Ladders, Personnel Platforms: OSHA, State Safety Standards.

1.04 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit drawings of handrail and safety chains. Show dimensions and reference materials of construction by ASTM designation and grade. Show design criteria.

C. Submit placing or erection drawings that indicate locations of handrail and safety chains. Reproductions of contract documents will not be accepted for this purpose.

PART 2 - MATERIALS

2.01 STAINLESS STEEL HANDRAILS

Construct stainless steel handrail of ASTM A312, Grade TP304L pipe of the sizes shown on the drawings.

2.02 STAINLESS STEEL HANDRAIL SAFETY CHAINS

Handrail safety chains shall be Type 304 stainless steel. Chains shall be proof coil style, 3/16 inch in diameter, with at least 12 links per foot and with snaphooks at each end. Snaphooks shall be Type 304 stainless steel.

2.03 WELDING ELECTRODES

A. Welding electrodes for stainless steel shall conform to AWS A5.4. Use Electrodes E308L for Type 304 stainless steel and E316L for Type 316 stainless steel.

PART 3 - EXECUTION

3.01 STORAGE OF MATERIALS

Store material above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 FABRICATION AND ERECTION

A. Clean the surfaces of metalwork to be in contact with concrete of rust, dirt, grease, and other foreign substances before placing concrete.

B. Set embedded metalwork accurately in position when concrete is placed and support it rigidly to prevent displacement or undue vibration during or after the placement of concrete. Unless otherwise specified, where metalwork is to be installed in recesses in formed concrete, said recesses shall be made, metalwork installed, and recesses filled with dry-pack mortar in conformance with Section 030500.

3.03 WELDING

A. Perform welding on stainless steel by the gas tungsten arc (TIG) process. Welds shall be full penetration and smooth. Provide inert gas on the inside of pipe during welding to reduce oxidation. Welding shall conform to AWS D1.6:2017-AMD1.

B. Provide a minimum of two passes for metal in excess of 5/16-inch thickness.

C. Produce weld uniform in width and size throughout its length with each layer of weldment smooth; free of slag, cracks, pinholes, and undercuttings; and completely fused to the adjacent weld beads and base metal. Avoid irregular surface, nonuniform bead pattern, and high crown. Form fillet welds of the indicated size of uniform height and fully penetrating. Accomplish repair, chipping, and grinding of welds in manner that will not gouge, groove, or reduce the base metal thickness.

3.04 INSTALLING HANDRAILS

Provide handrail components to complete the installation for the various types of handrail.

3.05 INSTALLING SAFETY CHAINS

Provide two chains 4 inches longer than the access opening for each opening. Mount the top chain 3 feet 6 inches above the floor, and mount the lower chain 2 feet above the floor.

END OF SECTION

SECTION 055300 GRATING, COVER PLATES, AND ACCESS HATCHES

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials, fabrication, and installation of steel grating, cover and floor plates, and aluminium access hatches.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Painting and Coating: 099000.

1.03 DESIGN CRITERIA

A. Grating, Floor Plates, and Miscellaneous Cover Plates: Design live load of 300 psf, maximum deflection of 1/240 of span.

B. Access Hatches: AASHTO H20 loading.

1.04 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit drawings of grating, cover plates, and access hatches. Show dimensions and reference materials of construction by ASTM designation and grade. Show design criteria.

C. Submit placing or erection drawings that indicate locations of fabricated items. Reproductions of contract documents will not be accepted for this purpose.

PART 2 - MATERIALS

2.01 DESIGN OF GRATING, FLOOR PLATES, AND MISCELLANEOUS COVER PLATES

A. Grating, floor plates, and miscellaneous cover plates shall be as detailed in the drawings or, if not detailed, shall be designed per subsection on “Design Criteria” in Part 1. No single piece of grating, floor plate, or miscellaneous cover plate shall weigh more than 80 pounds. Length of individual pieces shall not exceed one and one-half times the width, unless limited by the installation.

B. Field measure grating and cover plates for proper cutouts and size.

C. Grating shall be completely banded. For pipe and conduits (including electrical conduit) larger than 1 inch in diameter penetrating grating, cut and band grating before galvanizing.

2.02 STAINLESS STEEL PLATE AND MEMBERS

Except where otherwise specified, stainless steel plate and members shall be Type 316 or 316L, ASTM A240 or A666.

2.03 ALUMINUM SHEET

Aluminum sheet shall conform to ASTM B209, Alloy 3003, H 14 temper.

2.04 ALUMINIUM ACCESS HATCHES

A. Access hatches shall be U.S.F. Fabrications, Inc., Type THS or THD Aluminium or Bilco Type JAL of the size and configuration shown in the drawings. Access hatch doors and frames shall be fabricated from aluminum and painting shall be as per specifications. Latch and lifting mechanism assemblies, hold-open arms and guides, and brackets, hinges, pins, and fasteners shall be Type 316 stainless steel.

B. Locking and Latching Devices:

1. Recessed hasp covered by a hinged lid flush with the exterior surface.

2.05 GRATING

Grating shall be 316 welded steel. Main bars shall be of the thickness and depth indicated in the drawings.

2.06 CHECKERED COVER PLATES

Checkered cover plates shall be steel or stainless steel. Minimum thickness shall be as shown in the drawings. Provide U-bolt lifting handles located at opposite ends on each removable section. Handles shall be recessed to reduce tripping hazards. Steel plates, including angle edgings, support angles, and lifting handles, shall be stainless steel. Steel plates shall comply with ASTM A786. Stainless steel plates shall conform to ASTM A793, Pattern A, Grade S31600 or S31603.

2.07 FRAMES AND SUPPORTS FOR GRATING AND CHECKERED PLATES

Fabricated frames and supports for grating and checkered cover plates shall be stainless steel or as indicated in the drawings. Corners of embedded angle frames shall be mitered and welded with the welds ground smooth.

2.08 WELDING ELECTRODES

A. Welding electrodes for structural steel shall conform to AWS A5.1. Use electrodes in the E-70 series.

B. Welding electrode for aluminum shall be ER4043 filler metal.

C. Welding electrodes for stainless steel shall conform to AWS A5.4. Use electrodes as follows:

Stainless Steel Material	Welding Electrode Material
Type 304	E 308
Type 304L	E 347
Type 316	E 316
Type 316L	E 318

PART 3 - EXECUTION

3.01 STORAGE OF MATERIALS

Store structural material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 INSTALLATION AND ERECTION

A. Clean the surfaces of metalwork to be in contact with concrete of rust, dirt, grease, and other foreign substances before placing concrete.

B. Set grating seats and frames and checkered plate frames and supports accurately in position when concrete is placed and support it rigidly to prevent displacement or undue vibration during or after the placement of concrete. Unless otherwise specified, where metalwork is to be installed in recesses in formed concrete, said recesses shall be made, metalwork installed, and recesses filled with dry-pack mortar in conformance with Section 030500.

C. Set seat angles for grating so that the grating will be flush with the floor. Maintain the grating and floor plates flush with the floor. Seat angles and anchors shall be stainless steel or galvanized steel.

3.03 FASTENING

Fasten grating panels to supporting members two saddle clips at each end of each panel bolted to studs that are welded to supporting members. Bolt studs shall be 1/4 inch in diameter and of the same material as the supporting members. Saddle clips shall be the same material as the grating.

3.04 GALVANIZING

Zinc coating for plates, bolts, anchor bolts, and threaded parts shall be in accordance with ASTM A153 and F2329.

3.05 WELDING

A. Perform welding on steel by the SMAW process. Welding shall conform to AWS D1.1-2006, except as modified in AISC Section J2.

B. Perform welding on aluminum by the gas metal arc (MIG) or gas tungsten arc (TIG) process. Welding shall conform to AWS D1.2-2003.

C. Perform welding on stainless steel by the gas tungsten arc (TIG) process. Welds shall be full penetration and smooth. Provide inert gas on the inside of pipe during welding to reduce oxidation.

D. Provide a minimum of two passes for metal in excess of 5/16-inch thickness.

E. Produce weld uniform in width and size throughout its length with each layer of weldment smooth; free of slag, cracks, pinholes, and undercuttings; and completely fused to the adjacent weld beads and base metal. Avoid irregular surface, nonuniform bead pattern, and high crown. Form fillet welds of the indicated size of uniform height and fully penetrating. Accomplish repair, chipping, and grinding of welds in manner that will not gouge, groove, or reduce the base metal thickness.

3.06 REPAIR OF GALVANIZED SURFACES

Repair or replace metal with damaged galvanized surfaces at no additional cost to the Owner. Repair galvanized surfaces per Section 099000, System No. 55.

3.07 CORROSION PROTECTION OF ALUMINUM SURFACES

A. Coat aluminum surfaces to be embedded or which will be in contact with concrete or masonry per Section 099000, System No. 54 before installation. Allow the coating to dry before the aluminum is placed in contact with the concrete.

B. Where aluminum surfaces come in contact with dissimilar metals, keep the dissimilar metallic surfaces from direct contact by use of neoprene gaskets or washers.

END OF SECTION

SECTION 099000 PAINTING AND COATING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and application of painting and coating systems for the following surfaces:

A. Submerged metal.

B. Exposed metal.

C. Buried metal.

D. PVC.

E. Metal in contact with concrete.

F. Exterior architectural coatings and finishes.

G. Interior architectural coatings and finishes.

It does not include coating steel water tanks and reservoirs.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Coal-Tar Multiwrap Coating (AWWA C203)

C. Polyethylene Tape Coating (AWWA C214)

D. Extruded Polyolefin Pipe Coating (AWWA C215)

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit manufacturer’s data sheets showing the following information:

1. Percent solids by volume.

2. Minimum and maximum recommended dry-film thickness per coat for prime, intermediate, and finish coats.

3. Recommended surface preparation.

4. Recommended thinners.

5. Statement verifying that the specified prime coat is recommended by the manufacturer for use with the specified intermediate and finish coats.

6. Application instructions including recommended equipment and temperature limitations.

7. Curing requirements and instructions.

C. Submit color swatches.

D. Submit certificate and supplier's data sheets identifying the type and gradation of abrasives used for surface preparation. The certificate or data sheets shall specifically identify that the abrasives comply with federal and state of California regulations for materials to be used for abrasive blasting for surface preparation for paints and coatings.

E. Submit material safety data sheets for each coating.

PART 2 - MATERIALS

2.01 PAINTING AND COATING SYSTEMS

The following index lists the various painting and coating systems by service and generic type:

PAINT COATINGS SYSTEM INDEX

No.	**Title**	**Generic Coating**
Submerged Metal Coating Systems		
1.	Submerged Metal, Raw Water (Nonpotable) or Raw Sewage	Epoxy
7.	Submerged Metal, Potable or Nonpotable Water	Epoxy
Exposed Metal Coating Systems		
9.	Metal Under Thermal Insulation	Phenolic Epoxy
10.	Exposed Metal, Corrosive Environment	High-build epoxy (two-coat system) with polyurethane topcoat
13.	Exposed Metal, Corrosive Environment	Epoxy with urethane topcoat
Buried Metal Coating Systems		
21.	Buried Metal	Epoxy
24.	Buried Metal	Corrosion-resisting grease

Coating Systems for Nonferrous Metals		
54.	Aluminum Insulation from Concrete and Carbon Steel	Epoxy
55.	Repair of Galvanized Surfaces	Cold galvanizing compound

These systems are specified in detail in the following paragraphs. For each coating, the required surface preparation, prime coat, intermediate coat (if required), topcoat, and coating thicknesses are described. Mil thicknesses shown are minimum dry-film thicknesses.

2.02 SUBMERGED METAL COATING SYSTEMS

A. System No. 1--Submerged Metal—Raw Water (Nonpotable) or Raw Sewage:

Type: Epoxy having a minimum volume solids of 80%.

Service Conditions: For use with metal pipes or structures (such as scum troughs, sluice gates, or piping) alternately submerged in raw sewage or raw water (nonpotable) and exposed to a moist saturated hydrogen sulfide atmosphere, as in raw sewage wet wells. Minimum temperature resistance of the coating shall be 140°F for moist heat conditions.

Surface Preparation: SSPC SP-10.

Prime Coat: Devoe Bar-Rust 233H, 8 mils; or equal.

Finish Coat: Devoe Bar-Rust 233H, 8 mils; or equal.

B. System No. 7--Submerged Metal, Potable or Nonpotable Water:

Type: Epoxy.

Service Conditions: For use with structures, valves, piping, or equipment immersed in potable or nonpotable water.

Surface Preparation: SSPC SP-10.

Coating System: Apply the manufacturer’s recommended number of coats to attain the specified minimum dry-film coating thickness. Products: Devoe Bar-Rust 233H, Scotchkote 323, or equal; 20 mils total. Color of topcoat: white. Each coat shall be different color than the one preceding it.

2.03 EXPOSED METAL COATING SYSTEMS

A. System No. 9--Metal Under Thermal Insulation (250°F):

Type: Phenolic epoxy, epoxy amine, or MIO-filled epoxy phenolic Novalac having a minimum volume solids of 60%.

Service Conditions: For use on the exterior of steel, stainless steel, and ductile-iron piping covered with thermal insulation, in which the dry temperature does not exceed 250°F and the wet temperature does not exceed 180°F.

Surface Preparation: SSPC SP-10.

B. System No. 10--Exposed Metal, Corrosive Environment:

Type: High-build epoxy intermediate coat having a minimum volume solids of 60%, with an inorganic zinc prime coat and a pigmented polyurethane finish coat having a minimum volume solids of 52%.

Service Conditions: For use with metal structures or pipes subjected to water condensation; chemical fumes, such as hydrogen sulfide; salt spray; and chemical contact.

Surface Preparation: SSPC SP-10.

Prime Coat: Self-curing, two-component inorganic zinc-rich coating recommended by the manufacturer for overcoating with a high-build epoxy finish coat. Minimum zinc content shall be 12 pounds per gallon. Apply to a thickness of 3 mils. Products: Tnemec 90E-92, Devoe Catha-Coat 304 or 304V, International Interzinc 22HS, PPG Dimetcote 9HS, Carboline Carbozinc 11HS, Sherwin-Williams Zinc-Clad II Plus, or equal.

Intermediate Coat: Tnemec 104, Devoe Devran 224HS or 231, International Interseal 670HS, PPG Amercoat 385, Carboline Carboguard 890, Sherwin-Williams Macropoxy 646 B58-600, PPG PITT-GUARD® Direct-to-Rust Epoxy Mastic Coating 97-145 series, or equal; 5 mils.

Finish Coat: Two-component pigmented acrylic or aliphatic polyurethane recommended by the manufacturer for overcoating a high-build epoxy coating. Apply to a thickness of at least 2 mils. Products: Tnemec Series 1075, Devoe Devthane 379, International Interline 990HS, PPG Amercoat 450HS, Carboline 134HG, Sherwin-Williams Hi-Solids Polyurethane B65-300, PPG PITTHANE® Ultra Gloss Urethane Enamel 95-812 series, or equal.

C. System No. 13--Exposed Metal, Corrosive Environment:

Type: High-build epoxy prime coat with a pigmented high-build aliphatic or acrylic polyurethane finish coat.

Service Conditions: For use with metal structures or pipes subjected to water condensation; chemical fumes, such as hydrogen sulfide; salt spray; and chemical contact.

Surface Preparation: SSPC SP-10.

Prime Coat: Two-component high-build epoxy. Apply to a thickness of 8 mils. Products: PPG Amerlock 400, Devoe 235, Tnemec 104, International Interseal 670HS, Carboline

890 or 890LT, Sherwin-Williams Macropoxy 646 B58-600, PPG PITT-GUARD® Direct-to-Rust Epoxy Mastic Coating 97-145 series, or equal.

Finish Coat: Two-component pigmented high-build polyurethane. Apply one or more coats to a total thickness of 5 mils. Products: PPG "Amershield," Devoe Devthane 359, Tnemec Series 1075, International Interthane 990HS, Carboline 134HG, Sherwin-Williams Hi-Solids Polyurethane B65-300 series, PPG PITTHANE® Ultra Gloss Urethane Enamel 95-812 series, or equal.

D. System No. 15--Exposed Metal, Atmospheric Weathering or Water Condensation Environment:

Type: Gloss alkyd enamel having a minimum volume solids content of 46% with alkyd primer.

Service Conditions: For use on interior and exterior metal and piping subject to sunlight, weathering, humidity, or water condensation.

Surface Preparation: SSPC SP-6.

Prime Coat: Carboline Carbocoat 150 Universal Primer, Devoe 4140, Tnemec Primer Series V10, PPG Amercoat 5105, International Interlac 260HS, Sherwin-Williams Kem-Bond HS B50NZ series, PPG SPEEDHIDE® Int/Ext Rust Inhibitive Steel Primer 6-208 series, or equal, applied to minimum dry-film thickness of two mils.

Finish Coat: Two coats of Carboline Carbocoat 139, two coats of Devoe 4348, two coats of Tnemec Series 2H, two coats of PPG Amercoat 5450, two coats of International Interlac 820, two coats of Sherwin-Williams Industrial Enamel B54Z series, two coats of PPG MetalMax Int/Ext Gloss Alkyd 7-914 series, or equal. Apply to a minimum dry-film thickness of 1.5 mils per coat.

2.04 BURIED METAL COATING SYSTEMS

A. System No. 21--Buried Metal:

Type: High solids epoxy or phenolic epoxy having a minimum volume solids of 80% (ASTM D2697).

Service Conditions: Buried metal, such as valves, flanges, bolts, nuts, structural steel, and fittings.

Surface Preparation: SSPC SP-10.

Coating System: Apply three or more coats of PPG Amerlock 400 or 400VOC, Tnemec 104HS or 80, Devoe Bar-Rust 233H, Carboline 890LT, Sherwin-Williams Tank Clad HS B62-80 series, or equal; 30 mils total. Maximum thickness of an individual coating shall not exceed the manufacturer's recommendation.

B. System No. 24--Buried Metal:

Type: Corrosion-resisting grease.

Service Conditions: Buried metal, such as bolts, bolt threads, tie rods, and nuts.

Surface Preparation: SSPC SP-3 or SP-6.

Coating: NO-OX-ID GG-2 as manufactured by Sanchem, Inc. Apply to a minimum thickness of 1/4 inch.

2.05 COATING SYSTEMS FOR NONFERROUS METALS

A. System No. 54--Aluminum Insulation from Concrete and Carbon Steel:

Type: High solids epoxy or phenolic epoxy having a minimum volume solids of 80% (ASTM D2697).

Service Conditions: Coat areas of aluminum grating, stairs, structural members or aluminum fabrications, in contact with concrete or carbon steel with this system.

Surface Preparation: Solvent or steam cleaning per SSPC SP-1; do not use alkali cleaning. Then dust blast.

Coating System: Apply three or more coats of PPG Amerlock 400 or 400VOC, Tnemec Series 135, Devoe Bar-Rust 233H, Sherwin-Williams Macropoxy B58-600, PPG PITT-GUARD® Direct-to-Rust Epoxy Mastic Coating 97-145 series, or equal; 30 mils total. Maximum thickness of an individual coating shall not exceed the manufacturer's recommendation.

B. System No. 55--Repair of Galvanized Steel Surfaces:

Type: Cold galvanizing compound consisting of paint containing oils, solvents, and zinc dust and complying with MIL-P-21035. Minimum metallic zinc content in the cured coating shall be 90%.

Service Conditions: Repair of damaged galvanized coatings on steel surfaces.

Surface Preparation: Clean damaged surfaces per SSPC SP-1 and SP-11.

Coating System: Apply Z.R.C. Galvanizing Compound, RAMCO Specialty Products "Zinckit," NuWave "Galv-Match-Plus," Devcon "Cold Galvanizing," Clearco "Cold Galvanizing Spray," or equal to a minimum dry-film thickness of 3 mils. Apply per ASTM A780, Annex A2.

PART 3 - EXECUTION

3.01 WEATHER CONDITIONS

A. Do not paint in the rain, wind, snow, mist, and fog or when steel or metal surface temperatures are less than 5°F above the dew point.

B. Do not apply paint when the relative humidity is above 85%.

C. Do not paint when temperature of metal to be painted is above 120°F.

D. Do not apply alkyd, inorganic zinc, silicone aluminum, or silicone acrylic paints if air or surface temperature is below 40°F or expected to be below 40°F within 24 hours.

E. Do not apply epoxy, acrylic latex, and polyurethane paints on an exterior or interior surface if air or surface temperature is below 60°F or expected to drop below 60°F in 24 hours.

3.02 SURFACE PREPARATION PROCEDURES

A. Remove oil and grease from metal surfaces in accordance with SSPC SP-1. Use clean cloths and cleaning solvents and wipe dry with clean cloths. Do not leave a film or greasy residue on the cleaned surfaces before abrasive blasting.

B. Remove weld spatter and weld slag from metal surfaces and grind smoothly rough welds, beads, peaked corners, and sharp edges including erection lugs in accordance with SSPC SP-2 and SSPC SP-3. Grind 0.020 inch (minimum) off the weld caps on pipe weld seams. Grind outside sharp corners, such as the outside edges of flanges, to a minimum radius of 1/4 inch.

C. Do not abrasive blast or prepare more surface area in one day than can be coated in one day; prepare surfaces and apply coatings the same day. Remove sharp edges, burrs, and weld spatter.

D. For carbon steel, do not touch the surface between the time of abrasive blasting and the time the coating is applied. Apply coatings within two hours of blasting or before any rust bloom forms.

E. Surface preparation shall conform with the SSPC specifications as follows:

Solvent Cleaning	SP-1
Hand Tool Cleaning	SP-2
Power Tool Cleaning	SP-3
White Metal Blast Cleaning	SP-5
Commercial Blast Cleaning	SP-6
Brush-Off Blast Cleaning	SP-7
Pickling	SP-8
Near-White Blast Cleaning	SP-10
Power Tool Cleaning to Bare Metal	SP-11
Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating	SP-12
Surface Preparation of Concrete	SP-13

F. Wherever the words “solvent cleaning,” “hand tool cleaning,” “wire brushing,” or “blast cleaning” or similar words are used in these specifications or in paint manufacturer’s specifications, they shall be understood to refer to the applicable SSPC (Society for Protective Coatings), surface preparation specifications listed above.

G. Brush-off blasting of concrete and masonry surfaces is defined as opening subsurface holes and voids and etching the surface for a coating to bond.

H. For carbon steel surfaces, after abrasive blast cleaning, the height of the surface profile shall be 2 to 3 mils. Verify the surface profile by measuring with an impresser tape acceptable to the Owner’s Representative. Perform a minimum of one test per 100 square feet of surface area. Testing shall be witnessed by the Owner’s Representative. The impresser tape used in the test shall be permanently marked with the date, time, and locations where the test was made. Test results shall be promptly presented to the Owner’s Representative.

I. Do not apply any part of a coating system before the Owner’s Representative has reviewed the surface preparation. If coating has been applied without this review, if directed by the Owner’s Representative, remove the applied coating by abrasive blasting and reapply the coat in accordance with this specification.

3.03 ABRASIVE BLAST CLEANING

A. Use dry abrasive blast cleaning for metal surfaces. Do not use abrasives in automatic equipment that have become contaminated. When shop or field blast cleaning with handheld nozzles, do not recycle or reuse blast particles.

B. After abrasive blast cleaning and prior to application of coating, dry clean surfaces to be coated by dusting, sweeping, and vacuuming to remove residue from blasting. Apply the specified primer or touch-up coating within the period of an eight-hour working day. Do

not apply coating over damp or moist surfaces. Reclean prior to application of primer or touch-up coating any blast cleaned surface not coated within said eight-hour period.

C. Keep the area of the work in a clean condition and do not permit blasting particles to accumulate and constitute a nuisance or hazard.

D. During abrasive blast cleaning, prevent damage to adjacent coatings. Schedule blast cleaning and coating such that dust, dirt, blast particles, old coatings, rust, mill scale, etc., will not damage or fall upon wet or newly coated surfaces.

3.04 PREPARATION OF CONCRETE AND MASONRY SURFACES TO BE COATED

A. Surface preparation of concrete and masonry surfaces shall be in accordance with SSPC SP-13 and the following.

B. Do not apply coating until concrete has cured at least 30 days. Finish concrete surfaces per Section 030500. Do not use curing compound on surfaces that are to be coated.

C. Concrete and masonry surfaces on which coatings are to be applied shall be of even color, gray or gray-white. The surface shall have no pits, pockets, holes, or sharp changes of surface elevation. Scrubbing with a stiff-bristle fiber brush shall produce no dusting or dislodging of cement or sand. Sprinkling water on the surface shall produce no water beads or standing droplets. Concrete and masonry shall be free of laitance and slick surfaces.

D. Detergent clean the concrete or masonry surface with trisodium phosphate per ASTM D4258. Then sandblast surfaces (brush-off blast). Floor slabs may be acid etched per ASTM D4260 in lieu of sandblasting. After sandblasting, wash surfaces with water to remove dust and salts, per ASTM D4258 or D4261. The grain of the concrete surface to touch shall not be rougher than that of No. 10 mesh sand.

E. Do not apply coatings to concrete when the concrete is outgassing. Apply coatings only when the concrete surface temperature is stable, not rising.

3.05 PROCEDURES FOR ITEMS HAVING SHOP-APPLIED PRIME COATS

A. After application of primer to surfaces, allow coating to cure for a minimum of two hours before handling to minimize damage.

B. When loading for shipment to the project site, use spacers and other protective devices to separate items to prevent damaging the shop-primed surfaces during transit and unloading. If wood spacers are used, remove wood splinters and particles from the shop-primed surfaces after separation. Use padded chains or ribbon binders to secure the loaded items and minimize damage to the shop-primed surfaces.

C. Cover shop-primed items 100% with protective coverings or tarpaulins to prevent deposition of road salts, fuel residue, and other contaminants in transit.

D. Handle shop-primed items with care during unloading, installation, and erection operations to minimize damage. Do not place or store shop-primed items on the ground or on top of other work unless ground or work is covered with a protective covering or tarpaulin. Place shop-primed items above the ground upon platforms, skids, or other supports.

3.06 FIELD TOUCH-UP OF SHOP-APPLIED PRIME COATS

A. Remove oil and grease surface contaminants on metal surfaces in accordance with SSPC SP-1. Use clean rags wetted with a degreasing solution, rinse with clean water, and wipe dry.

B. Remove dust, dirt, salts, moisture, chalking primers, or other surface contaminants that will affect the adhesion or durability of the coating system. Use a high-pressure water blaster or scrub surfaces with a broom or brush wetted with a solution of trisodium phosphate, detergent, and water. Before applying intermediate or finish coats to inorganic zinc primers, remove any soluble zinc salts that have formed by means of scrubbing with a stiff bristle brush. Rinse scrubbed surfaces with clean water.

C. Remove loose or peeling primer and other surface contaminants not easily removed by the previous cleaning methods in accordance with SSPC SP-7. Take care that remaining primers are not damaged by the blast cleaning operation. Remaining primers shall be firmly bonded to the steel surfaces with blast cleaned edges feathered.

D. Remove rust, scaling, or primer damaged by welding or during shipment, storage, and erection in accordance with SSPC SP-10. Take care that remaining primers are not damaged by the blast cleaning operation. Areas smaller than 1 square inch may be prepared per SSPC SP-11. Remaining primers shall be firmly bonded to the steel surfaces with cleaned edges feathered.

E. Use repair procedures on damaged primer that protects adjacent primer. Blast cleaning may require the use of lower air pressure, smaller nozzles, and abrasive particle sizes, short blast nozzle distance from surface, shielding, and/or masking.

F. After abrasive blast cleaning of damaged and defective areas, remove dust, blast particles, and other debris by dusting, sweeping, and vacuuming; then apply the specified touch-up coating.

G. Other surfaces that are shop primed shall receive a field touch-up of the same primer used in the original prime coat.

3.07 PAINTING SYSTEMS

A. All materials of a specified painting 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 paint manufacturer for the particular coating system.

B. Deliver paints to the jobsite in the original, unopened containers.

3.08 PAINT STORAGE AND MIXING

A. Store and mix materials only in areas designated for that purpose by the Owner's Representative. The area shall be well-ventilated, with precautionary measures taken to prevent fire hazards. Post "No Smoking" signs. Storage and mixing areas shall be clean and free of rags, waste, and scrapings. Tightly close containers after each use. Store paint at an ambient temperature from 50°F to 100°F.

B. Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch-up painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

3.09 PROCEDURES FOR THE APPLICATION OF COATINGS

A. Conform to the requirements of SSPC PA-1. Follow the recommendations of the coating manufacturer including the selection of spray equipment, brushes, rollers, cleaners, thinners, mixing, drying time, temperature and humidity of application, and safety precautions.

B. Stir, strain, and keep coating materials at a uniform consistency during application. Power mix components. For multiple component materials, premix each component before combining. Apply each coating evenly, free of brush marks, sags, runs, and other evidence of poor workmanship. Use a different shade or tint on succeeding coating applications to indicate coverage where possible. Finished surfaces shall be free from defects or blemishes.

C. Do not use thinners unless recommended by the coating manufacturer. If thinning is allowed, do not exceed the maximum allowable amount of thinner per gallon of coating material. Stir coating materials at all times when adding thinner. Do not flood the coating material surface with thinner prior to mixing. Do not reduce coating materials more than is absolutely necessary to obtain the proper application characteristics and to obtain the specified dry-film thicknesses.

D. Remove dust, blast particles, and other debris from blast cleaned surfaces by dusting, sweeping, and vacuuming. Allow ventilator fans to clean airborne dust to provide good visibility of working area prior to coating applications. Remove dust from coated surfaces by dusting, sweeping, and vacuuming prior to applying succeeding coats.

E. Apply coating systems to the specified minimum dry-film thicknesses as determined per SSPC PA-2.

F. Apply primer immediately after blast cleaning and before any surface rusting occurs, or any dust, dirt, or any foreign matter has accumulated. Reclean surfaces by blast cleaning that have surface colored or become moist prior to coating application.

G. Apply a brush coat of primer on welds, sharp edges, nuts, bolts, and irregular surfaces prior to the application of the primer and finish coat. Apply the brush coat prior to and in conjunction with the spray coat application. Apply the spray coat over the brush coat.

H. Before applying subsequent coats, allow the primer and intermediate coats to dry for the minimum curing time recommended by the manufacturer. In no case shall the time between coats exceed the manufacturer's recommendation.

I. Each coat shall cover the surface of the preceding coat completely, and there shall be a visually perceptible difference in applied shade or tint of colors.

J. Applied coating systems shall be cured at 75°F or higher for 48 hours. If temperature is lower than 75°F, curing time shall be in accordance with printed recommendations of the manufacturer, unless otherwise allowed by the Owner's Representative.

K. Assembled parts shall be disassembled sufficiently before painting or coating to ensure complete coverage by the required coating.

3.10 SURFACES NOT TO BE COATED

Do not paint the following surfaces unless otherwise noted in the drawings or in other specification sections. Protect during the painting of adjacent areas:

A. Concrete walkways.

B. Mortar-coated pipe and fittings.

C. Stainless steel.

D. Metal letters.

E. Glass.

F. Roofings.

G. Fencing.

H. Electrical fixtures except for factory coatings.

I. Nameplates.

J. Grease fittings.

K. Brass and copper, submerged.

L. Buried pipe, unless specifically required in the piping specifications.

M. Fiberglass items, unless specifically required in the FRP specifications.

N. Aluminum handrail, stairs, and grating.

3.11 PROTECTION OF SURFACES NOT TO BE PAINTED

Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Mask openings in motors to prevent paint and other materials from entering the motors.

3.12 SURFACES TO BE COATED

The exact coating to be applied in any location is not designated by the descriptive phrases in the coating system titles such as “corrosive environment,” “buried metal,” or “submerged metal.” Coat surfaces with the specific coating systems as described below:

Coat mechanical equipment, such as pumps, blowers, etc. as described in the various mechanical equipment specifications.

3.13 DRY-FILM THICKNESS TESTING

A. Measure coating thickness specified for carbon steel surfaces with a magnetic-type dry-film thickness gauge in accordance with SSPC PA-2. Measure coating thickness specified for stainless steel, aluminum, and copper surfaces with an eddy-current type thickness gauge per ASTM D7091. Provide certification that the gauge has been calibrated by a certified laboratory within the past six months. Provide dry-film thickness gauge as manufactured by Mikrotest or Elcometer.

B. Test the finish coat of metal surfaces (except zinc primer and galvanizing) for holidays and discontinuities with an electrical holiday detector, low-voltage, wet-sponge type. Provide measuring equipment. Provide certification that the gauge has been calibrated by a certified laboratory within the past six months. Provide detector as manufactured by Tinker and Rasor or K-D Bird Dog.

C. Measure coating thickness specified for concrete or masonry surfaces in accordance with ASTM D4138. Test the finish coat of concrete and masonry surfaces in accordance with NACE SP0188-2006 or ASTM D4787. Patch coatings at the points of thickness measurement or holiday detection.

D. Check each coat for the correct dry-film thickness. Do not measure within eight hours after application of the coating.

E. For metal surfaces, make five separate spot measurements (average of three readings) spaced evenly over each 100-square feet of area (or fraction thereof) to be measured. Make three readings for each spot measurement of either the substrate or the paint. Move the probe or detector a distance of 1 to 3 inches for each new gauge reading. Discard any unusually high or low reading that cannot be repeated consistently. Take the average (mean) of the three readings as the spot measurement. The average of five spot measurements for each such 100-square-foot area shall not be less than the specified thickness. No single spot measurement in any 100-square-foot area shall be less than 80%, nor more than 120%, of the specified thickness. One of three readings which are averaged to produce each spot measurement may underrun by a greater amount as defined by SSPC PA-2.

F. For concrete surfaces, make five separate spot measurements spaced evenly over each 100 square feet of area (or fraction thereof) to be measured. The average of five spot measurements for each such 100-square-foot area shall not be less than the specified thickness. No single spot measurement in any 100-square-foot area shall be less than 80%, nor more than 120%, of the specified thickness.

G. Perform tests in the presence of the Owner's Representative.

3.14 REPAIR OF IMPROPERLY COATED SURFACES

If the item has an improper finish color or insufficient film thickness, clean and topcoat the surface with the specified paint material to obtain the specified color and coverage. Sandblast or power-sand visible areas of chipped, peeled, or abraded paint, feathering the edges. Then prime and finish coat in accordance with the specifications. Work shall be free of runs, bridges, shiners, laps, or other imperfections.

3.15 CLEANING

A. During the progress of the work, remove discarded materials, rubbish, cans, and rags at the end of each day's work.

B. Thoroughly clean brushes and other application equipment at the end of each period of use and when changing to another paint or color.

C. Upon completion of painting work, remove masking tape, tarps, and other protective materials, using care not to damage finished surfaces.

END OF SECTION

SECTION 099720 CHEMICAL-RESISTANT COATINGS FOR CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of a chemical-resistant coating for concrete subject to corrosive environments.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Painting and Coating: 099000.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with Section 013300.

B. Submit manufacturer's data sheets showing the following information:

1. Percent solids by volume of coating compound.

2. Number of coats required to give the specified dry thickness.

3. Minimum recommended dry thickness per coat for prime, intermediate, and finish coats.

4. Recommended surface preparation.

5. Recommended surface tensile strength of the concrete surface.

6. Application instructions including recommended equipment and temperature limitation.

7. Curing requirements and instructions.

C. Submit color swatches.

D. Submit certificate and supplier’s data sheets identifying the type and gradation of abrasives used for surface preparation. The certificate or data sheets shall specifically identify that the abrasives comply with federal and state of California regulations for materials to be used for abrasive blasting for surface preparation for paints and coatings.

E. Submit material safety data sheets for each coating.

PART 2 - MATERIALS

2.01 POLYURETHANE

A. Coating system shall be a two-component, minimum 100% solids, polyurethane or polyurethane elastomer, with primer.

B. Characteristics shall be as follows:

1. Tensile Strength on Concrete: 2,500 psi (minimum) per ASTM D412.

2. Flexibility: No effect bending 0.50 mm plate with 30-mil coating over 1/8-inch mandrel per ASTM D1737 or no effect bending 180 degrees over 1-inch mandrel with 15-mil coating per ASTM D522.

3. Elongation: 50% (minimum) recoverable, per ASTM D412.

4. Surface Hardness: 57 minimum, Shore "D" per ASTM D2240.

5. Abrasion Resistance: Weight loss of 80 mg (maximum) on Taber abraser, CS-17 wheel, 1,000 grams, 1,000 cycles per ASTM D4060.

C. Products: Utilithane 1600 as manufactured by Prime Coatings Inc; Sancon 100 as manufactured by Sancon Engineering Inc.; or equal.

D. Apply prime coat and finish coats to give a total dry coating thickness of at least 125 mils on walls and floor slabs.

2.02 ABRASIVES FOR SURFACE PREPARATION OF CONCRETE

Abrasives used for preparation of concrete surfaces shall be medium grade “Black Beauty” abrasive as manufactured by Reed Minerals, or equal. Silica sand will not be accepted.

PART 3 - EXECUTION

3.01 COATING SYSTEM

A. Materials 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.

B. Deliver coatings to the jobsite in the original, unopened containers.

3.02 PROTECTION OF SURFACES NOT TO BE COATED

Remove, mask, or otherwise protect surfaces not intended to be coated. Provide drop cloths to prevent coating materials from falling on or marring adjacent surfaces. Protect

working parts of mechanical and electrical equipment from damage during surface preparation and coating process. Mask openings in motors to prevent coating and other materials from entering the motors.

3.03 WEATHER CONDITIONS

A. Do not coat in the rain, wind, snow, mist, and fog or when surface temperatures are less than 5°F above the dew point.

B. Do not apply coatings when the relative humidity is above 85% or the temperature is above 90°F.

C. Do not coat when temperature of concrete to be painted is above 120°F.

D. Do not apply coatings if air or surface temperature drops below or is expected to drop below the manufacturer's recommended minimum temperature in a 24 hour period.

3.04 SURFACE PREPARATION

A. Surface preparation of concrete surfaces shall be in accordance with SSPC SP-13 and the following.

B. Do not apply coating until concrete has cured at least 30 days. Finish concrete surfaces per Section 030500. Do not use lubricants or release agents on tools. Do not use curing compound on surfaces that are to be coated.

C. Concrete surfaces on which coating is to be applied shall be of even color, gray or gray-white. The surface shall have no pits, pockets, holes, or sharp changes of surface elevation. Scrubbing with a stiff-bristle fiber brush shall produce no dusting or dislodging of cement or sand. Sprinkling water on the surface shall produce no water beads or standing droplets. Concrete and masonry shall be free of laitance and slick surfaces. The grain of the concrete surface to touch shall not be rougher than that of No. 10 mesh sand.

D. Repair existing deteriorated concrete as directed by Owner's Representative and per Section 030500, Finish F-4. Fill spalled areas with grout to provide a surface level with the surrounding area.

E. All existing concrete surfaces to be lined shall be waterblasted to remove all deteriorated concrete, oil, grease, or existing coating to produce sound and clean concrete. Wasterblasting equipment shall be capable of 10,000 psi. Cleaning shall be accomplished with a minimum of 5,000 psi using no detergents, solvents, or chemicals of any kind.

F. All debris produced from waterblasting operation shall be removed from the structure prior to coating. No debris shall be allowed to enter the sewer system.

G. Any surfaces subject to immersion shall be abrasive blasted. Abrasive blast surfaces (brush-off blast) per ASTM D4259 and Section E. After sandblasting, wash surfaces with water to remove dust and salts, per ASTM D4258 or D4261. Concrete surfaces shall be air-dried prior to lining application.

H. Do not apply coatings to concrete when the concrete is outgassing. Apply coatings only when the concrete surface temperature is stable, not rising.

3.05 ABRASIVE BLAST CLEANING

A. Use dry abrasive blast cleaning material. When field blast cleaning with hand-held nozzles, do not recycle or reuse blast particles.

B. After blast cleaning and prior to application of coating, dry clean surfaces to be coated by dusting, sweeping, and vacuuming to remove residue from blasting. Apply the specified primer or touch-up coating within the period of an eight-hour working day. Do not apply coating over damp or moist surfaces. Reclean prior to application of primer or touch-up coating any blast-cleaned surface not coated within said eight-hour period.

C. Keep the area of the work in a clean condition, and do not permit blasting particles to accumulate and constitute a nuisance or hazard.

D. During sandblast cleaning, prevent damage to adjacent coatings. Schedule blast cleaning and coating such that dust, dirt, blast particles, old coatings, rust, mill scale, etc., will not damage or fall upon wet or newly coated surfaces.

3.06 COATING APPLICATION

A. Lining application shall be performed only by workmen trained and experienced with the specified material. Provide proof of such experience with the bid documents. Proof shall include a list of similar projects using the specified material.

B. Apply the lining through plural component equipment specifically designed and approved by the manufacturer of the lining material. The equipment shall be in good working order to ensure correct proportioning and mixing of the components.

C. Apply the lining to specified thickness in one continuous coat. The lining shall be free of seams, holes, bubbles, or defects. All areas in question shall be removed, reworked, and patched.

D. For manholes, the lining shall be installed on the entire manhole concrete interior, including shelves, except for the formed channel surface. For wet wells, the lining shall be installed on the entire wet well concrete interior, including the floor.

E. Application of the lining shall not take place during weather described in Section 3.03. Protect the work from the above mentioned conditions.

3.07 WET GUAGE TESTING

A. During lining application, take wet gauge thickness readings as required to insure correct lining thickness.

B. Provide copies of the wet gauge thickness reading results to the Owner’s Representative.

3.08 HOLIDAY (CONTINUITY) TESTING OF APPLIED COATING

The Owner's Representative will inspect each coat of primer and finish coating in accordance with ASTM D4787 to determine integrity. Each coating application will be checked and deficiencies marked. After observing specified recoat time, apply additional coating materials over areas having any holidays or pinholes. After correction of deficiencies, the Owner's Representative will reinspect those areas to determine the acceptability of the additional coating at the Contractors expense. Each coating application must be 100% to the satisfaction of the Owner's Representative prior to succeeding coating applications.

END OF SECTION

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SECTION 099752 COLD-APPLIED WAX TAPE COATING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and application of a three-part, cold-applied wax tape coating system for buried piping per NACE RP0375-2006, Section 4 except as modified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Polyethylene Sheet Encasement (AWWA C105): 099754.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit manufacturer's catalog data sheets and application instructions.

PART 2 - MATERIALS

2.01 PRIMER

A. Primer shall be a blend of petrolatums, plasticizers, and corrosion inhibitors having a paste-like consistency. The primer shall comply with NACE RP0375-2006 and shall have the following properties:

1. Pour Point: 100°F to 110°F.

2. Flash Point: 350°F.

3. Coverage: 1 gallon per 100 square feet.

B. Primer shall be Trenton Wax Tape Primer, Denso Paste Primer, or equal.

2.02 WAX TAPE

A. Wax tape shall consist of a synthetic-fiber felt, saturated with a blend of microcrystalline wax, petrolatums, plasticizers, and corrosion inhibitors, forming a tape coating that is easily formable over irregular surfaces. The tape shall comply with NACE RP0375-2006 and shall have the following properties:

1. Saturant Pour Point: 115°F to 120°F.

2. Thickness: 50 to 70 mils.

3. Tape Width: 6 inches.

B. Wax tapes used for pipe soil-to-air transitions shall be UV light stable so as not to degrade in the presence of sunlight.

C. Wax tape shall be Trenton No. 1 Wax Tape, Denso "Densyl Tape," or equal.

2.03 PLASTIC WRAPPER

A. Wrapper shall be a polyvinylidene chloride plastic with three 50-gauge plies wound together as a single sheet. The wrapper shall have the following properties:

1. Color: Clear.

2. Thickness: 1.5 mils.

3. Tape Width: 6 inches.

B. Plastic wrapper shall be Trenton Poly-Ply, Denso Tape PVC Self-Adhesive, or equal.

2.04 POLYETHYLENE SHEET COATING

See Section 099754.

PART 3 - EXECUTION

3.01 WAX TAPE COATING APPLICATION

A. Surfaces shall be clean and free of dirt, grease, water, and other foreign material prior to the application of the primer and wax tape.

B. Apply primer by hand or brush to fitting surfaces. Work the primer into crevices and completely cover exposed metal surfaces.

C. Apply the wax tape immediately after the primer application. Work the tape into the crevices around fittings. Apply the wax tape by pressing and molding the tape into conformity with the surface so that it does not bridge over irregular surfaces configurations. Begin wrapping approximately 3 inches behind the area to be wrapped. If starting at a straight edge, wrap the tape spirally around the pipe while touching the end edge before starting the angle to begin the spiral. If the previous roll is headed in a downward direction, tuck the next roll under the previous roll. Stretch each roll tight as wrapping continues to avoid air bubbles.

D. Wrap the wax tape spirally around the pipe and across the fitting. Use a minimum overlap of 50% of the tape width. Apply tape to flanges, mechanical and restrained joint bolts, nuts and glands, and grooved-end couplings to 6 inches beyond each side of the item.

E. Work the tape into the crevices and contours of irregularly shaped surfaces and smooth out so that there is a continuous protective layer with no voids or spaces under the tape.

F. After application, seal the overlap seams of the tape by hand by tapering and pressing the seam, attempting to create a continuous surface. There shall be no air pockets underneath the tape. The tape shall have direct intimate contact with the pipe surface.

G. On vertical sections of the piping, such as at pipe-to-soil transitions, wrap the pipe starting from the bottom and proceeding upward so that downward flowing water and backfill do not catch in a seam.

H. Overwrap the completed wax tape installation with the plastic wrapping material. Wrap spirally around the pipe and across the fitting. Use a minimum overlap of 55% of the tape width and apply two layers or applications of overwrap. Secure plastic wrapper to pipe with adhesive tape.

3.02 APPLICATION OF POLYETHYLENE SHEET COATING TO BURIED PIPING

Wrap completed wax tape coating system with polyethylene film per Section 099754 and secure around the adjacent pipe circumference with adhesive tape.

3.03 HANDLING AND INSTALLING WAX-TAPE COATED PIPE

A. Handle pipe in a manner to minimize damage to the coating. Equipment used for the handling of coated pipe shall be designed and constructed to avoid damaging the protective coating system. Inspect supported areas of the pipe prior to installation. Repair damaged areas before installation.

B. The pipeline trench shall be free of rocks, foreign matter, and projections that could damage the coating system.

END OF SECTION

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SECTION 099754 POLYETHYLENE SHEET ENCASEMENT (AWWA C105)

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of a polyethylene sheet encasement for buried Steel and iron pipe, fittings, and valves.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Cold-Applied Wax Tape Coating: 099752.

B. Trenching, Backfilling, and Compacting: 312316.

C. General Piping Requirements: 400500.

D. Flexible Pipe Couplings and Expansion Joints: 400722.

E. Ductile-Iron Pipe: 402040.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with General Provisions and Section 013300.

B. Submit manufacturer's catalog literature and product data sheets describing the physical, chemical, and electrical properties of the encasement material.

PART 2 - MATERIALS

2.01 POLYETHYLENE WRAP

A. The encasement shall consist of low-density polyethylene wrap of at least 8-mil thickness conforming to AWWA C105. Color: Black.

B. Polyethylene encasement for ductile-iron pipe shall be supplied as a flat tube meeting the dimensions of Table 1 in AWWA C105 and shall be supplied by the ductile-iron pipe manufacturer.

2.02 PLASTIC ADHESIVE TAPE

A. Tape shall consist of polyolefin backing and adhesive which bonds to common pipeline coatings including polyethylene.

B. Minimum Width: 2 inches.

C. Products: Canusa Wrapid Tape; Tapecoat 35; Polyken 934; AA Thread Seal Tape, Inc.; or equal.

PART 3 - EXECUTION

3.01 APPLICATION OF MOLDABLE MASTIC FILLER TO IRREGULAR ADJACENT SURFACES

When the adjacent joints are bell-and-spigot or mechanical joints and any associated welding specifications do not require an external full fillet weld, apply a moldable mastic filler (per Section 400500) at the step-down area prior to the application of the sheet encasement and tape.

3.02 APPLYING SHEET COATING TO BURIED PIPING AND FITTINGS

A. Apply wrapping per AWWA C105 as modified herein.

B. Apply a single wrapping.

C. Install the polyethylene to completely encase the pipe and fittings to provide a watertight corrosion barrier. Continuously secure overlaps and ends of sheet and tube with polyethylene tape. Make circumferential seams with two complete wraps, with no exposed edges. Tape longitudinal seams and longitudinal overlaps, extending tape beyond and beneath circumferential seams.

D. Wrap bell-spigot interfaces, restrained joint components, and other irregular surfaces with wax tape or moldable sealant prior to placing polyethylene encasement.

E. Minimize voids beneath polyethylene. Place circumferential or spiral wraps of polyethylene tape at 2-foot intervals along the barrel of the pipe to minimize the space between the pipe and the polyethylene.

F. Overlap adjoining polyethylene tube coatings a minimum of 1 foot and wrap prior to placing concrete anchors, collars, supports, or thrust blocks. Hand wrap the polyethylene sheet, apply two complete wraps with no exposed edges to provide a watertight corrosion barrier, and secure in place with 2-inch-wide plastic adhesive tape.

3.03 APPLYING SHEET COATING TO BURIED VALVES

A. Wrap flanges and other irregular surfaces with wax tape or moldable sealant. Press tightly into place leaving no voids underneath and a smooth surface under coating for polyethylene sheet.

B. Wrap with a flat sheet of polyethylene. Place the sheet under the valve and the flanges or joints with the connecting pipe and fold in half. Extend the sheet to the valve stem and secure the sheet in place with 2-inch-wide plastic adhesive tape. Apply a second layer and secure with tape. Make two complete wraps, with no exposed edges, to provide a

watertight corrosion barrier. Secure the sheets with tape around the valve stem below the operating nut and around the barrel of the connecting pipe to prevent the entrance of water and soil. Place concrete anchor and support blocks after the wrap has been installed.

3.04 APPLYING SHEET COATING TO BURIED FLEXIBLE PIPE COUPLINGS

A. Wrap irregular surfaces with wax tape or moldable sealant. Press tightly into place leaving no voids underneath and a smooth surface under coating for polyethylene sheet.

B. Apply two layers or wraps around the coupling. Overlap the adjoining pipe or fitting a minimum of 1 foot and secure in place with tape. Provide sufficient slack in polyethylene to allow backfill to be placed around fitting without tearing polyethylene. Apply tape around the entire circumference of the overlapped section on the adjoining pipe or fitting in two complete wraps, with no exposed edges, to provide a watertight corrosion barrier.

3.05 REPAIR OF POLYETHYLENE MATERIAL

Repair polyethylene material that is damaged during installation. Use polyethylene sheet, place over damaged or torn area, and secure in place with 2-inch-wide plastic adhesive tape.

3.06 APPLYING SHEET COATING TO EXISTING BURIED PIPING

When connecting polyethylene-encased pipe or fittings to existing pipe, expose existing pipe, thoroughly clean the surface, and securely tape the end of the polyethylene to the existing as specified above. When the existing pipe is polyethylene encased, wrap new polyethylene encasement over the existing, with overlap of at least 2 feet. Tape securely as specified above.

3.07 BACKFILL FOR POLYETHYLENE-WRAPPED PIPE, VALVES, AND FITTINGS

Place sand backfill within 1 foot of the pipe, valves, and fittings wrapped with polyethylene encasement per Section 312316.

3.08 INSTALLATION AND REPAIR OF POLYETHYLENE AT SERVICE TAPS

A. Wrap two or three layers of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted.

B. Mount the tapping machine on the pipe area covered by the polyethylene tape. Then make the tap and install the corporation stop directly through the tape and polyethylene.

C. After making the direct service connection, inspect the entire circumferential area for damage and make repairs.

D. To minimize the possibility of dissimilar metal corrosion at service connections, wrap the corporation stop a minimum clear distance of 3 feet of copper service pipes with polyethylene or dielectric tape.

END OF SECTION

SECTION 099761 FUSION-BONDED EPOXY LININGS AND COATINGS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, application, and testing of one-part, fusion-bonded, heat-cured, thermosetting, 100% solids epoxy linings and coatings on steel, and ductile-iron equipment, such as valves, flexible pipe couplings, slide gates, and structural steel.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Flexible Pipe Couplings and Expansion Joints: 400722.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit the manufacturer's catalog literature and product data sheets, describing the physical and chemical properties of the epoxy coating. Describe the application and curing procedure.

C. Submit coating application test records for measuring coating thickness and holiday detection for each item or pipe section and fitting. Describe repair procedures used.

PART 2 - MATERIALS

2.01 PIPING AND EQUIPMENT SURFACES

A. The Contractor shall require the equipment suppliers to provide equipment that is free of salts, oil, and grease to the coating applicator.

B. The Contractor shall require pipe suppliers to provide bare pipe that is free of salts, oil, and grease to the coating applicator.

2.02 SHOP-APPLIED EPOXY LINING AND COATING

Lining and coating shall be a 100% solids, thermosetting, fusion-bonded, dry powder epoxy resin: Scotchkote 134 or 206N, Valspar "Pipeclad 1500 Red," or equal. Epoxy lining and coating shall meet or exceed the following requirements:

Hardness (minimum)	Barcol 17 (ASTM D2583) Rockwell 50 ("M" scale)
Abrasion resistance (maximum value)	1,000 cycles: 0.05 gram removed
	5,000 cycles: 0.115 gram removed
	ASTM D1044, Tabor CS 17 wheel, 1,000-gram weight
Adhesion (minimum)	3,000 psi (Elcometer)
Tensile strength	7,300 psi (ASTM D2370)
Penetration	0 mil (ASTM G17)
Adhesion overlap shear, 1/8-inch steel panel, 0.010 glue line	4,300 psi, ASTM D1002
Impact (minimum value)	100 inch-pounds (Gardner 5/8-inch diameter tup)

2.03 FIELD-APPLIED EPOXY COATING FOR PATCHING

Use a minimum 80% solids liquid epoxy resin, such as Scotchkote 306 or 323.

2.04 PAINTING AND COATING OF GROOVED-END AND FLEXIBLE PIPE COUPLINGS

Line and coat couplings the same as the pipe. Color shall match the color of the pipe fusion epoxy coating.

PART 3 - EXECUTION

3.01 SHOP APPLICATION OF FUSION-BONDED EPOXY LINING AND COATING--GENERAL

A. Grind surface irregularities, welds, and weld spatter smooth before applying the epoxy. The allowable grind area shall not exceed 0.25 square foot per location, and the maximum total grind area shall not exceed 1 square foot per item or piece of equipment. Do not use any item, pipe, or piece of equipment in which these requirements cannot be met.

B. Remove surface imperfections, such as slivers, scales, burrs, weld spatter, and gouges. Grind outside sharp corners, such as the outside edges of flanges, to a minimum radius of 1/4 inch.

C. Uniformly preheat the pipe, item, or piece of equipment prior to blast cleaning to remove moisture from the surface. The preheat shall be sufficient to ensure that the surface temperature is at least 5°F above the dew point temperature during blast cleaning and inspection.

D. Sandblast surfaces per SSPC SP-5. Protect beveled pipe ends from the abrasive blast cleaning.

E. Apply lining and coating by the electrostatic spray or fluidized bed process. Minimum thickness of lining or coating shall be 15 mils. Heat and cure per the epoxy manufacturer's recommendations. The heat source shall not leave a residue or contaminant on the metal surface. Do not allow oxidation of surfaces to occur prior to coating. Do not permit surfaces to flash rust before coating.

3.02 SHOP APPLICATION OF FUSION-BONDED EPOXY LINING AND COATING TO PIPE--ADDITIONAL REQUIREMENTS

A. Apply lining and coating per AWWA C213 except as modified herein.

B. Grind 0.020 inch (minimum) off the weld caps on the pipe weld seams before beginning the surface preparation and heating of the pipe.

3.03 SHOP APPLICATION OF FUSION-BONDED EPOXY LINING AND COATING TO JOINT AREAS OF DUCTILE-IRON AND CAST-IRON FITTINGS--ADDITIONAL REQUIREMENTS

Limit the protective coating thickness in the joints of ductile-iron and cast-iron fittings to maintain a leak-proof joint. However, the coating thickness in the joint area shall not be less than 4 mils.

3.04 QUALITY OF LINING AND COATING APPLICATIONS

The cured lining or coating shall be smooth and glossy, with no graininess or roughness. The lining or coating shall have no blisters, cracks, bubbles, underfilm voids, mechanical damage, discontinuities, or holidays.

3.05 FACTORY TESTING OF COATING--GENERAL

A. Test linings and coatings with a low-voltage wet sponge holiday detector. Test pipe linings and coatings per AWWA C213, Section 5.3.3. If the number of holidays or pinholes is fewer than one per 20 square feet of coating surface, repair the holidays and pinholes by applying the coating manufacturer's recommended patching compound to each holiday or pinhole and retest. If the number of pinholes and holidays exceeds one per 20 square feet of coating surface, remove the entire lining or coating and recoat the item or pipe.

B. Measure the coating thickness at three locations on each item or piece of equipment or pipe section using a coating thickness gauge calibrated at least once per eight-hour shift. Record each measured thickness value. Where individual measured thickness values are less than the specified minimum thickness, measure the coating thickness at three additional points around the defective area. The average of these measurements shall exceed the specified minimum thickness value, and no individual thickness value shall be more than 2 mils below or 3 mils above the specified minimum value. If a section of

the pipe, item, or piece of equipment does not meet these criteria, remove the entire lining or coating and recoat the entire item or piece of equipment.

3.06 FACTORY INSPECTION OF LINING AND COATING OF PIPE--ADDITIONAL REQUIREMENTS

Check for coating defects on the weld seam centerlines. There shall be no porous blisters, craters, or pimples lying along the peak of the weld crown.

3.07 SHIPPING, STORAGE, AND HANDLING

A. When loading piping, fittings, couplings, or other coated items for shipment to the project site, use spacers and other protective devices to separate pipes or other coated items to prevent damaging the coated surfaces during transit and unloading. If wood spacers are used, remove wood splinters and particles from the coated surfaces after separation. Use padded chains or ribbon binders to secure the loaded pipe or other coated items and minimize damage.

B. Do not load or unload pipe, fittings, couplings, or other coated items by inserting forklift tines or lifting chains inside the pipe or item. Use nonmetallic slings, padded chains, or padded forklift tines to lift pipe or other coated items.

C. Cover piping or other coated items 100% with protective coverings or tarpaulins to prevent deposition of road salts, fuel residue, and other contaminants in transit.

D. Provide stulls, braces, and supports for piping during shipping and storage such that out-of-roundness or deflection does not exceed 0.5% of the pipe diameter.

E. Handle piping and other coated items with care during the unloading, installation, and erection operations to minimize damage. Do not place or store pipe or other coated items on the ground or on top of other work unless ground or work is covered with a protective covering or tarpaulin. Place pipe or other coated items above the ground upon platforms, skids, or other supports.

F. Store piping or other coated items at the site on pallets to prevent direct contact with ground or floor. Cover pipe or coated items during storage with protective coverings or tarpaulins to prevent deposition of rainwater, salt air, dirt, dust, and other contaminants.

G. Do not allow piping or other coated items to contact metal, concrete, or other surfaces during storage, handling, or installation and erection at the site that could damage or scratch the coating.

3.08 FIELD REPAIRS

Patch scratches and damaged areas incurred while installing fusion-bonded epoxy coated items with a two-component, 80% solids (minimum), liquid epoxy resin. Wire brush or sandblast the damaged areas per SSPC SP-10. Lightly abrade or sandblast the coating or lining on the sides of the damaged area before applying the liquid epoxy coating. Apply

an epoxy coating to defective linings and coatings to areas smaller than 20 square inches. Patched areas shall overlap the parent or base coating a minimum of 0.5 inch. If a defective area exceeds 20 square inches, remove the entire lining and coating and recoat the entire item or piece of equipment. Apply the liquid epoxy coating to a minimum dry-film thickness of 15 mils.

END OF SECTION

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SECTION 260500 GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

A. Description

This section includes materials, installation, and testing of the electrical system.

B. Related Work Specified Elsewhere

1. One-Year Guarantee: Standard Specifications.

2. Permits and Licenses: Standard Specifications.

3. Submittals: 013300.

4. Construction Facilities and Temporary Controls: 015000.

5. Operation and Maintenance Manuals: 019310.

6. Arc-Flash Study: 260573.

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. In submitted catalog cuts, cross out items shown that are not pertinent to this project. Where catalog cuts list manufacturer's standard options, cross out those options not intended to be provided and clearly highlight those options that are to be provided.

D. Regulatory Agencies and Standards

1. See Standard Specifications.

2. Electrical work shall comply with the California Electrical Code and any applicable local codes, whichever are more stringent.

E. Quality Control

Materials, appliances, equipment, and devices shall conform to the applicable UL standards. The label of, or listing by, UL is required for all electrical equipment.

F. Operation and Maintenance Manuals

Submit operation and maintenance manuals in accordance with Section 019310.

G. Locations

1. General: Use equipment, materials, and wiring methods suitable for the types of locations in which they are located as defined below.

2. Definitions of Types of Locations:

a. Dry Locations: Indoor areas which do not fall within the definitions below for wet or corrosive locations and which are not otherwise designated in the drawings.

b. Wet Locations: Locations exposed to the weather, whether under a roof or not, unless otherwise designated in the drawings.

c. Corrosive Locations: Areas identified in drawings.

PART 2 - MATERIALS

A. General

1. Similar materials and equipment shall be the product of a single manufacturer.

2. Provide only products which are new, undamaged, and in the original cartons or containers.

3. Materials and equipment shall be the standard products of manufacturers regularly engaged in the production of such material and shall be the manufacturer's current design.

4. Materials and equipment shall be suitable for storage, installation, and operation at an ambient temperature of 0°C to 40°C except where more stringent conditions are stated in individual equipment specifications.

PART 3 - EXECUTION

A. Installation

1. The drawings indicate connections for typical equipment only. If the equipment furnished is different from what is shown, provide the modifications necessary for a safe and properly operating installation in accordance with the equipment manufacturer's recommendations.

2. The drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items. Field determine exact location based on physical size and arrangement of equipment, finished elevations, and obstructions.

3. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the electrical systems shall be accomplished without additional cost to the Owner.

4. Accomplish work required to pierce any waterproofing after the part piercing the waterproofing has been set in place. Seal and make watertight the openings made for this purpose.

5. Install equipment and material piercing fire walls and fire-resistant or fire-stopped walls, ceilings, and floors in a manner so the rating remains equivalent.

6. Seal weathertight equipment or components exposed to the weather.

7. Protect equipment outlets and conduit openings with factory-made plugs or caps whenever work is not in progress at that point.

B. Nameplates

1. Mark each individual disconnect switch, timer, relay, control panel and contactor to identify each item with its respective service or function.

2. Provide a nameplate inside the door of panelboard listing its designation, voltage, and feeder circuit number.

3. Provide nameplates with engraved lettering not less than 1/4 inch high. Use black-on-white laminated plastic, attached with rivets or sheet metal screws. Do not use embossed plastic adhesive tape.

C. Warning Signs

1. Install markings, identifications, warning, caution, or instruction signs where required by NEC, NFPA 70E, and NFPA 79 paragraph 4.5.1, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect.

2. The design of safety signs and labels shall conform to ANSI Z535.4. Service switchboard, panelboard and industrial control panels shall be field marked to warn qualified persons of potential electric arc hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment, in conformance with NEC 2005 Article 110.16.

3. Install engraved plastic-laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation. Install butyrate signs with metal backing for outdoor items.

END OF SECTION

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SECTION 260519 WIRES AND CABLES LESS THAN 600 VOLTS

PART 1 - GENERAL

A. Description

This section describes materials and installation of wires and cables rated 600 volts and below.

B. Related Work Specified Elsewhere

1. General Electrical Requirements: 260500.

2. Grounding and Bonding: 260526.

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. Submit material list for each conductor type. Indicate insulation material, conductor material, voltage rating, manufacturer, and other data pertinent to the specific cable, such as shielding, number of pairs, and applicable standards.

PART 2 - MATERIALS

A. Low-Voltage Building Wire

1. Conductor material shall be copper.

2. Low-voltage building wire for use at 600 volts or less shall be 600-volt insulated, Type XHHW or THWN, and rated for continuous operation at 75°C.

3. Use No. 12 AWG minimum conductor size for power and lighting circuits.

4. Use No. 14 AWG minimum conductor size for control circuits.

5. Conductors for lighting and receptacle circuits that are No. 10 AWG and smaller shall be solid. All other conductors shall be stranded.

B. Twisted-Shielded Cable

Single-pair cables shall be two No. 18 AWG stranded tinned-copper conductors individually insulated with fully color-coded PVC rated at 600 volts; insulated conductors twisted together and shielded with a spiral-wound metal foil tape overlapped for 100% shielding. Outer jacket shall be PVC.

C. Grounding Conductors--Bare Copper

Refer to Section 260526 for bare copper grounding conductors.

D. Category 6 Cable

Category 6 cable shall consist of 4 twisted pairs of different lay and ground wires, enclosed by an overall conductive mylar backed aluminum foil shield. This shall be enclosed by an overall thermoplastic jacket. The cable shall meet the applicable requirements of ANSI/TIA/IEA-568-B.

E. Conductor Tags

Provide self-extinguishing heat-shrink individual or sleeved, nonmetallic, snap-on type. Grafoplast, Phoenix Contact, Thomas & Betts sleeve markers, or equal.

F. Plastic Adhesives

Plastic adhesives for color coding shall be 7-mil minimum thick, flame-retardant, weather-resistant tape, resisting abrasion, UL rays, moisture, alkalies, solvents, and acids. Adhesives shall meet the requirements of UL 510 and CSA C22.2.

PART 3 - EXECUTION

A. Low-Voltage Building Wire Installation

1. Install wiring and cable in conduit and terminate unless otherwise noted.

2. To reduce pulling tension in long runs, coat cables with pulling compound recommended by the cable manufacturer before being pulled into conduits.

3. Remove debris and moisture from the conduits, boxes, and cabinets prior to cable installation.

4. Group conductors No. 1/0 and smaller in panelboards, cabinets, pull boxes, motor control centers, variable frequency drives, and switchboard wireways; tie with plastic ties; and fan out to terminals. Lace conductors No. 2/0 and larger with marline.

B. Identification

1. Color Coding of Low-Voltage Building Wire: Provide color coding throughout the entire network of feeders and circuits as follows:

Phase	240/120 Volts	480/277 Volts
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	---	Yellow
Neutral	White	Gray
Ground	Green	Green

2. Phase conductors No. 10 AWG and smaller and neutral/ground conductors No. 6 and smaller shall have factory color coding with solid color insulation. Do not use onsite coloring of ends of conductors or apply colored plastic adhesives in lieu of factory color coding. Larger conductors may have onsite application of colored plastic adhesives at ends of conductors and at each splice.

3. Control wires shall have colored insulation. Separate color codes for each wire shall be provided in each conduit that has up to seven wires. Conduits with more than seven wires shall have at least seven types of colored insulation.

4. Tagging of Conductors: Tag control wires and instrument cables in panels, pull boxes, wireways, and at control device. Tag control wires and instrument cables with same wire numbers as on the shop drawing submittals. Tag power wires in pull boxes and wireways where there is more than one circuit. Tag power conductors with motor control center or panelboard number and circuit numbers.

C. Low-Voltage Wire Splices

1. Solid Conductors: Use 3M "Scotchlok," Ideal "Super Nut," Buchanan B-Cap, or equal. Seal splices in underground handholes and pull boxes and in light poles with individual sealing packs of Scotchcast Brand 400 Resin or equal.

2. Stranded Conductors No. 8 and Larger: Use T & B "Locktite" connectors, Burndy Versitaps and heavy-duty connectors, O.Z. solderless connectors, or equal.

3. Stranded Conductors No. 10 and Smaller: Use crimp connectors with tools by same manufacturer and/or UL listed for connectors of all stranded conductors.

4. Retighten bolt-type connectors 24 to 48 hours after initial installation and before taping. Tape connections made with noninsulated-type connectors with rubber-type tape, one and one-half times the thickness of the conductor insulation, then cover with Scotch 33 tape.

D. Low-Voltage Wire Terminations

1. Terminate wires and cables at each end.

2. Provide ring tongue, nylon- or vinyl-insulated copper crimp terminals for termination on screw-type terminals, except for light switches and receptacles. Utilize installation tools recommended by the crimp manufacturer.

3. Terminal lugs shall be electro-tin plated copper compression type or spring compression type with a corrosion protection coating. Provide color-coded system on terminal and die sets to provide the correct number and location of crimps. Permanent die index number shall be embossed on completed crimp for inspection purposes.

4. Tighten screws to the value recommended by the manufacturer.

E. Field Testing

1. Perform insulation resistance test on all circuits and feeders with No. 10 size conductors and larger. Utilize a 1,000-volt d-c megohmmeter for 600-volt insulated conductors.

2. Test each complete circuit prior to energizing. Insulation resistance between conductors and between each conductor and ground shall not be less than 25 megohms. Repair or replace wires or cables in circuits that do not pass this test and repeat the test.

3. Evaluate ohmic values by comparison with conductors of same length and type.

4. Inspect shielded cables for proper shield grounding, proper terminations, and proper circuit identifications.

5. Inspect control cables for proper termination and proper circuit identification.

6. In cables terminated through window-type CTs, verify that neutrals and grounds are terminated for correct operation of protective devices.

END OF SECTION

SECTION 260526 GROUNDING AND BONDING

PART 1 - GENERAL

A. Description

This section includes materials, testing, and installation of electrical grounding.

B. Related Work Specified Elsewhere

1. General Electrical Requirements: 260500.
2. Wires and Cables Less Than 600 Volts: 260519.

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.
2. Submit material list for all grounding materials and equipment. Indicate size, material, and manufacturer.
3. Submit test results. Indicate overall resistance to ground and resistance of each electrode.

D. Performance Requirements

1. Grounding System Resistance:
    a. Grounds Not Covered Above: 25 ohms.

PART 2 - MATERIALS

A. Ground Rods

Ground rods shall be copper-clad steel, 3/4 inch in diameter, minimum 10 feet long, with hardened steel points.

B. Connections

1. Ground Clamps: Clamps for connection of ground wire to ground rod shall be bronze.
2. Exothermic Connections: Provide Cadweld or equal.

C. Conductors

1. Equipment Ground: Conductors shall be low-voltage building-wire type as specified in Section 260519.

2. Bare Copper Conductors: Annealed bare copper, conforming to ASTM B3 and B8.

PART 3 - EXECUTION

A. Equipment Grounding

1. Ground raceways and noncurrent-carrying parts of electrical equipment in accordance with NEC Article 250. Use the metallic conduit system for equipment and enclosure grounding.

2. Additionally, all circuits shall carry one ground conductor for equipment grounding. Ground conductor shall be in excess of grounding through the metallic conduit system.

B. Ground Well

1. Provide a handhole and ground rod as detailed in the drawings to aid in performing ground testing and connecting additional ground rods if required by the test results. Connect ground wire from ground rod to main service switchboard ground bus as detailed in the drawings.

C. Connections

Exothermic weld all underground connections.

D. Tests

Before making connections to the ground electrode, measure the resistance of the electrode to ground using a ground resistance tester specifically designed for ground resistance testing. Perform testing in accordance with test instrument manufacturer's recommendations using fall-of-potential method. Perform the test not less than two days after the most recent rainfall and in the afternoon after any ground condensation (dew) has evaporated. If a resistance less than the performance requirements is not obtained, provide a ground rod driven 6 inches below grade spaced 10 feet away from the ground well and connect to ground test well with No. 4 AWG bare copper wire and repeat the test. If the performance requirements are still not obtained, inform the Owner for resolution.

END OF SECTION

SECTION 260534 CONDUITS, BOXES, AND FITTINGS

PART 1 - GENERAL

A. Description

This section includes material, installation, and testing for conduit, boxes, and fittings.

B. Related Work Specified Elsewhere

1. General Electrical Requirements: 260500.

2. Grounding and Bonding: 260526.

3. Trenching, Backfilling, and Compacting: 312316.

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. Submit product data for the following:

a. Conduit and fittings for each type specified.

b. Boxes.

D. Quality Control

1. NEMA Compliance: Comply with NEMA standards pertaining to conduits and components.

2. UL Compliance and Labeling: Comply with requirements of UL standards pertaining to electrical conduits and components. Provide conduits and components listed and labeled by UL.

PART 2 - MATERIALS

A. Rigid Steel Conduit and Fittings

1. Rigid Steel Conduit and Fittings: Conform to ASME C80.1, NEMA RN2, and UL 6, hot-dipped galvanized after threading. The zinc coating shall be flexible and not crack during bending.

2. Fittings:

a. Locknuts: Steel or malleable iron.

b. Bushings: Threaded type, steel or malleable iron, with 105°C rated plastic insulated throat. Plastic bushings with a temperature rating of 105°C may be used for conduits 1 inch and smaller.

c. Box Connectors for Wet Locations: Provide a watertight threaded hub on enclosure consisting of sealing fitting with tapered conduit thread, neoprene O-ring, and 105°C rated insulating throat with grounding and bonding lug.

d. Couplings: Threaded, hot-dipped galvanized after fabrication.

3. Long-Radius Elbows (90 Degrees):

Conduit Size (inches)	**Minimum Radius (inches)**
3/4 through 1 ¼	12
2 and 2 ½	15
3 and 3 ½	18
4	30
5	36
6	42

B. PVC-Coated Rigid Steel Conduit and Fittings

1. Conduit:

a. All conduits, prior to coating, shall conform to ASME C80.1 and UL 6. Conduits shall be hot-dipped galvanized inside and out with hot galvanized threads.

b. The zinc surface shall be treated prior to coating to enhance the bond between metal and plastic.

c. Both interior and exterior of the conduit shall be coated with an epoxy acrylic primer of approximately 0.5-mil thickness.

d. The exterior coating shall be applied by dipping in liquid plastisol or other equal method that will produce a finished product conforming to NEMA 5-19-1986.

e. The thickness of the PVC coating shall be a minimum of 40 mils the full length of the conduit except the threads.

f. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic.

g. Apply a chemically cured urethane coating of a thickness of 2 mils to the interior of conduit.

h. The conduit shall be bendable without damage to the PVC or urethane coatings.

i. Threads shall have an added protection of a 2-mil clear urethane coating.

j. The PVC-coated rigid galvanized steel conduit shall be certified and authorized to apply the ETL verification mark "ETL Verified to PVC-001." ETL certified to Intertek ETL SEMKO High Temperature H2O PVC Coating Adhesion Test Procedure.

2. Fittings:

a. Coat fittings similar to the conduits.

b. Provide a loose coupling with each length of conduit. A PVC coating shall be bonded to the outer surface of the coupling, and a PVC sleeve equal to the outside diameter of the uncoated conduit shall extend beyond both ends of the coupling approximately one pipe diameter or 2 inches whichever is smaller. The wall thickness of the sleeve shall be the same as the plastic coating on the pipe.

c. The PVC coating on the coupling shall be ribbed to enhance installation.

d. Hubs shall have PVC sleeves equal to those on the couplings.

e. Screws on Form 8 fittings shall be of stainless steel with encapsulated plastic heads.

f. Size U bolts and RA clamps to fit conduit, and encapsulate the nuts in plastic.

g. Fittings shall otherwise be same as specified for rigid steel.

h. Elbows or bends exceeding 45 degrees shall be PVC coated and shall be of the same dimensions as specified for rigid steel long-radius elbows.

i. Conduit bodies, where applicable, shall be Form 8 with a tongue-in-groove (V-seal) gasket to effectively seal out corrosive elements.

3. Conduits and fittings shall conform to NEMA RN-1 and shall be manufactured by Robroy, Perma-coat, KorKap, or equal.

C. <u>Rigid Nonmetallic Conduit (PVC) and Fittings</u>

1. Conduit: PVC Schedule 40, 90°C rise rating, conforming to NEMA TC-2 Type EC-40 and UL 651.

2. Long-Radius Elbows (90 Degrees): Rigid PVC-coated conduit of the same dimension as specified for steel conduit.

3. Couplings, Adapters, End Bells, Expansion Couplings, Elbows, and Turns of 30 Degrees: Factory-made in accordance with NEMA TC-2 and TC-3.

4. Joint Cement: As recommended by manufacturer as suitable for the climate, furnished with instructions to achieve watertight joints.

5. Manufacturers: Carlon, Condux, or equal.

D. Liquid-Tight Flexible Metal Conduit and Fittings

1. Conduit: Steel, UL 360 listed, PVC jacketed.

2. Fittings:

a. UL listed for use with the conduit.

b. In sizes 1 1/4 inches and less, UL listed for grounding.

c. Made of steel or malleable iron, zinc plated, 105°C insulated throat, grounding and bonding lug.

E. Conduit Bodies

1. Provide types, shapes, and sizes to suit individual applications. Provide matching gasketed covers, secured with at least two captive corrosion-resistant screws.

2. Bodies connecting to rigid conduit shall be of the same material and material coating as the conduit, with metal threaded hubs. Provide with threaded covers or gasketed covers secured with at least two corrosion-resistant captive screws.

3. Bodies connecting to nonmetallic conduit shall be nonmetallic conduit bodies conforming to UL 514B.

F. Specialty Conduit Fittings

1. Expansion/Deflection Fittings for Rigid Metal Conduit: Weatherproof with an internal bonding arrangement. Provide for 3/4-inch movement in all directions. Where used for angular movement, allow for a 30-degree deflection from normal in any direction.

2. Expansion Fittings for Rigid Nonmetallic Conduit: O-ring type with at least two rings, allowing for a minimum conduit movement of 6 inches.

G. Junction and Pull Boxes

1. Provide factory-made standard sizes, and shop fabricate when nonstandard size boxes are shown or are required. Comply with UL and NEMA standards.

2. NEMA 1: Sheet steel, hot-dipped galvanized after fabrication. Finish with one coat of metal primer and one coat of primer sealer.

3. NEMA Type 4X: Type 316 stainless steel, with gasketed covers and Type 304 stainless steel bolts or screws.

4. NEMA 4: Code gauge steel, hot-dipped galvanized after fabrication. Provide cover with Type 303 stainless steel bolts.

5. Junction boxes shall be manufactured by Hoffman, Wiegmann, or equal.

H. Hazardous Locations

1. Conform to NEC Articles 501 and 502 for areas identified as "Hazardous Areas".

2. Provide threaded cast boxes and fittings for junction boxes and pull boxes in Class I areas. Unless otherwise indicated, boxes and fittings shall be UL listed for installation in Class I, Groups A, B, C, and D.

3. Provide EYS-type sealing fittings suitable for Class I, Division 1 areas. Use EYD-type drain sealing fittings suitable for Class I, Division 1 areas where shown in the drawings. Use sealing fiber and compound approved for Class I, Division 1 areas.

I. Conduit Sealant

1. Moisture Barrier Types: Sealant shall be a nontoxic, nonshrink, nonhardening, putty-type hand-applied material providing an effective barrier under submerged conditions.

2. Fire-Retardant Types: Fire stop material shall be a reusable, nontoxic, asbestos-free, expanding, putty-type material with a three-hour rating in accordance with UL 35L4.

PART 3 - EXECUTION

A. Conduit Usage Schedule

Install the following types of conduits and fittings in locations listed, unless otherwise noted in the drawings. Definitions and requirements of NEC apply unless specifically modified below. Refer to Section 260500 for definitions of locations.

1. Exterior, Exposed:

a. Material: Rigid steel conduit.

b. Minimum Size: 3/4 inch.

2. Exposed, Where Area is Indicated as Classified Location:

a. Material: PVC-coated rigid steel conduit.

b. Minimum Size: 3/4 inch.

3. Below grade, Underground:

a. Material: PVC Schedule 40 conduit (PVC Schedule 80 conduit, where subjected to physical damage)

b. Minimum Size: 3/4 inch.

4. Interior, Exposed, Dry, and Wet Locations:

a. Material: Rigid steel conduit.

b. Minimum Size: 3/4 inch.

5. Interior, Dry Locations:

a. Material: Rigid steel conduit.

b. Minimum Size: 3/4 inch.

6. Embedded in Concrete:

a. Material: Rigid steel conduit.

b. Minimum Size: 3/4 inch.

7. Final Connections to Motors, or Instruments:

a. Material: Liquid-tight flexible conduit.

b. Minimum Size: 3/4 inch.

c. Length of liquid-tight flexible conduit shall be 5 feet or less, unless field conditions require longer lengths.

B. Junction and Pull Boxes--Usage Schedule

Install the following type of boxes in locations listed, unless otherwise noted in the drawings. Refer to Section 260500 for definitions of locations:

1. Exterior: NEMA 4X.

2. Interior, Dry: NEMA 1.

3. Corrosive: NEMA 4X.

C. Conduit Fill

For runs that are not sized in drawings, compute the maximum conduit fill using NEC requirements for Type THW conductors (larger if applicable), although the actual wiring may be with types of conductors having smaller cross-sections.

D. Conduit Installation, General

1. Install conduit concealed or exposed, as indicated in the drawings.

2. Run exposed conduits parallel and perpendicular to surface or exposed structural members and follow surface contours as much as practicable to provide a neat appearance.

3. Make right-angle bends in conduit runs with long-radius elbows or conduits bent to radii not less than those specified for long-radius elbows.

4. Make bends and offsets so that the inside diameter of conduit is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.

5. Cap all conduits immediately after installation to prevent entrance of foreign matter.

6. Do not use diagonal runs except when specifically noted in the drawings.

7. Route exposed conduit to preserve headroom, access space, and work space.

8. Treat threaded joints of rigid steel conduit with T&B "Kopr-Shield" before installing fittings where conduit is in slabs and other damp or corrosive areas.

9. For PVC-coated rigid conduits, use manufacturer's recommended installation tools and recommendations. The manufacturer shall certify the installer before installation can proceed.

10. Conduit Terminations:

    a. Terminate conduits with locknuts and bushings except where threaded hubs are specified.

    b. Install conduits squarely to the box and provide one locknut outside the box and one locknut and bushing inside the box.

    c. Install locknuts with dished side against the box.

d. When terminating in threaded hubs, screw the conduit or fitting tight into the hub so that the end bears against the fire protection shoulder.

e. When chase nipples are used, install conduits and coupling square to the box and tighten the chase nipple leaving no exposed threads.

11. Install exposed, parallel, or banked conduits together. Make bends in parallel or banked runs from the same centerline so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel.

12. Conduit runs are shown schematically. Supports, pull boxes, junction boxes, and other ancillary equipment are not usually shown in drawings. If not shown, provide as required by NEC except that there shall not be more than the equivalent of three quarter bends (270 degrees) total between underground pull points. Provide additional boxes to permit pulling of wires without damage to the conductors or insulation.

13. Locations of conduit stub-ups shown in the drawings are schematic. Coordinate these locations with conduit entries of actual equipment served.

E. Requirements for Rigid Nonmetallic (PVC) Conduit

1. Comply with the installation provisions of NEMA TC-2, except as modified below.

2. Make cuts with a fine tooth handsaw. For sizes 2 inches and larger, use a miter box or similar saw guide to assure a square cut.

3. Use factory-made couplings for joining conduit.

4. Cementing and joining operation shall not exceed 20 seconds. Do not disturb joint for 5 minutes, longer (up to 10 minutes) at lower temperatures. Make joints watertight. Joining procedure shall conform to the procedures of ASTM D2855.

5. Install expansion fittings. Expansion fittings are required when the conduit is left exposed in trenches for a period of time during which the conduit's temperature can vary more than 2 degrees. Install expansion fittings near the fixed end of the run and 100 feet on center.

F. Conduit Sealing

1. Seal conduit entries with conduit sealant as follows:

a. Where conduit leaves an area identified as corrosive.

b. Where conduits exit buildings and underground structures.

G. Grounding

1. Provide grounding in accordance with Section 260526.

2. Use grounding bushings for all conduits carrying a grounding conductor.

3. Provide a grounding conductor in flexible conduit, size conforming to NEC Article 250.

H. Conduits Underground

Where PVC conduit is installed underground, provide a minimum 30-inch cover from finished grade to the top of conduit, including pavement areas where applicable. Provide 3-inch minimum sand bedding above and below conduits in accordance with Section 312316, maintain 12-inch minimum separation from other underground systems and 3-inch minimum clearance from trench sides, and provide 3-inch-wide red “WARNING” marker tape, Seaton Style SP 360 or equal, 18 inches below finished grade and centered over the conduit. Provide conduit spacers as required to maintain separation and comply with the NEC..

I. Conduit Supports

1. Support conduit at intervals and at locations as required by the NEC. Do not use perforated strap or plumber’s tape for conduit supports.

2. Where area or room is identified as "Corrosive Location," supports, hangers, preformed channels, and clamps shall be Type 316 stainless steel, PVC-coated steel, or fiberglass. Fiberglass support system shall be as manufactured by Omnistrut, Click, or equal. Bolts and nuts for stainless steel and PVC-coated support systems shall be Type 316 stainless steel.

J. Conduit Penetrations

1. Unless otherwise indicated, dry-pack around conduits which penetrate concrete walls, or floors.

2. Conduits passing vertically through concrete slabs shall be sleeved, except where sealing and expansion/deflection fittings are required. Pack sleeves through floors and fire-rated walls with fire-rated packing. Nonrated penetrations may be packed with nonshrink grout.

3. Install conduits passing through building sidewalls with expansion/deflection fittings.

4. Maintain the integrity of damp-proofing and waterproofing membranes that are penetrated by conduits and boxes.

5. Buried conduit shall penetrate surface at right angle.

K. Damaged Conduit

1. Repair or replace conduit damaged during or after installation.

2. Replace crushed or clogged conduit or any conduit whose inner surface is damaged or not smooth.

3. Repair cuts, nicks, or abrasions in the zinc coating of galvanized conduit with galvanizing repair stick, Enterprise Galvanizing "Galvabra" or equal.

4. Repair cuts, nicks, or abrasions in the PVC coating of PVC-coated conduit with the manufacturer's recommended PVC material and build up surface thickness to match the factory coating thickness and color.

L. Empty Conduit

1. Provide 200-pound strength pull cord in all empty conduits.

2. Provide a waterproof label on each end of the pull cords to indicate the destination of the other end.

M. Equipment Supports

Support wall-mounted junction boxes and pull box enclosures in wet and corrosive locations with Type 316 stainless steel preformed channels and Type 316 stainless steel concrete anchors.

N. Adjusting and Cleaning

Upon completion of installation of conduits and boxes, inspect interiors of conduits and boxes; clear blockages; and remove burrs, dirt, and construction debris.

END OF SECTION

SECTION 260548 SEISMIC RESTRAINT FOR ELECTRICAL EQUIPMENT

PART 1 - GENERAL

A. Description

This section describes the requirements for furnishing and installing seismic restraint devices for electrical equipment.

B. Related Work Specified Elsewhere

When it applies, this section is referenced in other sections of the specifications.

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. Submit stamped and signed seismic anchoring calculations with equipment and raceway submittals. Calculations shall be performed by a licensed civil or structural engineer employed by the equipment manufacturer and registered in the state of California.

3. Submit equipment anchoring methods. Include anchoring locations, anchor types, and minimum anchor embedment depths. Anchors shall have ICC-approved anchorage values.

D. Project-Specific Criteria

1. Importance Factor, Ip: 1.5.

2. Occupancy Category: III.

3. Seismic Design Category: D.

4. Site Class: Default.

5. S_{DS}: 1.05.

6. S_{D1}: 0.79.

7. Ap and Rp per ASCE 7 Table 13.6-1.

PART 2 - MATERIALS

A. Seismic Design of Equipment

Equipment fabricated or assembled at manufacturers' premises shall be designed and constructed in such a manner that all portions, elements, subassemblies, and/or parts of said equipment and the equipment as a whole, including their attachments, shall have the capability of withstanding seismic forces specified under "Seismic Anchoring and Restraints" below.

B. Seismic Anchoring and Restraints

Equipment Anchors: Electrical equipment shall be securely anchored. Anchoring shall have the capability of withstanding seismic forces per ASCE 7, Chapter 13.

PART 3 - EXECUTION

A. Equipment

Install equipment anchors in accordance with the final shop drawing and manufacturer's recommendations. Properly torque all bolts to the required values.

END OF SECTION

SECTION 260573 ARC-FLASH STUDY

PART 1 - GENERAL

A. Description

This section describes the requirements for furnishing an arc-flash hazard analysis.

B. Submittals

Submit in accordance with the General Provisions and Section 013300.

PART 2 - MATERIALS

A. Arc Flash Label

1. Arc flash labels shall identify the following as a minimum:

   a. Flash Hazard Boundary: Threshold at which burn level exceeds 1.2 cal/cm^2.

   b. Calculated incident energy at indicated working distance (18 inches).

   c. Hazard risk category and personal protective equipment (PPE) description.

   d. Equipment rated voltage.

   e. Required electrical glove class.

   f. Shock hazard boundaries (based on equipment rated voltage).

   g. Location (name of board).

   h. Name of organization that performed the analysis and contact information.

2. Labels shall carry either a “DANGER” or “WARNING” header, depending on whether an accident will or can result in injury or death, as stated in ANSI Z534.4.f. Header shall also include the following: “QUALIFIED WORKERS ONLY – PPE REQUIRED.”

3. Labels shall carry a footer that reads “Warning: Changes in equipment settings or system configuration will invalidate the calculated values and PPE requirements.”

4. Labels shall be 6 inches long by 4 inches wide, die-cut and shall come on industrial-quality adhesive-backed vinyl.

PART 3 - EXECUTION

A. General

1. Utilize independent NETA-certified testing firm to perform study using commercially available computer software, such as Power Tools for Windows by SKM Systems Analysis, Inc.; ETAP by Operation Technology, Inc.; or equal.

2. Study shall be performed under the supervision of and signed by a registered professional electrical engineer.

3. The study shall include scope, results, comments, and suggestions. Evaluation procedures shall follow applicable ANSI, NEMA, IEEE, and UL standards.

4. Obtain referenced or required characteristics and data from pertinent equipment manufacturers and from serving utility company as applicable.

B. Arc-Flash Hazard Analysis and Equipment Labeling

Perform an arc-flash hazard analysis in compliance with the latest edition of NFPA 70E 110.8(B)(1) for the electrical equipment in accordance with Appendix D of NFPA 70E and IEEE 1584 to identify:

1. The arc-flash protection boundaries, defined in Article 130.3(A) as "an approach limit at a distance from exposed live parts within which a person could receive a second-degree burn if an electrical arc flash were to occur."

2. The shock hazard boundaries.

3. The PPE and protective clothing necessary, based on the incident energy present at the working distance for the task to be performed, as described in Article 130.3(B) and Article 130.7.

4. Switchboards, panelboards, industrial control panels, and individually mounted starters shall be included in the study and shall be provided with arc flash labels. Labels shall be provided for each section of switchboard. Arc flash study shall not exclude equipment exempted by NFPA 70(E) and IEEE 1585, which allow exclusion of equipment that operates at 240 volts maximum and is fed from a transformer smaller than 125 kVA.

C. Reevaluation of Analysis

Owner will have the right to request reevaluation of any part of the coordination and arc flash analysis to improve coordination or to reduce arc flash risk category or to eliminate cable protection inadequacy. Owner reserves the right to contact the individual who performed the study or to witness the actual reevaluation at the premises of the organization performing the study and shall be allowed to make suggestions. All of these services shall be provided at no extra cost.

D. Safety Training

An electrical safety training (based on the results of the arc flash study) shall be provided for up to 10 of the Owner's staff at project facility or Owner's headquarters. The Owner will provide a suitable classroom or conference room for such training.

END OF SECTION

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SECTION 262650 ELECTRIC MOTORS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Low voltage electric motors and accessories, furnished under other Sections, and which are a part of equipment assemblies shall be in conformance with the requirements specified in this Section, unless otherwise noted. This section includes performance, and descriptive type specifications.

B. Unless otherwise specified or approved, all electric motors furnished and installed by the Contractor shall conform to the requirements specified herein.

1. Motors rated 1 hp or greater shall be premium efficient type per NEMA MG-1.

1.02 REFERENCES:

A. Institute of Electrical and Electronics Engineers (IEEE).

1. 112: Test Procedures for Polyphase Induction Motors and Generators.

2. 1349: IEEE Guide for the Application of Electric Motors in Class 1, Division 2 Hazardous (Classified) Locations.

B. National Electric Manufacturer's Association (NEMA):

1. MG-1: Motors and Generators.

C. National Fire Protection Association (NFPA):

1. 70: National Electrical Code (NEC).

1.03 SUBMITTALS

A. Shop drawings: Submit the following in accordance with Section 01 33 00.

B. Submit shop drawings and manufacturers' product data in accordance with the requirements of Section 26 05 00.

1. Descriptive literature and motor characteristics.

2. Shop drawings and descriptive data to include:

a. Complete list of all motors to be furnished.

b. Outlines, dimensions, weights, and wiring diagrams.

c. Location of main and accessories boxes with size of conduit entrance.

d. Efficiency and power factor at 1/2, 3/4 and full load.

e. Bearing design data and grease requirements.

f. Nameplate data.

g. Shop test report.

h. Field acceptance test report.

1.04 QUALITY ASSURANCE

A. Provide in accordance with Section 01 43 00 and as specified.

B. Motors to comply with the latest reference standards listed below.

1. National Electrical Code (NEC).

2. Underwriters Laboratories, Inc. (UL).

3. National Electric Manufacturer's Association (NEMA).

a. NEMA Standard MG-1 - Motors and Generators.

4. Anti-Friction Bearing Manufacturer's Association, Inc. (AFBMA).

5. American National Standard Institute (ANSI).

6. Institute of Electrical and Electronics Engineers (IEEE).

a. IEEE Standard 112 - Test Procedures for Polyphase Induction Motors and Generators.

b. IEEE 1349 - IEEE Guide for the Application of Electric Motors in Class 1, Division 2 Hazardous (Classified) Locations.

C. Routine tests shall be performed on representative motors, and shall include the information described on NEMA MG1-12.54 Report of Test Form for Routine Tests on Induction Motors. Efficiency shall be determined in accordance with IEEE Publication No. 112, Method B. Power factor shall be measured on representative motors.

1.05 DELIVERY, STORAGE AND HANDLING

A. Provide in accordance with Section 01 66 10 and as specified.

B. Shipping:

1. Ship motors assembled to driven equipment complete except where partial disassembly is required by transportation regulations or for protection of components.

2. Pack spare parts in containers bearing labels clearly designating contents and pieces of equipment for which intended.

3. Deliver spare parts at same time as pertaining materials. Delivery to Owner after completion of work.

C. Receiving and Storage:

1. Inspect and inventory items upon delivery to site.

2. Store and safeguard equipment and material in heated storage facility as recommended by equipment manufacturer.

3. Protect motors from moisture at all times.

D. Prolonged Storage:

1. For extended outdoor storage, remove motors from equipment and store separately.

2. If storage is anticipated to be longer than two months, store in accordance with the manufacturer instructions including the following additional steps.

3. Maintain motor space heaters energized.

4. Fill the oil reservoirs of motors with sleeve bearings to the proper level with the specified oil.

5. Motors with anti-friction bearings to receive an initial change of grease and then be re-greased every six months.

6. Remove the motor shaft braces and the rotate motor shaft every two weeks. Replace the shaft braces prior to relocation to the installation site. Under no circumstances should the motor be lifted without the braces in place.

PART 2 - PRODUCTS

2.01 MOTOR MANUFACTURERS:

A. General Electric Company.

B. Reliance Electric.

C. U.S. Motors.

D. Or Approved Equal

2.02 ELECTRIC MOTOR RATINGS:

A. Voltage Ratings:

1. Unless otherwise specified, motors with ratings of 1/2 to 350 hp (0.37 to 261kW) shall be rated 460-volt (nameplate rating), three-phase, 60-Hertz; motors of 1/3 hp (0.25 kW) or less to be rated 115-volt, single-phase, 60 Hertz.

B. The following specific motor requirements shall be in the equipment specifications:

1. RPM.

2. Motor enclosure type.

2.03 MOTOR DESIGN REQUIREMENTS:

A. Unless otherwise specified or permitted all electric motors furnished and installed by the Contractor shall conform to the requirements hereinafter set forth.

B. Every motor shall be of sufficient capacity to operate the driven equipment under all load and operating conditions without exceeding its rated nameplate current or power or its specified temperature limit at rated voltage. Each motor shall develop ample torque for its required service throughout its acceleration range at a voltage 10 percent below nameplate rating. Where indicated on the electrical drawings to be operated on a reduced voltage starter, the motor shall develop ample torque under the conditions imposed by the reduced voltage starting method.

C. The motor shall have sufficient capacity to operate the driven equipment as given in the equipment detail specifications. The motor shall not be required to deliver more than its rated nameplate horsepower, at unity (1.15) service factor, under any condition of mechanical or hydraulic loading.

D. The motor shall be suitable for rated horsepower and full service factor operation at 3,000 feet elevation above sea level.

E. Type of Motors:

1. All motors shall be NEMA Design B or of a type having starting characteristics and ruggedness as may be necessary under the actual conditions of operation and, unless otherwise specified, shall be suitable for full-voltage starting.

F. Insulation:

1. All motors shall have Class F insulation with temperature rise by resistance at full load rating of a Class F insulation+ in accordance with NEMA Standards for

Motors and Generators, NEMA MG1, and based on a maximum ambient temperature of 40 degrees C unless otherwise specified.

2. Insulation systems shall be manufacturer's premium grade, resistant to attack by moisture, acids, alkalies and mechanical or thermal shock for 480 volt motors. Provide 80 degrees C, Class F rise or better by resistance at 100 percent load and provide a Class F insulation system, suitable for an ambient temperature motor operation of 0 to 40 degrees C at no more than 3,300 feet (1,000 m) above sea level for inverter duty motors. This temperature rise shall be met when motors. .

3. Motors for outdoor service shall have vacuum/pressure impregnated epoxy insulation for moisture resistance.

4. Insulation for inverter duty motor windings shall meet or exceed the Pulse Endurance Index for magnetic wire and shall not be injured when exposed to repeated pulse type waveforms, repetitive high voltage transients, switching frequency and rate of rise of the pulse. Class H varnish shall be used.

G. Enclosures:

1. Motors shall have a steel or cast iron frame and a cast iron or stamped steel conduit box, as specified below. Conduit box shall be split from top to bottom and shall be capable of being rotated to four positions. Synthetic rubber-like gaskets shall be provided between the frame and the conduit box and between the conduit box and its cover. Motor leads shall be sealed with a non-wicking, non-hygroscopic insulating material. A frame mounted pad with drilled and tapped hole, not less than 1/4-inch (6 mm) diameter, shall be provided inside the conduit box for motor frame grounding.

   a. Totally enclosed fan cooled: TEFC motors shall have a steel or cast iron frame, cast iron end brackets, cast iron conduit box, 1.15 service factor at 40 degrees C, tapped drain holes (corrosion resistant plugs for frames 286T and smaller and automatic breather/drain devices for frames 324T and larger) and upgraded insulation by additional dips and bakes to increase moisture resistance.

   b. Totally enclosed non-ventilated: TENV motors shall include the same rating and accessories as specified for TEFC motors.

   c. Explosion proof motors shall comply with all requirements of Class I, Division I, Group D, hazardous locations as defined by the NEC and with all other safety codes pertaining thereto.

H. Special Purpose Motors:

1. Chemical duty motors shall be provided with severe duty rating. Motors shall be of the corrosion resistant type conforming to motors designated by the manufacturer as Corro-Duty, Mill and Chemical, Custom Severe Duty, or similar

quality designation. Severe duty motors shall have a cast iron frame, cast iron end brackets, cast iron conduit box and 1.15 service factor at 40 degrees C and tapped drain holes (corrosion resistant plug for frames 286T and smaller and automatic breather/drain devices for frames 324T and larger).

2. Hermetically sealed air conditioning units, elevators, hoists, cranes and other devices complying with special safety codes shall be furnished with motors, control equipment, accessories and safety devices for approved, safe, and efficient operation, in accordance with the manufacturer's standards and to be rated for the duty cycle as specified for the driven equipment. Minimum service factor 1.15 above 3 hp.

3. Submersible motors shall be manufacturer's standard.

4. Synchronous and wound rotor motors shall be specified elsewhere in the specifications when required.

5. Inverter duty rated: Motors for operation on variable frequency drives shall meet current power quality levels published in NEMA MG1, Part 31. Enclosures shall be equal to those furnished for severe duty or explosion proof motors. Motor shaft and bearings shall be insulated. Internal service factor shall be 1.15 that of the nameplate. Ventilation system shall be designed for maximum heat transfer. Stator laminations shall be stagger-stacked and stamped from high grade electrical steel to minimize eddy-current losses and heat build-up caused by inverter induced harmonics. Rotors shall be configured to minimize skin-effect heating.

I. Auxiliary Devices:

1. Three phase motors shall not be provided with starting capacitors.

2. Single-phase motors requiring switching devices and auxiliary starting resistors, capacitors, or reactors shall be furnished as combination units with such auxiliaries either incorporated within the motor housings or housed in suitable enclosures mounted upon the motor frames. Each combination unit shall be mounted upon a single base and to be provided with a single conduit box.

J. General Design of Motors:

1. Motors shall comply with the latest NEMA Standards Publication No. MG1 for Motors and Generators, unless otherwise specified.

2. All polyphase non-explosion proof motors shall be designed for energy efficient operation and meet the requirements of MG1-12.53 a and b.

3. Motor windings shall be braced to withstand successfully the stresses resulting from the method of starting. The windings shall be treated thoroughly with acceptable insulating compound suitable for protection against moisture and slightly acid or alkaline conditions.

4. Bearings shall be of the self-lubricating type, designed to ensure proper alignment of rotor and shaft and to prevent leakage of lubricant.

    a. Bearings for open motors shall be of the sleeve or ball type, as specified under the respective items of mechanical equipment.

    b. Bearings for totally enclosed and explosionproof motors shall be of the ball type.

    c. Bearing minimum L-10 fatigue life in hours at 100 percent load shall be 50,000.

    d. Bearing grease shall be of the 120 degrees C thermal capability type.

5. All three phase two speed motors shall be of the two-winding design.

6. All three phase motors shall be provided with a 1.15 service factor.

7. Three phase motors shall be of cast iron construction including frame and end brackets.

8. Totally enclosed motors shall be provided with automatic breather and drain

9. Motor nameplates shall be stainless steel.

10. Motor Terminal Boxes and Leads:

    a. Motors shall be furnished with oversize conduit terminal boxes to provide for making and housing the connections, and with flexible leads of sufficient length to extend for a distance of not less than 4 inches beyond the face of the box. The size of cable terminals, and terminal box conduit hoses shall be as permitted by the **Engineer**. An acceptable type of solderless lug to be furnished. Totally enclosed and explosionproof motors to have cast-iron terminal boxes.

    b. Leads for space heaters shall be brought out into an auxiliary, cast, conduit box on the motor side opposite to the main terminal box. Auxiliary box to have 1 inch (50 mm) threaded conduit openings and shall be so constructed that conduit entrance may be placed at top, bottom, or either side.

    c. A grounding terminal shall be provided in the main terminal box and a bronze grounding bolt to be furnished at the conduit side of the motor frame.

K. Motor Efficiencies:

1. Three phase motors rated 1 hp (0.75 kW) and larger shall be of the premium efficiency, “Design E”, type per Table 12.1 of NEMA MG1 Part 12. Motors shall have a NEMA Nominal Efficiency not less than the values referenced in NEMA

MG1. Efficiency values shall be based on tests performed in accordance with IEEE Publication No. 112, Method B. Motors with horsepower or rpm's not listed shall conform to comparable standards of construction and materials as those for listed motors.

L. Shop Painting:

1. Unless otherwise specified, motors shall be given a shop application of paint filler or enamel sealer, a flat coat of undercoater for enamel, and two coats of enamel or, in lieu of this treatment, other corrosion-resistant treatment customary with the manufacturer.

M. Motor Data:

1. The Contractor shall furnish the **Engineer** with five certified copies of characteristic curves of each motor furnished, except 115-volt motors. Curves shall be supplied as a part of the driven equipment submittal.

N. Motor Shop Tests:

1. Motor shop tests shall be made in accordance with the IEEE Test Codes as specified in the NEMA MG1 Standards for Motors and Generators. NEMA report-of-test forms to be used in submitting test data.

2. Motor efficiency shall be determined by use of IEEE Standard 112 Test Method B, and by use of MGI-12.53 a and b.

3. For induction motors larger than 100 hp (75 kW), complete tests of each motor furnished to be made and certified tests data sheets to be submitted, unless witness shop tests are required by the technical specifications pertaining to the equipment. Each motor shall be tested at rated voltage for: efficiency and power factor at 50, 75, and 100 percent of it rated horsepower; for temperature rise, torque, no-load current, starting current, full load current, and dielectric strength; and for compliance with all specified performance requirements.

4. For induction motors 5 hp, up to and including 100 hp, copies of routine tests reports of electrically duplicate motors shall be furnished.

5. For motors 3 hp or less, no test data need be furnished.

O. Spare Parts:

1. Furnish one spare bearing of each type for each motor size and type.

P. Capacitors for Motors:

1. All three phase, non-explosionproof 460 volt motor (except for motors driven through variable frequency drive units) shall be provided with a capacitor of the

maximum kVAR. Size recommended by the motor manufacturer and in accordance with the requirements of the NEC.

2. Capacitors shall be furnished with the motors. All capacitors to be installed and wired in accordance with the requirements of the NEC.

3. Capacitor shall be rated 600 volt, 3-phase, 60 Hertz.

4. Each capacitor unit to be enclosed in a corrosion-resistant weatherproof dusttight housing for indoor/outdoor use with threaded conduit connection. A heavy duty corrosion-resistant wall rack shall be provided with each capacitor. Discharge resistors to be included to reduce the voltage to 50 volts or less within one minute after the capacitor is disconnected from the source.

5. Capacitors shall be dry film or liquid insulated and shall be hermetically sealed in steel enclosures.

6. Each capacitor unit shall be furnished with three high interrupting capacity current limiting fuses. Fuss shall be equipped with blown-fuse indicators.

7. Capacitor enclosures shall be suitable for conduit connection and of the NEMA enclosure type required for the area as indicated on the Drawings. Covers shall be gasketed, bolt-on type.

8. Capacitors shall be UL listed.

9. Capacitors shall be by General Electric Co.; Square D Co.; Sprague; or equal.

2.04 ELECTRICAL INTERFACE:

A. All items of electrical equipment that are furnished with process, heating, ventilating, or other equipment shall conform to the requirements specified under the applicable electrical sections of the Division 26 specifications. Enclosures for electrical equipment such as switches, starters, etc., shall also conform to the requirements specified under the applicable electrical sections of the Division 26 specifications.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Verify heaters are energized on motors installed in outdoor or unheated areas.

B. After motor installation but before connection to power wiring, test motor winding insulation in accordance with the applicable Division 26 requirements.

C. After connection to power wiring, check for operating temperature, correct rotation, vibration, alignment and operating current drawn under load.

D. Submit all motor test results for review and record.

3.02 CONTRACT CLOSEOUT:

A. Provide in accordance with Section 01 70 00.

END OF SECTION

SECTION 311100 CLEARING, STRIPPING, AND GRUBBING

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes the work included in clearing, stripping, grubbing, and preparing the project site for construction operations.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Existing Conditions: General Provisions and Section 013300.

B. Protecting Existing Underground Utilities: 020120.

C. Earthwork: 312300.

D. Trenching, Backfilling, and Compacting: 312316.

1.03 CLEARING

Remove and dispose of trees, snags, stumps, shrubs, brush, limbs, sticks, branches, and other vegetative growth. Remove rocks, tiles, and lumps of concrete. Remove all evidence of their presence from the surface. Remove and dispose of trash piles, rubbish. Protect structures and piping above and below ground, trees, shrubs, and vegetative growth which are not designated for removal.

1.04 STRIPPING

A. Remove and dispose of organic sod, grass and grass roots, and other objectionable material remaining after clearing from the areas designated to be stripped.

1.05 GRUBBING

After clearing and stripping, remove and dispose of wood or root matter, including stumps, logs, trunks, roots, or root systems greater than 1 inch in diameter or thickness to a depth of 12 inches below the ground surface.

PART 2 - MATERIALS

2.01 TREES AND SHRUBBERY

Existing trees, shrubbery, and other vegetative material may not be shown in the drawings. Inspect the site as to the nature, location, size, and extent of vegetative

material to be removed or preserved, as specified herein. Preserve in place trees that are specifically shown in the drawings and designated to be preserved.

2.02 PRESERVATION OF TREES, SHRUBS, AND OTHER PLANT MATERIAL

A. Save and protect plant materials (trees, shrubbery, and plants) beyond the limits of clearing and grubbing from damage resulting from the work. No filling, excavating, trenching, or stockpiling of materials will be permitted within the drip line of these plant materials. The drip line is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of a plant or group of plants. To prevent soil compaction within the drip line area, no equipment will be permitted within this area.

B. Cut and remove tree branches where necessary for construction. Remove branches other than those required for a balanced appearance of any tree. Treat cuts with a tree sealant.

PART 3 - EXECUTION

3.01 CLEARING, STRIPPING, AND GRUBBING AREAS AND LIMITS

A. Clear, strip, and grub excavation and embankment areas associated with new structures, slabs, walks, and roadways.

B. Clear and strip stockpile areas.

C. Limits of clearing, stripping, and grubbing:

1. Excavation, Excluding Trenches: 5 feet beyond tops of cut slopes.

2. Trench excavation for piping and electrical conduits: 3 feet from edge of trench.

3. Earth Fill: 5 feet beyond toe of permanent fill as indicated in the drawings.

4. Structures: 15 feet beyond footings.

5. Streets, Roadways, and Parking Areas: 10 from toe of fill or top of cut.

6. Sidewalks: 2 feet beyond edges.

7. Landscaped Areas: 2 feet beyond areas designated to receive landscaping.

3.02 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

Do not burn combustible materials. Remove cleared and grubbed material from the worksite and dispose.

3.03 DISPOSAL OF STRIPPED MATERIAL

Remove stripped material and dispose offsite.

END OF SECTION

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SECTION 312300 EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of earthwork for excavations, fills, and embankments for structures. Refer to the Geotechnical Investigation Report and general notes on plans for additional earthwork requirements. When a discrepancy exists between these specifications and the Geotechnical Investigation Report, the most stringent requirement shall apply.

1.02 SUBMITTALS

A. Submit excavation and shoring drawings for worker protection in accordance with the special Provisions Section 10-7 as required by labor Code Section 6075. Plans shall be prepared by a Professional Civil Engineer licensed in State of California and include a statement that the plan complies with Cal/OSHA Construction Safety Orders.

B. For imported material, submit a report from a testing laboratory verifying that the material 0.25% asbestos by weight or volume and conforms to the gradation specified. Submit asbestos test results with the submittals for materials gradation. Material gradation reports without the accompanying asbestos test results will be rejected as incomplete.

1.03 TESTING FOR COMPACTION

A. The Owner will test for compaction and relative density as described below.

B. Determine the density of soil in by nuclear methods, ASTM D6938. Additional densities will be required if the backfill material is visually variable. Compaction test will be performed for each lift or layer.

C. Determine laboratory moisture-density relations of soils per ASTM D1557. The compaction test results for maximum dry density and optimum water content shall be adjusted in accordance with ASTM D4718. This will be required for determination of percent relative compaction and moisture variation from optimum.

D. Determine the relative density of cohesionless soils per ASTM D4253 and D4254.

E. Sample materials in accordance with ASTM D75 (aggregates) and ASTM D1586 or D2487 (soils), as applicable.

F. “Relative compaction” is the ratio, expressed as a percentage, of the in place dry density to the laboratory maximum dry density.

G. Compaction shall be deemed to comply with the specifications when no test falls below the specified relative compaction.

1.04 DISPOSAL OF EXCESS MATERIALS

Excess site excavated or wasted material shall be disposed of offsite by the Contractor at his expense. No prearranged disposal site or related permits have been determined or secured by the Owner.

PART 2 - MATERIALS

2.01 STRUCTURAL BACKFILL

A. Structural backfill is material that is to be placed adjacent to and around piping and structures.

B. Material shall be free from deleterious material, rocks or hard lumps greater than three inches in maximum dimension, and shall have the following gradation:

Sieve Size	**Percent Passing By Weight**
1 1/2 inches	100
3/4 inch	80 to 90
3/8 inch	60 to 75
No. 4	50 to 65
No. 40	25 to 40
No. 100	20 to 35
No. 200	0 to 15

C. Material should have an Expansion Index of 30 or less when tested in accordance with ASTM D4829

D. Excavated onsite material may be used for structural backfill provided it conforms to the above specifications for structural backfill material.

2.02 SAND

A. Granular material free from clay balls, organic matter, and other deleterious substances and conforming to the following gradations:

Sieve Size	Percent Passing By Weight
3/8 inch	100
No. 4	75 to 100
No. 30	12 to 50
No. 100	5 to 20
No. 200	0 to 10

2.03 WATER FOR COMPACTION

Water shall be free of organic materials and shall have a pH of 7.0 to 9.0, a maximum chloride concentration of 500 mg/L, and a maximum sulfate concentration of 500 mg/L. Provide all water needed for earthwork. Provide temporary piping and valves to convey water from the source to the point of use.

2.04 FILTER FABRIC

See Section 313219.

PART 3 - EXECUTION

3.01 DEWATERING

Provide and operate equipment adequate to keep excavations and trenches free of water.

3.02 EXCAVATION

A. Excavations shall have sloping, sheeting, shoring, and bracing conforming with 29CFR1926 Subpart P-Excavations, CAL/OSHA requirements.

B. Excavation is unclassified. Perform excavation regardless of the type, nature, or condition of the material encountered to accomplish the construction. Do not operate excavation equipment within 5 feet of existing structures or newly completed construction. Excavate with hand tools in these areas.

3.03 LIMITS OF FOUNDATION EXCAVATION

Excavate to the depths and widths needed to accomplish the construction. Allow for forms, working space, structural backfill, and site grading. Over excavate to a minimum of 2 feet below the bottom of the planned excavation and 5 foot beyond the perimeter of structures. Backfill over excavation with compacted structural backfill material. Correct cuts below grade by trimming adjoining areas and creating a smooth transition.

3.04 PREPARATION OF FOUNDATION SUBGRADE

A. The finished subgrade shall be within a tolerance of ±0.08 of a foot of the grade and cross section indicated, shall be smooth and free from irregularities, and shall be at the specified relative compaction. The subgrade shall extend over the full width and extend 1 foot beyond the edge of the foundations.

B. Compact the top 12 inches of the subgrade to 95% relative compaction. Recompaction will not be required if rock is exposed at the final subgrade.

C. Remove soft material encountered and replace with structural backfill. Fill holes and depressions to the required line, grade, and cross sections with structural backfill.

D. If rock is encountered at the final grade, over excavate to a depth of 6 inches and place structural backfill to establish the final grade.

3.05 PREPARATION FOR PLACING FILL OR BACKFILL

A. After excavation of existing material or removal of unacceptable material at the exposed subgrade, scarify the final subgrade surface to a depth of 12 inches and compact to 95% relative compaction.

B. Remove foreign materials and trash from the excavation before placing any fill material. Obtain the specified compressive strength and finish of concrete work before backfilling.

3.06 PLACING AND COMPACTING STRUCTURAL BACKFILL

A. Place structural backfill material around piping, structures, channels, and other areas, including authorized over excavation areas, to the lines and grades shown or specified. Do not exceed loose lifts of 8 inches.

B. Limits of Structural Backfill: Limits of structural backfill shall be 1.0 feet from edge of footing and shall extend at a 1:1 slope to the finish grade.

C. Compact each lift to 95% relative compaction, unless otherwise shown in the drawings. Stop structural backfill at least 6 inches below finished grade in all areas where topsoil is to be placed.

D. Do not operate earthmoving equipment within 5 feet of walls of concrete structures. Place and compact backfill adjacent to concrete walls with hand-operated tampers or other equipment that will not damage the structure.

END OF SECTION

SECTION 312316 TRENCHING, BACKFILLING, AND COMPACTING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation for pipeline trench excavation, backfilling, and compacting.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Existing Conditions: General Provisions.

B. General Concrete Construction: 030500.

C. Clearing, Stripping, and Grubbing: 311100.

D. Earthwork: 312300.

E. Filter Fabric: 313219.

F. Pressure Testing of Piping: 400515.

G. Equipment, Piping Duct, and Valve Identification: 400775.

1.03 SUBMITTALS

A. Submit a report from a testing laboratory verifying that material contains less than 0.25% asbestos by weight or volume and conforms to the specified gradations or characteristics for pea gravel, granular material, imported sand, rock refill for foundation stabilization, and water. Submit asbestos test results with the submittals for materials gradation. Material gradation reports without the accompanying asbestos test results will be rejected as incomplete.

B. Submit method(s) of compaction including removal sequence of shoring where used.

1.04 TESTING FOR COMPACTION

A. The Owner will test for compaction as described in Section 312300.

1.05 PAVEMENT ZONE

The pavement zone includes the asphalt concrete and aggregate base pavement section placed over the trench backfill.

1.06 STREET ZONE

The street zone is the top 30 inches of the trench immediately below the pavement zone in paved areas. Where the depth of cover over the pipe does not permit the full specified thickness of the street zone, construct a thinner street zone, extending from the top of the pipe zone to the bottom of the pavement zone.

1.07 TRENCH ZONE

The trench zone includes the portion of the trench from the top of the pipe zone to the bottom of the street zone in paved areas or to the existing surface in unpaved areas. If the resulting trench zone is less than 24 inches thick, the street zone shall extend to the top of the pipe zone and there shall be no separate trench zone.

1.08 PIPE ZONE

The pipe zone shall include the full width of trench from the bottom of the pipe or conduit to a horizontal level above the top of the pipe, as specified below. Where multiple pipes or conduits are placed in the same trench, the pipe zone shall extend from the bottom of the lowest pipe to a horizontal level above the top of the highest or topmost pipe. Thickness of pipe zone above the highest top of pipe shall be as follows unless otherwise shown in the drawings or otherwise described in the specifications for the particular type of pipe installed.

Pipe Diameter	Thickness of Pipe Zone Above Top of Pipe
6 inches or smaller	12 inches
8 inches and larger	12 inches

1.09 PIPE BASE OR BEDDING

The pipe base or bedding shall be defined as a layer of material immediately below the bottom of the pipe or conduit and extending over the full trench width in which the pipe is bedded. Thickness of pipe base shall be as follows unless otherwise shown in the drawings or otherwise described in the specifications for the particular type of pipe installed.

Pipe Diameter	Thickness of Pipe Base
All Diameters	6 Inches

PART 2 - MATERIALS

2.01 GRANULAR MATERIAL FOR BACKFILL--STREET AND TRENCH ZONES

Granular material or granular soil for backfill used above the pipe zone shall be lean bank-run or pit-run gravel, or native soil. The maximum particle size shall be 2 inches. A maximum of 10%shall pass a No. 200 sieve.

2.02 NATIVE EARTH BACKFILL--STREET AND TRENCH ZONES

A. Native earth backfill used above the pipe zone shall be excavated fine-grained materials free from roots, debris, rocks larger than 3 inches, asbestos, organic matter, clods, clay balls, broken pavement, and other deleterious materials. Less than 50% shall pass a No. 200 sieve. At least 40%shall pass a No. 4 sieve. The coarser materials shall be well distributed throughout the finer material.

B. Backfill materials that are obtained from trench excavated materials to the extent such material is available shall be either screened directly into the trench or screened during the trenching operation. If screened during trenching, the material shall be maintained free of unscreened material during the handling and backfilling process. Hand selecting of rocks from earth as it is placed into the trench will not be permitted in lieu of the specified screening. Under no circumstances will native earth backfill be allowed or used in the pipe base or pipe zone areas. Backfill shall be moisture conditioned to within approximately 2% of the optimum moisture content prior to being placed in trench.

2.03 IMPORTED SAND--PIPE ZONE AND PIPE BASE

A. See Section 312300.

2.04 GRAVEL AND CRUSHED ROCK--PIPE ZONE AND PIPE BASE

A. Gravel or crushed rock material shall contain less than 0.25% asbestos by weight or volume and conform to the Standard Specifications for Public Works Construction, Section 200-1.2.and shall meet the following gradation:

Sieve Sizes	**Designated Gravel Size**			
	1-1/2-Inch	**1-Inch**	**3/4-Inch**	**3/8-Inch**
	Percent Passing	**Percent Passing**	**Percent Passing**	**Percent Passing**
2 inches	100	-	-	-
1 1/2 inches	90 to 100	100	-	-
1 inch	20 to 55	90 to 100	100	-
3/4 inch	0 to 15	30 to 60	90 to 100	-
1/2 inch	-	0 to 20	30 to 60	100
3/8 inch	0 to 5	-	0 to 20	90 to 100
No. 4	-	0 to 5	0 to 5	30 to 60
No. 8	-	-	-	0 to 10

B. Use 3/4-inch size unless indicated otherwise in the drawings.

2.05 SAND-CEMENT SLURRY BACKFILL--PIPE ZONE

Sand-cement slurry backfill shall consist of one sack (94 pounds) of Type I or II portland cement added per cubic yard of imported sand and sufficient water for workability.

2.06 ROCK REFILL FOR FOUNDATION STABILIZATION

Rock refill shall be crushed or natural rock containing less than 0.25% asbestos by weight or volume, having the following gradation:

Sieve Size	Percent Passing By Weight
3 inches	100
1 1/2 inches	70 to 100
3/4 inch	60 to 100
No. 4	25 to 55
No. 30	10 to 30
No. 200	0 to 10

2.07 CONCRETE FOR PIPE ENCASEMENT AND THRUST BLOCKS

A. Concrete for unreinforced pipe encasement and thrust blocks shall be Class C per Section 030500, unless otherwise shown in the drawings.

B. Provide thrust blocks at fittings in pipe having rubber gasket bell-and-spigot or unrestrained mechanical joints. Provide thrust blocks at fittings for FRP pipe, regardless of the type of joint utilized. Do not provide thrust blocks for steel pipe having welded, flanged, or butt-strap joints unless detailed in the drawings or required in the detailed piping specification.

C. See the details in the drawings for thrust block sizes. Install thrust blocks based on the test pressures given in the drawings . Size thrust blocks in accordance with the following table:

Pipe Test Pressure (psi)	Use Thrust Block Sizing for
0 to 25	25 psi
26 to 50	50 psi
51 to 100	100 psi
101 to 150	150 psi
151 to 200	200 psi

D. Dimensions of thrust blocks for pipes smaller than 6 inches shall be the same as the dimensions shown for 6-inch pipe, unless specific dimensions are shown in the drawings.

2.08 WATER FOR COMPACTION

See Section 312300. Water shall be free of organic materials injurious to the pipe coatings.

2.09 UNDERGROUND PLASTIC WARNING TAPE FOR METAL PIPE

See Section 400775.

2.10 UNDERGROUND DETECTABLE METALLIC PIPE WARNING TAPE

See Section 400775.

2.11 FILTER FABRIC

See Section 313219.

PART 3 - EXECUTION

3.01 SLOPING, SHEETING, SHORING, AND BRACING OF TRENCHES

Trenches shall have sloping, sheeting, shoring, and bracing conforming with 29CFR1926, Subpart P--Excavations, CAL/OSHA requirements, and the General Provisions.

3.02 SIDEWALK, PAVEMENT, AND CURB REMOVAL

Cut bituminous and concrete pavements regardless of the thickness and curbs and sidewalks prior to excavation of the trenches with a pavement saw or pavement cutter. Width of the pavement cut shall be at least equal to the required width of the trench at ground surface. Haul pavement and concrete materials from the site. Do not use for trench backfill.

3.03 TRENCH EXCAVATION

A. Excavate the trench to the lines and grades shown in the drawings with allowance for pipe thickness, sheeting and shoring if used, and for pipe base or special bedding. If the trench is excavated below the required grade, refill any part of the trench excavated below the grade at no additional cost to the Owner with foundation stabilization material. Place the refilling material over the full width of trench in compacted layers not exceeding 6inches deep to the established grade with allowance for the pipe base or special bedding.

B. Trench widths in the pipe zone shall be as shown in the drawings. If no details are shown, maximum width shall be 18 inches greater than the pipe outside diameter. Comply with 29 CFR Part 1926 Subpart P--Excavations. Trench width at the top of the trench will not be limited except where width of excavation would undercut adjacent structures and footings. In such case, width of trench shall be such that there is at least 2 feet between the top edge of the trench and the structure or footing.

C. Construct trenches in rock by removing rock to a minimum of 6 inches below bottom of pipe and backfilling with imported sand.

3.04 TRENCH EXCAVATION IN BACKFILL AND EMBANKMENT AREAS

A. Construct and compact the embankment to an elevation of 1-foot minimum over the top of the largest pipe or conduit to be installed.

B. Excavate trench in the compacted backfill or embankment.

3.05 LOCATION OF EXCAVATED MATERIAL

A. During trench excavation, place the excavated material only within the working area . Do not obstruct any roadways or streets. Do not place trench spoil over pipe, buried utilities, manholes, or vaults. Conform to federal, state, and local codes governing the safe loading of trenches with excavated material.

B. Locate trench spoil piles at least 15 feet from the tops of the slopes of trenches. Do not operate cranes and other equipment on the same side of the trench as the spoil piles.

3.06 DEWATERING

Provide and maintain means and devices to remove and dispose of water entering the trench excavation during the time the trench is being prepared for the pipe laying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. These provisions shall apply during both working and nonworking hours, including lunchtime, evenings, weekends, and holidays. Dispose of the water in a manner to prevent damage to adjacent property and in accordance with regulatory agency requirements. Do not drain trench water through the pipeline under construction.

3.07 FOUNDATION STABILIZATION

A. After the required excavation has been completed, the Owner will inspect the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation be conducted in all areas within the influence of the pipeline where unacceptable materials exist at the exposed subgrade. Overexcavation shall include the removal of all such unacceptable material that exist directly beneath the pipeline to a width 24 inches greater than the pipe outside diameter and to the depth required.

B. Place filter fabric on the bottom of the trench and up the sides a sufficient height to retain rock refill material. Backfill the trench to subgrade of pipe base with rock refill

material for foundation stabilization. Place the foundation stabilization material over the full width of the trench and compact in layers not exceeding 6 inches deep to the required grade. Foundation stabilization work shall be executed in accordance with a change order.

C. Rock refill used by the Contractor for his convenience will not be cause for any additional payment.

3.08 INSTALLING BURIED PIPING

A. Grade the bottom of the trench to the line and grade to which the pipe is to be laid, with allowance for pipe thickness. Remove hard spots that would prevent a uniform thickness of bedding. Place the specified thickness of pipe base material over the full width of trench. Grade the top of the pipe base ahead of the pipe laying to provide firm, continuous, uniform support along the full length of pipe, and compact to the relative compaction specified herein. Before laying each section of the pipe, check the grade and correct any irregularities.

B. Excavate bell holes at each joint to permit proper assembly and inspection of the entire joint. Fill the area excavated for the joints with the bedding material specified or indicated in the drawings for use in the pipe zone. If no bedding material is specified or indicated, use imported sand.

C. Inspect each pipe and fitting before lowering the buried pipe or fitting into the trench. Inspect the interior and exterior protective coatings. Patch damaged areas in the field with material recommended by the protective coating manufacturer. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after installation.

D. Handle pipe in such a manner as to avoid damage to the pipe. Do not drop or dump pipe into trenches under any circumstances.

E. When installing pipe, do not deviate more than 1 inch from line or 1/4 inch from grade. Measure elevation at the pipe invert.

F. After pipe has been bedded, place pipe zone material simultaneously on both sides of the pipe, in maximum 6-inch lifts, keeping the level of backfill the same on each side. If no pipe zone material is specified or indicated, use imported sand. Carefully place the material around the pipe so that the pipe barrel is completely supported and no voids or uncompacted areas are left beneath the pipe. Use particular care in placing material on the underside of the pipe to prevent lateral movement during subsequent backfilling.

G. Compact each lift to the relative compaction specified herein.

H. Push the backfill material carefully onto the backfill previously placed in the pipe zone. If no backfill material is otherwise specified or indicated, use materials meeting the requirements for structural backfill. Do not permit free-fall of the material until at least 2 feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of

material directly onto the pipe or the tamped material around the pipe. Do not operate heavy equipment or a sheepsfoot wheel mounted on a backhoe over the pipe until at least 3 feet or one-half of the internal diameter, whichever is greater, of backfill has been placed and compacted over the pipe.

I. When the pipe laying is not in progress, including the noon hours, close the open ends of pipe. Do not allow trench water, animals, or foreign material to enter the pipe.

J. Keep the trench dry until the pipe laying and jointing are completed.

3.09 BACKFILL COMPACTION

A. Unless otherwise shown in the drawings or otherwise described in the specifications for the particular type of pipe installed, relative compaction in pipe trenches shall be as follows:

1. Pipe Zone: 90% relative compaction.

2. Backfill in Trench Zone Not Beneath Paving: 90% relative compaction. Compact backfill within embankment above the pipe zone to the same relative compaction as the adjacent embankment as specified in Section 312300.

3. Backfill in Trench Zone to Street Zone in Paved Areas: 95% relative compaction.

4. Backfill in Street Zone in Paved Areas: 95% relative compaction.

5. Rock Refill for Foundation Stabilization: 80% relative density.

6. Refill for Overexcavation: 80% relative density.

B. Compact trench backfill to the specified relative compaction. Compact by using mechanical compaction or hand tamping. Do not use high-impact hammer-type equipment except where the pipe manufacturer warrants in writing that such use will not damage the pipe.

C. Compact material placed within 12 inches of the outer surface of the pipe by hand tamping only.

D. Do not use any axle-driven or tractor-drawn compaction equipment within 5feet of building walls, foundations, and other structures.

3.10 MATERIAL REPLACEMENT

Remove and replace any trenching and backfilling material that does not meet the specifications, at the Contractor's expense.

3.11 PLACING SAND-CEMENT SLURRY BACKFILL

Place sand-cement slurry backfill in a uniform manner that will prevent voids in or segregation of the material. Remove foreign material that falls into the excavation or trench. Do not commence backfilling over or place any material over the slurry cement backfill until at least four hours after placing the sand-cement slurry.

END OF SECTION

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SECTION 312323 GRAVEL AND CRUSHED ROCK BASE FOR STRUCTURES

PART 1 - GENERAL

1.01 DESCRIPTION

This includes materials, testing, and installation of gravel and crushed rock bases for structures such as manholes and vaults.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Earthwork: 312300.

C. Precast concrete vaults: 034220

1.03 SUBMITTALS

Submit copy of a report from a testing laboratory verifying that the material contains less than 0.25% asbestos by weight or volume and conforms to the specified gradations or characteristics. Submit asbestos test results with the submittals for material gradation.

1.04 TESTING FOR COMPACTION

A. The Owner will test for compaction or relative density as described in Section 312300.

PART 2 - MATERIALS

2.01 CRUSHED ROCK AND GRAVEL

A. Crushed rock base and gravel are defined as natural or crushed rock, free from organic matter and containing less than 0.25% asbestos by weight or volume, and meeting the following gradation:

Sieve Size	Percent Passing By Weight
1 1/2 inches	100
3/4 inch	90 to 100
No. 4	0 to 10
No. 200	0 to 5

B. Durability Index shall be at least 40 per ASTM D3744.

PART 3 - EXECUTION

3.01 PLACEMENT OF CRUSHED ROCK OR GRAVEL

A. Place crushed rock or gravel base beneath structures where shown in the drawings, 12 inches thick unless otherwise indicated. Excavate below the required grade for the bottom of the structure and refill with crushed rock or gravel as specified above. The rock base shall extend to a minimum of 24 inches beyond the structure base, floor slab, or footing.

B. Compact crushed rock base as follows unless otherwise indicated:

1. Lower Lift: 90% relative density.

2. Upper Lifts: 90% relative density.

C. Place base material in maximum lifts of 6 inches.

END OF SECTION

SECTION 313219 FILTER FABRIC

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of filter fabric and its maintenance until the bedding material cover is completed.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Clearing, Stripping, and Grubbing: 311100.

B. Earthwork: 312300.

C. Trenching, Backfilling, and Compacting: 312316.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit manufacturer's catalog data and a sample of the filter fabric.

C. Submit manufacturer's recommended installation instructions and details.

D. Submit mill certificate or affidavit signed by a legally authorized official from the company manufacturing the fabric. The mill certificate or affidavit shall attest that the fabric meets the chemical, physical, and manufacturing requirements stated in this specification.

1.04 GEOTEXTILE INSTALLATION AND RIPRAP APPLICATION INSTRUCTION AND TRAINING

The Contractor and the geotextile manufacturer’s representative shall conduct a geotextile installation and test riprap fill performance demonstration/training session at the site prior to foundation preparation, geotextile installation, and riprap installation. This training session shall prequalify the placement and installation personnel, demonstrate the proper foundation preparation and installation methods used, and ensure that the riprap application methods will not damage the geotextile during installation. Establish geotextile installation procedures. Determine the maximum heights from which the soil, sand, and riprap can be dropped without damaging the geotextile.

PART 2 - MATERIALS

2.01 MANUFACTURERS

Product	Catalog No.	AOS	Woven/Non
Geotex	GT-4x4F	30	Woven

Or equal.

2.02 FILTER FABRIC

A. Filter fabric shall be a pervious sheet of woven or nonwoven plastic yarn. The filter fabric shall provide an apparent opening size (AOS) per ASTM D4751 no coarser than the U.S. Standard Sieve No. 30.

B. The plastic yarn shall meet the physical requirements specified in AASHTO M288.

C. Geotextiles shall meet the properties specified in AASHTO M288 as follows:

Service	Requirements
Stabilization	Table 4

D. Manufacture the fabric into a width not less than 12.5 feet.

E. Filter fabric shall not act as a wicking agent.

PART 3 - EXECUTION

3.01 SHIPMENT, STORAGE, AND HANDLING

A. Protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust, and debris at all times during shipment and storage. To the extent possible, wrap the fabric in a heavy-duty protective covering.

B. Store fabric on clean, dry surfaces, free of foreign substances such as grease, oil, paint, epoxy, cement, or any other substances which would have a deleterious effect on the fabric. When stored in outside areas, keep fabric 1-foot minimum above ground level. Keep the fabric in its protective covering until it is ready for installation. Cover opened rolls by a waterproof cover. Do not use hooks, tongs, or other sharp tools or instruments when handling fabric. Fabric may be unloaded or handled in one of the following ways:

1. By placing slings under the rolls.

2. By using a pole inserted through a hollow core, provided the pole extends 1-foot minimum beyond each end of the core and lifting and handling devices are attached to only that portion of the pole located outside the ends of the core.

3. By hand.

3.02 PROTECTION DURING INSTALLATION

Protect the geotextile during installation from clogging, tears, and other damage. Provide ballast (e.g., sand bags) to prevent uplift by wind. Do not leave the geotextile uncovered for more than 14 days after installation.

3.03 SUBGRADE PREPARATION

Prepare the surface to receive fabric to a smooth condition free of sharp objects, obstructions, depressions, debris, and soft or low-density pockets of material.

3.04 COVERING WITH FILTER ROCK

A. Schedule the work so that the covering of the fabric with the planned thickness of the specified material is accomplished within 30 days after placement of the fabric. Failure to comply shall require replacement of fabric.

B. Protect the filter fabric from damage due to the placement of riprap or other materials by limiting the height of drop of the material or by placing a 6 inch-cushioning layer of sand on top of the fabric before dumping the material. Before placement of riprap, the Contractor shall demonstrate that the placement technique will prevent damage to the fabric.

3.05 COVERING WITH SOIL OR SAND

Do not cover geotextile prior to inspection by the Owner's Representative. Place cover soil or sand in a manner that prevents soil or sand from entering the geotextile overlap zone, prevents tensile stress from being mobilized in the geotextile, and prevents wrinkles from folding over onto themselves. On side slopes, place soil or sand backfill from the bottom of the slope upward. Do not drop cover soil or sand onto the geotextile from a height greater than 3 feet. Do not operate equipment directly on top of the geotextile. Use equipment with ground pressures less than 7 psi to place the first lift over the geotextile. Maintain a minimum of 12 inches of soil between full-scale construction equipment and the geotextile. Cover soil or sand material type, compaction, and testing requirements are described in Section 312300 and 312316. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 5 mph.

3.06 REPAIRING DAMAGED FABRIC

A. Protect the fabric at all times during construction from contamination by surface runoff. Remove and replace fabric so contaminated with uncontaminated fabric. Repair any damage to the fabric during its installation or during placement of bedding materials by the Contractor at his expense.

B. Repair fabric damaged during placing, in other than underdrain piping service, by placing a piece of fabric large enough to cover the torn or punctured area, meet the overlap requirement, and extend a minimum of 12 inches beyond the edge of the

damaged area. Repair damaged sections of fabric used in underdrain piping by cutting out the damaged section over the full width of the spiral section and stitching a new fabric section in place for a minimum length of 18 inches.

C. Damage to the fabric resulting from the Contractor's vehicles, equipment, or operations shall be repaired by the Contractor at his expense.

D. Maintain a minimum of 6 inches of material between the fabric and Contractor's equipment, during spreading and compaction of the bedding material. Where embankment material is to be placed on the filter fabric, maintain a minimum of 18 inches of embankment material between the fabric and the Contractor's equipment. Do not operate or drive equipment or vehicles directly on the filter fabric.

END OF SECTION

SECTION 331220 BACKFLOW PREVENTERS AND DETECTOR CHECKS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of reduced pressure backflow preventers.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Pressure Testing of Piping: 400515.

C. Manual, Check, and Process Valves: 400520.

D. Equipment, Piping, Duct, and Valve Identification: 400775.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 0133000.

B. Submit manufacturer's certificate of compliance with AWWA C511 for backflow preventers.

C. Provide manufacturer's certification that materials are lead-free.

D. Submit dimensional drawings for each size and type of backflow preventer

E. Submit manufacturer’s catalog data and detail drawings showing backflow preventer parts and describe by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show manufacturer’s recommended maximum operating pressure and maximum recommended flow. Show linings and coatings.

PART 2 - MATERIALS

2.01 BACKFLOW PREVENTERS

A. Backflow preventers shall be of the reduced pressure type, complying with AWWA C511. Provide two independently operating check valves, two shutoff valves, an automatic pressure differential relief valve, and test cocks so that a test of each check valve can be made. Design backflow preventers for cold-water service.

B. Backflow preventers of sizes 2 inches and smaller shall have bronze (ASTM B61 or B62) check valves. Check valves shall be of the poppet type and have replaceable seats.

C. Backflow preventers 2 inches and larger shall have check valves of either the poppet or the toggle lever type. Check valves larger than 2 inches shall have cast-iron (ASTM A126, Class B) body and cover.

D. Differential relief valve shall be bronze (ASTM B61 or B62) with Type 304 or 316 stainless steel trim.

E. Isolation valves shall be Type V-100 gate or Type V-300 ball per Section 400520 for backflow preventers smaller than 3 inches

F. Backflow preventers shall be Clayton Model RP, Mueller Model FRP-II or 6CM or equal.

2.02 BRONZE COMPONENTS

Bronze in contact with water shall have the following chemical constituents:

Constituent	Content
Zinc	7% maximum
Aluminum	2% maximum
Lead	8% maximum
Copper + Nickel + Silicon	83% minimum

PART 3 - EXECUTION

3.01 PAINTING AND COATING

A. Coat backflow preventers and include isolation valves the same as the adjacent piping. If the adjacent piping is not coated, then coat per Section 099000, System No. 15. Apply the specified prime and intermediate, and finish coats at the place of manufacture. Do not coat bronze or stainless steel items. The finish coat shall be selected by the owner.

3.02 SHIPMENT AND STORAGE

A. Identify the equipment with item and serial numbers. Material shipped separately shall be identified with securely affixed, corrosion-resistant metal tags indicating the item and serial number of the equipment for which it is intended. In addition, ship crated equipment with duplicate packing lists, one inside and one on the outside of the shipping container.

B. Pack and ship one copy of the manufacturer’s standard installation instructions with the equipment. Provide the instructions necessary to preserve the integrity of the storage preparation after the equipment arrives at the jobsite and before start-up.

C. Provide flanged openings with metal closures at least 3/16-inch thick, with elastomer gaskets and at least four full-diameter bolts. Provide closures at the place of pump manufacture prior to shipping. For studded openings, use all the nuts needed for the intended service to secure closures.

D. Provide threaded openings with steel caps or solid-shank steel plugs. Do not use nonmetallic (such as plastic) plugs or caps. Provide caps or plugs at the place of pump manufacture prior to shipping.

E. Clearly identify lifting points and lifting lugs on the equipment or equipment package. Identify the recommended lifting arrangement on boxed equipment.

3.03 INSTALLATION OF BACKFLOW PREVENTERS

A. Installation shall be done by an installer certified in the RCSD.

B. Do not use duct tape and plastic for covering the ends of pipe flanges. Use a solid metal cover with rubber gasket to cover flange openings during installation. These metal covers shall remain in place until the piping is connected to the equipment.

C. Do not spring flanges of connecting piping into position. Separately work inlet and outlet piping systems into position to bring the piping flanges into alignment with the matching equipment flanges. Do not move equipment to achieve piping alignment. Do not use electrical heating stress relieving to achieve piping alignment.

D. Line up pipe flange bolt holes with machinery nozzle bolt holes within 1/16 inch maximum offset from the center of the bolt hole to permit insertion of bolts without applying any external force to the piping.

E. Flange face separation shall be within the gasket spacing ±1/16 inch. Use only one gasket per flanged connection.

3.04 FIELD TESTING

Pressure test the backflow preventers along with the connecting piping per Section 400515. There shall be no visible leaks in the backflow preventer assembly, valves, or joints of the interconnecting piping.

END OF SECTION

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SECTION 331300 DISINFECTION OF PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and procedures for disinfection of Utility water mains by the continuous feed method and by the slug method. Disinfect piping in accordance with AWWA C651. Disinfection is not for wastewater process piping unless specifically noted otherwise on the Drawings.

1.02 RELATED WORK DESCRIBED ELSEWHERE

Pressure Testing of Piping: 400515.

1.03 JOB CONDITIONS

A. Discharge of chlorinated water into watercourses or surface waters is regulated by the National Pollutant Discharge Elimination System (NPDES). Disposal of the chlorinated disinfection water and the flushing water is the Contractor's responsibility. Dechlorinate the disinfection water such that the chlorine residual complies with California Regional Water Quality Control Board No. R5-2022-0006-03, NPDES No. CA G995002.

B. Schedule the rate of flow and locations of discharges in advance to permit review and coordination with Owner and cognizant regulatory authorities.

C. Use potable water for chlorination.

PART 2 - MATERIALS

2.01 LIQUID CHLORINE

Inject with a solution feed chlorinator and a water booster pump. Follow the instructions of the chlorinator manufacturer.

2.02 CALCIUM HYPOCHLORITE (DRY)

Dissolve in water to a known concentration in a drum and pump into the pipeline at a metered rate.

2.03 SODIUM HYPOCHLORITE (SOLUTION)

Further dilute in water to desired concentration and pump into the pipeline at a metered rate.

2.04 CHLORINE RESIDUAL TEST KIT

For measuring chlorine concentration, supply and use a medium range, drop count, DPD drop dilution method kit per AWWA C651, Appendix A.1. Maintain kits in good working order available for immediate test of residuals at point of sampling.

PART 3 - EXECUTION

3.01 CONTINUOUS FEED METHOD FOR PIPELINES

Introduce potable water into the pipeline at a constant measured rate. Feed the chlorine solution into the same water at a measured rate. Proportion the two rates so that the chlorine concentration in the pipeline is maintained at a minimum concentration of 25 mg/L. Check the concentration at points downstream during the filling to ascertain that sufficient chlorine is being added.

3.02 SLUG METHOD FOR PIPELINES

Introduce the water in the pipeline at a constant measured rate. At the start of the test section, feed the chlorine solution into the pipeline at a measured rate so that the chlorine concentration created in the pipeline is 100 mg/L. Feed the chlorine for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 100 mg/L for at least three hours.

3.03 DISINFECTION OF VALVES, BLIND FLANGES, AND APPURTENANCES

During the period that the chlorine solution or slug is in the section of pipeline, open and close valves to obtain a chlorine residual at hydrants and other pipeline appurtenances. Swab exposed faces of valves and blind flanges prior to bolting flanges in place with a 1% sodium hypochlorite solution.

3.04 DISINFECTION OF CONNECTIONS TO EXISTING PIPELINES

Disinfect isolation valves, pipe, and appurtenances per AWWA C651, Section 4.7. Flush with potable water until discolored water, mud, and debris are eliminated. Swab interior of pipe and fittings with a 1% sodium hypochlorite solution. After disinfection, flush with potable water again until water is free of chlorine odor.

3.05 CONFIRMATION OF RESIDUAL IN PIPING

A. After the chlorine solution applied by the continuous feed method has been retained in the pipeline for 24 hours, confirm that a chlorine residual of 25 mg/L minimum exists along the pipeline by sampling at air valves and other points of access.

B. With the slug method, confirm by sampling as the slug passes each access point and as it leaves the pipeline that the chlorine concentration in the slug is at least 50 mg/L.

3.06 PIPELINE FLUSHING

After confirming the chlorine residual, flush the excess chlorine solution from the pipeline until the chlorine concentration in the water leaving the pipe is within 0.5 mg/L of the replacement water.

3.07 SAMPLING AND BACTERIOLOGIC TESTING

A. There shall be no water in trenches up to the connection for sampling. The sampling piping shall be clean, disinfected, and flushed prior to sampling.

B. Collect two sets of samples per AWWA C651, Section 5.1, deliver to a certified laboratory within six hours of obtaining the samples, and obtain a bacteriologic quality test to demonstrate the absence of coliform organisms in each separate section of the pipeline after chlorination and refilling. Collect at least one set of samples from every 1,200 feet of the new water main, plus one set from the end of the pipeline and at least one set from each branch.

3.08 PIPING TEST FACILITY REMOVAL

After satisfactory disinfection, disinfect and replace air valves, restore the pipe coating, and complete the pipeline where temporary disinfection or test facilities were installed.

3.09 PIPING TO BE DISINFECTED

1. Disinfection is not wastewater process piping unless specifically noted otherwise on the Drawings.
2. Disinfect (internally and externally) any piping inside the following structures:

    a. Utility water piping

3.10 REPETITION OF PROCEDURE

If the initial chlorination fails to produce the required residuals and bacteriologic tests, repeat the chlorination and retesting until satisfactory results are obtained.

3.11 DECHLORINATION

Dechlorinate per AWWA C655. Perform testing of residual chlorine before discharge of water into the environment.

END OF SECTION

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SECTION 400500 GENERAL PIPING REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes the general requirements for selecting piping materials; selecting the associated bolts, nuts, and gaskets for flanges for the various piping services in the project; and miscellaneous piping items.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit affidavit of compliance with referenced standards (e.g., AWWA, ANSI, ASTM, etc.).

C. Submit certified copies of mill test reports for bolts and nuts, including coatings if specified. Provide recertification by an independent domestic testing laboratory for materials originating outside of the United States.

D. Submit manufacturer's data sheet for gaskets supplied showing dimensions and bolting recommendations.

1.03 DEFINITIONS OF BURIED AND EXPOSED PIPING

A. Buried piping is piping buried in the soil, commencing at the wall or beneath the slab of a structure. Where a coating is specified, provide the coating up to the structure wall. Unless detailed otherwise, coating shall penetrate wall no less than 1 inch. Piping encased in concrete is considered to be buried. Do not coat encased pipe.

B. Exposed piping is piping in any of the following conditions or locations:

1. Above ground.

2. Inside buildings, vaults, or other structures.

3. In underground concrete trenches or galleries.

1.04 PIPING SERVICE

Piping service is determined by the fluid conveyed, regardless of the pipe designation. For example, pipes designated "Air Low Pressure," "Air High Pressure," and "Air" are all considered to be in air service.

PART 2 - MATERIALS

2.01 MATERIALS SELECTION AND ALTERNATIVE MATERIALS

The Piping Schedule in the drawings lists the material and specifications for each piping service in the project. In locations where the piping material referenced on the Piping Schedule is not appropriate, the piping material is indicated in the drawings. Materials called out in the drawings shall govern over materials stated in the Piping Schedule.

2.02 THREAD FORMING FOR STAINLESS STEEL BOLTS

Form threads by means of rolling, not cutting or grinding.

2.03 BOLTS AND NUTS FOR FLANGES FOR STEEL AND DUCTILE-IRON PIPING.

A. Bolts and nuts for Class 125 or 150 flanges (including AWWA C207, Class D) located indoors, outdoors above ground, and in vaults and structures shall be carbon steel, ASTM A307, Grade B, hot-dipped galvanized per ASTM F2329.

B. Bolts and nuts for buried or submerged Class 125 or 150 flanges shall be Type 316 stainless steel conforming to ASTM A193, Grade B8M for bolts and ASTM A194, Grade 8M for nuts.

C. Hex head machine bolts for use with lugged valves shall comply with ASTM A193, Grade B7.

D. Fit shall be Classes 2A and 2B per ASME B1.1 when connecting to cast-iron valves having body bolt holes.

E. Bolts used in flange insulation kits shall conform to ASTM A193 (Grade B7). Nuts shall conform to ASTM A194 (Grade 2H).

F. Provide washers for each nut. Washers shall be of the same material as the nuts.

2.04 BOLTS AND NUTS FOR FLANGES FOR FRP, PVC, CPVC, AND PVDF PIPE

A. Bolts and nuts for flanges located indoors, outdoors above ground, and in vaults and structures shall be carbon steel, ASTM A307, Grade B, hot-dipped galvanized per ASTM F2329.

B. Bolts for piping in sodium hypochlorite service shall be made of titanium, per ASTM F467, Grade Ti1 or Ti7. Nuts shall conform to ASTM F467, same material as the bolts.

C. Bolts and nuts for buried and submerged flanges and flanges located outdoors above ground or in vaults and structures shall be Type 316 stainless steel conforming to ASTM A193, Grade B8M for bolts and ASTM A194, Grade 8M for nuts or Type 304 stainless steel conforming to ASTM A193, Grade B8 for bolts and ASTM A194, Grade 8 for nuts.

D. Provide a washer under each nut and under each bolt head. Washers shall be of the same material as the nuts.

2.05 LUBRICANT FOR STAINLESS STEEL BOLTS AND NUTS

Lubricant shall be chloride free and shall be RAMCO TG-50, Anti-Seize by RAMCO, Specialty Lubricants Corporation Husky™ Lube O'Seal, or equal.

2.06 GASKETS FOR FLANGES FOR STEEL PIPING IN WATER SERVICE

Gaskets for potable water service shall be NSF 61 certified.

Gaskets for flat face and raised face flanges shall be 1/8-inch thick and shall be one of the following nonasbestos materials:

1. Aramid fiber-inserted rubber, with a Shore "A" hardness of 75 to 85. Gaskets shall be suitable for a pressure of 200 psi at a temperature of 180°F. Products: Garlock Multi-Swell 3760-U or equal.

2. PTFE with inert filler, 1/8 inch thick, bound with nitrile. Gaskets shall be suitable for a pressure of 500 psi at a temperature of 400°F. Products: Garlock Gylon Style 3505 or equal..

2.07 GASKETS FOR FLANGES FOR DUCTILE-IRON PIPING AND FITTINGS IN AIR AND WATER SERVICE

Gaskets for potable water service shall be NSF 61 certified.

Gaskets shall be full face, 1/8-inch thick, aramid fiber-inserted rubber, with a Shore "A" hardness of 75 to 85. Gaskets shall be suitable for a water pressure of 200 psi at a temperature of 180°F. Gaskets shall have "nominal" pipe size inside diameters not the inside diameters per ASME B16.21. Products: Garlock Multi-Swell 3760-U or equal..

2.08 GASKETS FOR FLANGES FOR DUCTILE-IRON PIPING AND FITTINGS IN WATER SERVICE (SPECIFICATION SECTIONS 402040)

Gaskets for potable water service shall be NSF 61 certified.

Gaskets shall be full face, 1/8-inch thick, cloth-inserted rubber, with a Shore "A" hardness of 75 to 85. Gaskets shall be suitable for a water pressure of 200 psi at a temperature of 180°F. Gaskets shall have "nominal" pipe size inside diameters not the inside diameters per ASME B16.21. Products: Garlock Multi-Swell 3760-U or equal.

Acrylic or aramid fiber bound with nitrile. Products: Garlock "Bluegard," Klinger "Klingersil C4400," or equal. Gaskets shall be suitable for a pressure of 500 psi at a temperature of 400°F.

2.09 FLANGE INSULATION KITS

A. Flange insulation kits shall consist of insulating gasket, an insulating stud sleeve for each bolt, insulating washers for each bolt, and a steel washer between each insulating washer and the nut. The sleeves shall be one piece, integral with the insulating washer. Provide double sleeve and washer sets for each bolt.

B. Gasket material shall be phenolic, 1/8 inch thick. The flange insulating gasket shall be full diameter (full face) of the flange with a nitrile O-ring on each side of the gasket. Dielectric strength shall be not less than 500 volts per mil and a compressive strength of not less than 24,000 psi.

C. Insulating flange bolt sleeves shall be spiral-wrapped mylar having a minimum dielectric strength of 4,000 volts per mil.

D. Insulating flange bolt washers shall be high-strength phenolic a minimum thickness of 1/8 inch. Dielectric strength shall be not less than 500 volts per mil and a compressive strength of not less than 25,000 psi.

E. Steel flange bolt washers for placement over the insulating washers shall be a minimum thickness of 1/8 inch and be zinc plated or stainless steel.

F. Flange insulation kits shall be as manufactured by Advance Product Systems, PSI, Central Plastics Company, or equal.

2.10 INSULATING UNIONS

Insulating unions shall consist of a molded nylon sealing sleeve mounted in a three-piece malleable-iron (ASTM A47 or A197) body. Ends shall be threaded (ASME B1.20.1) when connecting to steel piping and copper solder joint when connecting to copper piping. Minimum working pressure shall be 150 psi. Unions shall be as manufactured by Central Plastics Company, Capital Insulation, or equal.

2.11 GASKETS FOR FLANGES FOR PVC PIPING (SPECIFICATION SECTION 402090)

Gaskets for flanged joints shall be full faced, 1/8-inch thick, having a hardness of 50 to 70 durometer A. Gasket material for other than sodium hypochlorite service shall be EPR. Gasket material for sodium hypochlorite service shall be Viton ETP.

PART 3 - EXECUTION

3.01 INSTALLING PIPE SPOOLS IN CONCRETE

Install pipes in walls and slabs before placing concrete. See Sections 033000 and 400762.

3.02 RAISED FACE AND FLAT FACE FLANGES

Where a raised face flange connects to a flat-faced flange, remove the raised face of the flange.

3.03 INSTALLING ABOVEGROUND OR EXPOSED PIPING

A. Provide pipe hangers and supports as detailed in the drawings and as specified in Section 400764.

B. Install pipe without springing, forcing, or stressing the pipe or any adjacent connecting valves or equipment.

3.04 INSTALLING FLANGED PIPING

A. Set pipe with the flange bolt holes straddling the pipe horizontal and vertical centerline. Install pipe without springing, forcing, or stressing the pipe or any adjacent connecting valves or equipment. Before bolting up, align flange faces to the design plane within 1/16 inch per foot measured across any diameter. Align flange bolt holes within 1/8-inch maximum offset.

B. Inspect each gasket to verify that it is the correct size, material, and type for the specified service and that it is clean and undamaged. Examine bolts or studs, nuts, and washers for defects such as burrs or cracks and rust and replace as needed.

C. Clean flanges by wire brushing before installing flanged fittings. Clean flange bolts and nuts by wire brushing, lubricate carbon steel bolts with oil and graphite, and tighten nuts uniformly and progressively.

D. Bolt lengths shall extend completely through their nuts. Any that fail to do so shall be considered acceptably engaged if the lack of complete engagement is not more than one thread.

E. Do not use more than one gasket between contact faces in assembling a flanged joint.

F. Tighten the bolts to the manufacturer’s specifications, using the recommended cross bolt pattern in multiple steps of increasing torque, until the final torque requirements are achieved. Do not over torque.

G. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reset or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

3.05 INSTALLING BLIND FLANGES

A. At outlets not indicated to be connected to valves or to other pipes and to complete the installed pipeline hydrostatic test, provide blind flanges with bolts, nuts, and gaskets.

B. Coat the inside face of blind flanges per Section 099000, System No. 7.

3.06 INSTALLING GROOVED-END PIPING

A. Install grooved-end pipe and fittings in accordance with the coupling manufacturer's recommendations and the following.

B. Clean loose scale, rust, oil, grease, and dirt from the pipe or fitting groove before installing coupling. Apply the coupling manufacturer's gasket lubricant to the gasket exterior including lips, pipe ends, and housing interiors.

C. Fasten coupling alternately and evenly until coupling halves are seated. Use torques as recommended by the coupling manufacturer.

D. Provide separate hangers and supports at both sides of flexible joints; see Section 400764.

3.07 INSTALLATION OF STAINLESS STEEL BOLTS AND NUTS

Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

END OF SECTION

SECTION 400515 PRESSURE TESTING OF PIPING

PART 1 - GENERAL

A. Description

This section specifies the cleaning and hydrostatic and leakage testing of pressure piping.

B. Related Work Specified Elsewhere

1. Disinfection of Piping and Structures: 331300.

2. Manual, Check, and Process Valves: 400520.

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. Submit test bulkhead locations and design calculations, pipe attachment details, and methods to prevent excessive pipe wall stresses.

3. Submit test records to the Owner's Representative upon completion of the testing.

D. Test Pressures

Test pressures shall be as specified on plans.

E. Testing Records

Provide records of each piping installation during the testing. These records shall include:

1. Date and times of test.

2. Identification of process, pipeline, or pipeline section tested or retested.

3. Identification of which piping was tested per the requirements of the California Plumbing Code.

4. Identification of pipeline material.

5. Identification of pipe specification.

6. Test fluid.

7. Test pressure at low point in pipeline or pipeline section.

8. Remarks: Leaks identified (type and location), types of repairs, or corrections made.

9. Certification by Contractor that the leakage rate measured conformed to the specifications.

PART 2 - MATERIALS

A. Vents and Drains for Aboveground Piping

Install vents on the high points of aboveground piping, whether shown in the drawings or not. Install drains on low points of aboveground piping, whether shown in the drawings or not. Provide a valve at each vent or drain point. Valves shall be 3/4 inch for piping 3 inches and larger and 1/2 inch for piping smaller than 3 inches. Valves shall be as specified in Section 400520, Type 300, unless shown otherwise in the drawings.

B. Manual Air-Release Valves for Buried Piping

Provide temporary manual air-release valves for pipeline test. Construct the pipe outlet in the same manner as for a permanent air valve and after use, seal with a blind flange, pipe cap, or plug and coat the same as the adjacent pipe.

C. Test Bulkheads

Design and fabricate test bulkheads per Section VIII of the ASME Boiler and Pressure Vessel Code. Materials shall comply with Part UCS of said code. Design pressure shall be at least 2.0 times the specified test pressure for the section of pipe containing the bulkhead. Limit stresses to 70% of yield strength of the bulkhead material at the bulkhead design pressure. Include air-release and water drainage connections.

D. Testing Fluid

1. Testing fluid shall be water.

2. For potable water pipelines, obtain and use only potable water for hydrostatic testing.

E. Testing Equipment

Provide calibrated pressure gauges, pipes, bulkheads, pumps, chart recorder, and meters to perform the hydrostatic testing.

PART 3 - EXECUTION

A. Testing Preparation

1. Pipes shall be in place, backfilled, and anchored before commencing pressure testing.

2. Conduct pressure tests on exposed and aboveground piping after the piping has been installed and attached to the pipe supports, hangers, anchors, expansion joints, valves, and meters.

3. For buried piping, the pipe may be partially backfilled and the joints left exposed for inspection during an initial leakage test. Perform the final pressure test, however, after completely backfilling and compacting the trench.

4. Provide any temporary piping needed to carry the test fluid to the piping that is to be tested. After the test has been completed and demonstrated to comply with the specifications, disconnect and remove temporary piping. Do not remove exposed vent and drain valves at the high and low points in the tested piping; remove any temporary buried valves and cap the associated outlets. Plug taps or connections to the existing piping from which the test fluid was obtained.

5. Provide temporary drain lines needed to carry testing fluid away from the pipe being tested. Remove such temporary drain lines after completing the pressure testing.

6. Prior to starting the test, the Contractor shall notify the Owner's Representative.

B. Cleaning

1. Before conducting hydrostatic tests, flush pipes with water to remove dirt and debris. Maintain a flushing velocity of at least 3 fps for water testing. Flush pipes for time period as given by the formula

$$T = \frac{2L}{3}$$

in which:

T = flushing time (seconds)
L = pipe length (feet)

2. For pipelines 24 inches or larger in diameter, acceptable alternatives to flushing are use of high-pressure water jet, sweeping, or scrubbing. Water, sediment, dirt, and foreign material accumulated during this cleaning operation shall be discharged, vacuumed, or otherwise removed from the pipe.

C. Testing and Disinfection Sequence for Potable Water Piping

1. Perform required disinfection after hydrostatic testing, except when pipeline being tested is connected to a potable waterline.

2. Locate and install test bulkheads, valves, connections to existing pipelines, and other appurtenances in a manner to provide an air gap separation between existing potable water pipelines and the pipeline being tested. Disinfect water and pipeline being tested before hydrostatic testing when connected to a potable waterline.

D. Initial Pipeline Filling for Hydrostatic Testing

Maximum rate of filling shall not cause water velocity in pipeline to exceed 1 fps. Filling may be facilitated by removing automatic air valves and releasing air manually.

E. Testing New Pipe Which Connects to Existing Pipe

Prior to testing new pipelines that are to be connected to existing pipelines, isolate the new line from the existing line by means of test bulkheads, spectacle flanges, or blind flanges. After successfully testing the new line, remove test bulkheads or flanges and connect to the existing piping.

F. Hydrostatic Testing of Aboveground or Exposed Piping

1. Open vents at high points of the piping system to purge air while filling the pipe with water. Venting during system filling may also be provided by temporarily loosening flanges.

2. Subject the piping system to the test pressure indicated on the Piping Schedule in the drawings. Maintain the test pressure for a minimum of four hours. Examine joints, fittings, valves, and connections for leaks. The piping system shall show zero leakage or weeping. Correct leaks and retest until zero leakage is obtained.

3. Test hot and cold water piping subject to the State of California Plumbing Code, latest edition. Piping subject to this testing requirement is shown in the Piping Schedule in the drawings.

G. Hydrostatic Testing of Buried Piping

1. Where any section of the piping contains concrete thrust blocks or encasement, do not perform the pressure test until at least 10 days after placing the concrete. When testing mortar-lined or PVC piping, fill the pipe to be tested with water and allow it to soak for at least 48 hours to absorb water before conducting the pressure test.

2. Apply and maintain the test pressure by means of a positive displacement hydraulic force pump.

3. Maintain the test pressure for the following duration by restoring it whenever it falls an amount of 5 psi:

Pipe Diameter (inches)	**Hours**
18 and less	4
20 to 36	8
Greater than 36	24

4. After the test pressure is reached, use a meter to measure the additional water added to maintain the pressure. This amount of water is the loss due to leakage in the piping system. The allowable leakage volume is defined by the formula

$$L = \frac{HND(P)^{1/2}}{C}$$

in which:

L = allowable leakage (gallons)
H = specified test period (hours)
N = number of rubber-gasketed joints in the pipe tested
D = diameter of the pipe (inches)
P = specified test pressure (psig)
C = 7,400

5. Test piping subject to the State of California Fire Code requirements per NFPA 24. Test such piping hydrostatically at not less than 200-psi pressure for two hours or at 50 psi in excess of the maximum static pressure when the maximum static pressure is in excess of 150 psi. The amount of leakage in piping shall be measured at the specified test pressure by pumping from a calibrated container. The amount of leakage at the joints shall not exceed 2 quarts per hour per 100 gaskets or joints irrespective of pipe diameter. The piping subject to this testing requirement is shown in the Piping Schedule in the drawings.

6. The allowable leakage for buried piping having threaded, brazed, or welded (including solvent welded) joints shall be zero.

7. Repair and retest any pipes showing leakage rates greater than that allowed in the above criteria.

H. Repetition of Test

If the actual leakage exceeds the allowable, locate and correct the faulty work and repeat the test. Restore the work and all damage resulting from the leak and its repair. Eliminate visible leakage.

I. Bulkhead and Test Facility Removal

After a satisfactory test, remove the testing fluid, remove test bulkheads and other test facilities, and restore the pipe coatings.

END OF SECTION

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SECTION 400520 MANUAL, CHECK, AND PROCESS VALVES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of manually operated valves, check valves, and process valves including gate, butterfly, ball, hose bibbs, globe, angle, eccentric plug, diaphragm, check, solenoid, pet cocks, vacuum breakers, gauge valves, and instrument valve manifolds.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Polyethylene Sheet Encasement (AWWA C105): 099754.

C. Miscellaneous Electrical Devices: 260590.

D. General Piping Requirements: 400500.

E. Pressure Testing of Piping: 400515.

F. Equipment, Piping, Duct, and Valve Identification: 400775.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit manufacturer's catalog data and detail construction sheets showing all valve parts. Describe each part by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Identify each valve by tag number to which the catalog data and detail sheets pertain.

C. Show valve dimensions including laying lengths. Show port sizes. Show dimensions and orientation of valve actuators, as installed on the valves. Show location of internal stops for gear actuators. State differential pressure and fluid velocity used to size actuators. For worm-gear actuators, state the radius of the gear sector in contact with the worm and state the handwheel diameter.

D. Show valve linings and coatings. Submit manufacturer's catalog data and descriptive literature.

E. Submit six copies of a report verifying that the valve interior linings and exterior coatings have been tested for holidays and lining thickness. Describe test results and repair procedures for each valve. Do not ship valves to project site until the reports have been returned by the Owner's Representative and marked "Resubmittal not required."

F. For butterfly and eccentric plug valves, show the clear diameter or size of the port. Show the actual area of the port as a percentage of the area as calculated for the nominal valve size.

PART 2 - MATERIALS

2.01 GENERAL

A. Valves are identified in the drawings by size and type number. Install valves complete with operating handwheels or levers, chainwheels, extension stems, floor stands, gear actuators, operating nuts, chains, and wrenches required for operation.

B. Valves shall have the name of the manufacturer and the size of the valve cast or molded onto the valve body or bonnet or shown on a permanently attached plate.

C. For buried locations, valves with mechanical joint ends may be substituted for the flanged ends specified provided the mechanical joint ends are compatible with the pipe ends.

2.02 NO-LEAD BRASS

All brass valves and fittings that may come into contact with water intended for use in a public water system shall be made of a no-lead brass and shall meet the National Sanitary Foundation (NSF) International Standard 372. All brass valves and fittings shall have the manufacturer’s name and/or trademark permanently stamped or cast on it. Another marking, such as “NL”, “EBIT”, “FD”, or commonly-accepted identifier, indicating the alloy as no-lead shall also be cast or stamped into the fitting or valve. The no-lead-brass designation shall be indicated on all appropriate submittals.

2.03 VALVE ACTUATORS

A. Provide lever or wrench actuators for exposed valves 6 inches and smaller. For larger valves, provide handwheels.

B. Where manually operated valves (size 4 inches and larger) are installed with their centerlines more than 6 feet 9 inches above the floor, provide chainwheel and guide actuators.

C. Provide stem extensions when valves are installed in insulated piping. Stem extensions shall be of a length sufficient to bring the bottom of the operating lever, handle, or wheel 1 to 2 inches above the outside of the insulation.

D. Provide 2-inch AWWA operating nuts for buried and submerged valves.

E. Provide enclosed gear actuators on butterfly, ball, and plug valves 8 inches and larger, unless electric motorized valve actuators are shown in the drawings. Gear actuators for valves 8 through 20 inches shall be of the worm and gear, or of the traveling nut type.

Gear actuators for valves 24 inches and larger shall be of the worm and gear types. Gear actuators for motorized valves shall be of the worm and gear type, regardless of size.

F. Provide gear actuators on gate valves 14 inches and larger, unless electric motorized valve actuators are shown in the drawings. Gear actuators shall be of the bevel or spur gear type. Provide grease case. Gearing shall comply with AWWA C500.

G. Design gear actuators assuming that the differential pressure across the plug, gate, or disc is equal to the test pressure of the connecting piping and assuming a fluid velocity of 16 fps for valves in liquid service and 80 fps for valves in air or gas service and a line fluid temperature range of 50°F to 100°F unless otherwise required in the detailed valve specifications. Size actuators using a minimum safety factor of 1.5 for valves in open/close service and 2.0 in modulating service.

H. Gear actuators shall be enclosed, oil lubricated, with seals provided on shafts to prevent entry of dirt and water into the actuator. Gear actuators for valves located above ground or in vaults and structures shall have handwheels. The actuators for valves in exposed service shall contain a dial indicating the position of the valve disc or plug. Gear actuators for buried or submerged valves shall have 2-inch-square AWWA operating nuts.

I. For buried or submerged service, provide watertight shaft seals and watertight valve and actuator cover gaskets. Provide totally enclosed actuators designed for buried or submerged service.

J. Traveling nut and worm and gear actuators shall be of the totally enclosed design so proportioned as to permit operation of the valve under full differential pressure rating of the valve with a maximum pull of 40 pounds on the handwheel or crank. Provide stop limiting devices in the actuators in the open and closed positions. Actuators shall be of the self-locking type to prevent the disc or plug from creeping. Design actuator components between the input and the stop-limiting devices to withstand without damage a pull of 200 pounds for handwheel or chainwheel actuators and an input torque of 300 foot-pounds for operating nuts when operating against the stops.

K. Handwheel diameters for traveling nut actuators shall not exceed 8 inches for valves 12 inches and smaller and shall not exceed 12 inches for valves 20 inches and smaller.

L. Self-locking worm gear shall be a one-piece design of gear bronze material (ASTM B427; or ASTM B84, Alloy C86200), accurately machine cut. Actuators for eccentric and lubricated plug valves may use ductile-iron gears provided the gearing is totally enclosed with spring-loaded rubber lip seals on the shafts. The worm shall be hardened alloy steel (ASTM A322, Grade G41500 or G41400; or ASTM A148, Grade 105-85), with thread ground and polished. Support worm-gear shaft at each end by ball or tapered roller bearings. The reduction gearing shall run in a proper lubricant. The handwheel diameter shall be no more than twice the radius of the gear sector in contact with the worm. Worm-gear actuators shall be Limitorque Model HBC, EIM Series W, or equal.

M. Design actuators on buried valves to produce the required torque on the operating nut with a maximum input of 150 foot-pounds.

N. Valve actuators, handwheels, or levers shall open by turning counterclockwise.

2.04 CAST-IRON VALVE BOXES FOR BURIED VALVES

A. Valve boxes shall be two-piece sliding type, cast iron, with extension shafts. Units shall be as specified by the City of Dos Palos standards. Extension pipes shall be cast iron.

B. Coat buried cast-iron pieces per Section 099000, System No. 21

2.05 EXTENSION STEMS FOR BURIED AND SUBMERGED VALVE ACTUATORS

A. Where the depth of the valve is such that its centerline is more than 4 feet below grade, provide operating extension stems to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover. Where the valve is submerged, provide operating extension stems to bring the operating nut to 6 inches above the water surface. Extension stems shall be steel, solid core, and shall be complete with 2-inch-square operating nut. The connections of the extension stems to the operating nuts and to the valves shall withstand without damage a pull of 300 foot-pounds.

B. Extension stem diameters shall be as tabulated below:

Valve Size (inches)	**Minimum Extension Stem Diameter (inches)**
2	3/4
3, 4	7/8
6	1
8	1 1/8
10, 12	1 1/4
14	1 3/8
16, 18	1 1/2
20, 24, 30, 36	1 3/4

2.06 FLOOR STANDS, EXTENSION STEMS, AND EXTENSION STEM SUPPORT BRACKETS

A. When required by the installations, provide floor stands and extension stems for operation of valves. Floor stands shall be of the nonrising stem, indicating type, complete with steel extension stems, couplings, handwheels, stem guide brackets, and special yoke attachments as required by the valves and recommended and supplied by the stand manufacturer. Floor stands shall be cast-iron base type: Clow, Figure F-5515; Bingham and Taylor; Stockham; or equal. Handwheels shall turn counterclockwise to open the valves.

B. Provide Type 316 stainless steel anchor bolts.

C. Provide steel extension stems for valves in exposed service. Provide Type 316 stainless steel stems for valves in submerged service.

D. Provide adjustable stem guide brackets for extension stems. The bracket shall allow valve stems to be set over a range of 2 to 36 inches from walls. Provide bushings drilled to accept up to 2-inch-diameter stems. Base, arm, and clamp shall be ductile iron or Type 316 stainless steel. Bushing shall be bronze (ASTM B584, Alloy C86400 or C83600). Bolts, nuts, screws, and washers (including wall anchor bolts) shall be Type 316 stainless steel. Provide slots in the bracket to accept 3/4-inch bolts for mounting the bracket to the wall. Products: Trumbull Industries, Inc., Adjustable Stem Guide or equal.

2.07 CHAINWHEELS AND GUIDES

Chainwheels and guides shall be Clow Figure F-5680, DeZurik Series W or LWG, Stockham, or equal. Chainwheels and guides shall be galvanized iron, steel, or aluminum. Chains shall extend to within 4 feet of the operating floor. Chains shall be galvanized steel or Type 316 stainless steel.

2.08 VALVE TAGGING AND IDENTIFICATION

Provide identifying valve tags per Section 400775.

2.09 BOLTS AND NUTS FOR FLANGED VALVES

Bolts and nuts for flanged valves shall be as described in Section 400500.

2.10 GASKETS FOR FLANGES

Gaskets for flanged end valves shall be as described in Section 400500.

2.11 PAINTING AND COATING

A. Coat metal valves located above ground or in vaults and structures the same as the adjacent piping. If the adjacent piping is not coated, then coat valves per Section 099000, System No. 10. Apply the specified prime coat at the place of manufacture. Apply intermediate and finish coats in field. Finish coat shall match the color of the adjacent piping. Coat handwheels the same as the valves.

B. Coat buried metal valves at the place of manufacture per Section 099000, System No. 21.

C. Coat submerged metal valves, stem guides, extension stems, and bonnets at the place of manufacture per Section 099000, System No. 7 or fusion-bonded epoxy.

D. Line the interior metal parts of metal valves 4 inches and larger, excluding seating areas and bronze and stainless steel pieces, per Section 099000, System No. 7. Apply lining at the place of manufacture.

E. Coat floor stands per Section 099000, No. 10.

F. Test the valve interior linings and exterior coatings at the factory with a low-voltage (22.5 to 80 volts, with approximately 80,000-ohm resistance) holiday detector, using a sponge saturated with a 0.5% sodium chloride solution. The lining shall be holiday free.

G. Measure the thickness of the valve interior linings per Section 099000. Repair areas having insufficient film thickness per Section 099000.

2.12 PACKING, O-RINGS, AND GASKETS

Unless otherwise stated in the detailed valve specifications, packing, O-rings, and gaskets shall be one of the following non-asbestos materials:

A. Teflon.

B. Kevlar aramid fiber.

C. Acrylic or aramid fiber bound by nitrile. Products: Garlock "Bluegard," Klinger "Klingersil C4400," or equal.

D. Buna-N (nitrile).

2.13 RUBBER SEATS

Rubber seats shall be made of a rubber compound that is resistant to free chlorine and monochloramine concentrations up to 10 mg/L in the fluid conveyed.

2.14 VALVES

A. Ball Valves:

1. Type 300—Full Port Threaded Bronze Ball Valves 2 Inches and Smaller:

Ball valves, 2 inches and smaller, for air or water service shall have a pressure rating of at least 600 psi WOG at a temperature of 100°F. Provide full port ball and body design. Valves shall comply with MSS SP-110. Provide bronze (ASTM B62 or ASTM B584, Alloy C83600 or C84400) body and plug ball retainer. Ball and stem shall be Type 316 stainless steel. Valves shall have threaded ends (ASME B1.20.1), nonblowout stems, reinforced Teflon seats, and have plastic-coated lever actuators. Valves shall be Stockham T-285 Series, Apollo 77C-140 Series, or equal.

2. Type 310-Double Union PVC Ball Valves 3 Inches and Smaller:

Thermoplastic ball valves, 3 inches and smaller, for water and chemical service shall be rated at a pressure of 150 psi at a temperature of 105°F. Body, ball, and stem shall be PVC conforming to ASTM D1784, Type 1, Grade 1. Seats shall be Teflon. O-ring seals shall be EPDM. Valve ends shall be of the double-union design. Ends shall be socket welded except where threaded or flanged-end valves are specifically shown in the drawings. Valves shall have handle for manual operation. Valves shall

be as manufactured by Chemtrol, Hayward, R & G Sloan, Spears Manufacturing Company, Plast-O-Matic, IPEX Series VK or VKD, or equal.

3. Type 316--Double Union CPVC Ball Valves 3 Inches and Smaller with Vented Ball for Sodium Hypochlorite Service:

   Vented CPVC ball valves, 3 inches and smaller, for chemical service shall be rated at a pressure of 150 psi at a temperature of 105°F and rated at a pressure of 85 psi at a temperature of 140°F. Provide machined vent hole, deburred, in the ball to allow gases to vent. Body, ball, and stem shall be CPVC conforming to ASTM D1784, Type 4, Grade 1. Seats shall be Teflon. O-ring seals shall be Viton. Valve ends shall be of the double-union design. Ends shall be socket welded except where threaded or flanged-end valves are specifically shown in the drawings. Valves shall have handle for manual operation. Valves shall be Plast-O-Matic "Z-MBV-Vent," Asahi/America Type 21, or equal.

4. Type 320--Regular Port Threaded Stainless Steel Ball Valves 2 Inches and Smaller:

   Stainless steel ball valves, 2 inches and smaller, for water service shall be rated at a minimum pressure of 1,500 psi WOG at a temperature of 100°F. Valve body, ball, and stem shall be Type 316 stainless steel, ASTM A276 or A351. Seat and seals shall be reinforced Teflon. Valves shall have lever actuators, plastic coated. Valves shall have threaded ends (ASME B1.20.1) and nonblowout stems. Valves shall be McCanna Figure M402, Worcester Series 48, Stockham Figure SD 2120-SSMO-R-T, Apollo 76-100 Series, or equal.

B. Plug Valves:

1. Plug and Seating Design for Eccentric Plug Valves (Types 500, 510, 515, 520, and 525):

   Eccentric plug valves shall comply with AWWA C517 and the following. Provide a rectangular or circular plug design, with an associated rectangular or round seat. Provide bidirectional seating design. The valve shall seat with the rated pressure both upstream and downstream of the closed plug. Provide geared actuators sized for bidirectional operation.

2. For Types 500, 510, 515, 520, and 525 eccentric plug valves, the metallic portion of the plug shall be one-piece design and shall be without external reinforcing ribs which result in there being a space between the rib and the main body of the plug through which water can pass. Valves shall be repackable without any disassembly of valve or actuator. The valve shall be capable of being repacked while under the design pressure in the open position. Nowhere in the valve or actuators shall the valve shaft be exposed to iron on iron contact. Sleeve bearings shall be stainless steel in valve sizes 20 inches and smaller and bronze or stainless steel in valve sizes 24 inches and larger. Provide enclosed worm-gear actuators for valves 6 inches and larger.

3. Rubber compounds shall have less than 2% volume increase when tested in accordance with ASTM D471 after being immersed in distilled water at a temperature of 73.4°F ±2°F for 70 hours.

4. Type 500--Eccentric Plug Valves 3 Inches and Smaller:

   Eccentric plug valves, 1/2 through 3 inches, shall be nonlubricated type. Minimum pressure rating shall be 175 psi. Bodies shall be made of Ductile iron conforming to ASTM A536, Grade 65-45-12. Ends shall be threaded or flanged (ASME B16.1, Class 125). Plug shall be Ductile iron conforming to ASTM A536, Grade 65-45-12 with Buna-N facing. Design plugs to seat over a pressure range of 5 to 25 psi. Body cap screws and bolts and nuts shall be Type 316 stainless steel. Packing shall be nitrile butadiene-filled Teflon. Alternatively, U-cup seals may be provided. Valves shall be DeZurik Figure 118 PEC or PEF, Clow, Val-Matic “Cam-Centric,” Milliken Figure 601, Pratt “Ballcentric,” or equal.

5. Type 510--Eccentric Plug Valves 4 Through 12 Inches:

   Eccentric plug valves, 4 through 12 inches, shall be nonlubricated type. Minimum pressure rating shall be 175 psi. Bodies shall be Ductile iron conforming to ASTM A536, Grade 65-45-12. Ends shall be flanged, Class 125 per ASME B16.1. Plugs shall be ductile iron (ASTM A536, Grade 65-45-12) with Buna-N facing. Design plugs to seat over a pressure range of 5 to 25 psi. Valve body seats shall be Type 304 or 316 stainless steel or have a raised welded-in overlay at least 1/8-inch thick of not less than 90% nickel. Body cap screws and bolts and nuts shall be Type 316 stainless steel. Packing shall be butadiene-filled Teflon. Alternatively, U-cup seals may be provided. Valves shall be DeZurik Figure 118 PEC or PEF, Clow F-5412, Val-Matic “Cam-Centric,” Milliken “Millcentric,” Pratt “Ballcentric,” or equal.

6. Type 520—Eccentric Plug Valves 14 through 20 Inches:

   Eccentric plug valves, 14 inches and larger, shall be nonlubricated type. Minimum pressure rating shall be 150 psi. Bodies shall be Ductile iron conforming to ASTM A536, Grade 65-45-12. Ends shall be flanged, Class 125 per ASME B16.1 or as shown in the drawings. Plugs shall be ductile iron (ASTM A536, Grade 65-45-12) with Buna-N facing. Design plugs to seat over a pressure range of 5 to 25 psi. Valve body seats shall be 316 stainless steel or have a raised welded-in overlay at least 1/8-inch thick of not less than 90% nickel. Plug shall be of the one-piece design. Body cap screws and bolts and nuts shall be Type 316 stainless steel. Packing shall be butadiene-filled Teflon. Alternatively, U-cup seals may be provided. Provide 100% port area. Valves shall be DeZurik Figure 118 PEC, Clow F-5412, Val-Matic “Cam-Centric,” Milliken "Millcentric," Pratt “Ballcentric,” or equal.

C. Solenoid Valves:

1. Design and construct solenoid valves such that they can be used in both horizontal and vertical piping.

2. Type 900--Metallic Solenoid Valves 1 1/2 Inches and Smaller:

Solenoid valves of sizes 1/4 through 1 1/2 inches for water and air service shall have forged brass (Alloy C23000) or bronze (ASTM B62) bodies with Teflon main seats. Internal plunger, core tube, plunger spring, and cage assembly shall be stainless steel (Types 302, 304, or 305). Solenoid enclosures shall be NEMA 4. Valve actuators shall be 120-volt a-c. Seals shall be Teflon. Valves shall have a maximum operating pressure and a maximum differential pressure of 125 psi. Valves shall be ASCO "Redhat", Parker Hannifin “Skinner”, or equal.

D. Pet Cocks and Drain Cocks:

1. Type 1000--Pet Cocks 1/2 Inch and Smaller:

Pet cocks shall be all bronze (ASTM B62) or brass (ASTM B16), rated at 125 psi. Provide lever or tee handle operator. Pet cocks shall be Crane Figure 724, Lunkenheimer Figure 478 or 479, or equal.

2. Type 1010--Drain Cocks 1/2 Inch and Smaller:

Drain cocks shall be all bronze (ASTM B62) or brass (ASTM B16), rated at 125 psi. Provide lever or tee handle operator. Drain cocks shall be Crane Figure 702, Lunkenheimer Figure 476 or 980, or equal.

PART 3 - EXECUTION

3.01 JOINTS

A. Bolt holes of flanged valves shall straddle the horizontal and vertical centerlines of the pipe run to which the valves are attached. Clean flanges by wire brushing before installing flanged valves. Clean flange bolts and nuts by wire brushing, lubricate threads with oil and graphite, and tighten nuts uniformly and progressively. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reseat or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

B. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves. Joints shall be watertight.

C. Install lug-type valves with separate hex head machine bolts at each bolt hole and each flange (two bolts per valve bolt hole).

D. Install grooved-end couplings for valves in accordance with Section 400500.

3.02 INSTALLING EXPOSED VALVES

A. Unless otherwise indicated in the drawings, install valves in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above the floor with their operating stems

vertical. Install valves in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above the floor with their operating stems horizontal.

B. Install valves on vertical runs of pipe that are next to walls with their stems horizontal, away from the wall. Valves on vertical runs of pipe that are not located next to walls shall be installed with their stems horizontal, oriented to facilitate valve operation.

3.03 INSTALLING BURIED VALVES

A. Connect the valve, coat the flanges, apply tape wrapping or polyethylene encasement, and place and compact the backfill to the height of the valve stem.

B. Place block pads under the extension pipe to maintain the valve box vertical during backfilling and repaving and to prevent the extension pipe from contacting the valve bonnet.

C. Mount the upper slip pipe of the extension in midposition and secure with backfill around the extension pipe. Pour the concrete ring allowing a depression so the valve box cap will be flush with the pavement surface.

D. In streets without concrete curbs and in open areas, install the valve box as for a paved area with concrete curb except include a marker post. Cut the marker post from 4-inch by 4-inch dense structural grade Douglas fir No. 2 or Southern Pine No. 2 surfaced on four sides to a length of 5 feet. Chamfer the top. Set the post in concrete, 2 feet into the ground, away from traffic, and to the side of the pipeline. Coat with a seal and finish coat of white alkyd exterior paint. On the side facing the valve, letter in black the word "VALVE" and the distance in feet from the marker post to the valve box cap.

3.04 FIELD COATING BURIED VALVES

A. Coat flanges of buried valves and the flanges of the adjacent piping, and the bolts and nuts of flanges and mechanical joints, per Section 099000, System No. 24.

B. Wrap buried metal valves 6 inches and larger with polyethylene sheet per Section 099754.

3.05 INSTALLING ECCENTRIC PLUG VALVES

A. Install such that the rotation of the plug is about a horizontal axis.

B. Install such that the plug stores in the top when the valve is open.

C. Orient the valve such that the seat is opposite the high-pressure side.

3.06 INSTALLING EXTENSION STEM GUIDE BRACKETS

Install at 6- to 8-foot centers. Provide at least two support brackets for stems longer than 10 feet, with one support near the bottom of the stem and one near the top.

3.07 MOUNTING GEAR ACTUATORS

The valve manufacturer shall select and mount the gear actuator and accessories on each valve and stroke the valve from fully open to fully closed prior to shipment.

3.08 FIELD INSTALLATION OF GEAR ACTUATOR

Provide the actuator manufacturer's recommended lubricating oil in each actuator before commencing the field testing.

3.09 VALVE LEAKAGE TESTING

Test valves for leakage at the same time that the connecting pipelines are tested. See Section 400515 for pressure testing requirements. Protect or isolate any parts of valves, actuators, or control and instrumentation systems whose pressure rating is less than the pressure test. Valves shall show zero leakage. Repair or replace any leaking valves and retest.

3.10 VALVE FIELD TESTING

A. Operate manual valves through three full cycles of opening and closing. Valves shall operate from full open to full close without sticking or binding. Do not backfill buried valves until after verifying that valves operate from full open to full closed. If valves stick or bind, or do not operate from full open to full closed, repair or replace the valve and repeat the tests.

B. Gear actuators shall operate valves from full open to full close through three cycles without binding or sticking. The pull required to operate handwheel- or chainwheel-operated valves shall not exceed 80 pounds. The torque required to operate valves having 2-inch AWWA nuts shall not exceed 150 ft-lbs. If actuators stick or bind or if pulling forces and torques exceed the values stated previously, repair or replace the actuators and repeat the tests. Operators shall be fully lubricated in accordance with the manufacturer's recommendations prior to operating.

END OF SECTION

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SECTION 400580 FABRICATED STAINLESS STEEL SLIDE GATES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of fabricated stainless steel slide and weir gates, open channel or wall mounted conforming to AWWA C561 and as supplemented herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Equipment, Piping, Duct, and Valve Identification: 400775.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit dimensional drawings.

C. Submit manufacturer’s catalog data and detail drawings showing slide gate parts and described by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show coatings.

D. Submit calculations to show that gates, stems, and lifts meet the specifications.

E. Submit manufacturer's installation instructions.

1.04 MANUFACTURERS’ SERVICES

Provide equipment manufacturer's services at the jobsite for the minimum labor days listed below, travel time excluded:

A. One labor day to check the installation and advise during start-up, testing, and adjustment of the equipment.

B. One Labor Day to instruct the Owner's personnel in the operation and maintenance of the equipment.

PART 2 - MATERIALS

2.01 MANUFACTURERS AND MODELS

Slide gates shall be of the upward opening type designed to mount on the face of concrete walls. Type 4 slide gates shall be Rodney Hunt Series, Whipps Series 900, or equal.

2.02 SLIDE GATE DESIGN

A. Slide gates and appurtenances shall comply with AWWA C561, except as modified herein.

B. Provide slide gates complete with gates, guides, frames, baseplates, seats, stems, stem guides, seals, actuators, and anchor bolts. Design slide gates for minimum seating and unseating heads of 10 feet. Measure the seating and unseating heads from the top surface of the water to the centerline of the disc.

C. Seating head and unseating head conditions: Leakage not to exceed 0.05 gpm per foot (0.62 L/min per meter) of seating perimeter.

D. Provide all structural components 1/4-inch (6.3 mm) minimum thickness.

E. Gate assemblies shall be media blasted or passivated in accordance with ASTM A380 prior to shipment to remove all mill scale, weld splatter, discoloration, or other surface imperfections.

F. Slide gates shall have rising stems.

2.03 GUIDES

A. The guides shall extend in one continuous piece from the gate invert to form posts for the handwheel operator stand. The extended guides or posts shall require no additional reinforcing to support the operator. Construct the guides of the formed plate into a rigid, continuous structural shape.

B. Provide UHMW polyurethane seals or seats along the sides of the gates.

C. Provide UHMWPE seals along the top of the gate for submerged applications.

2.04 SLIDE

A. Fabricate the disc/slide using stainless steel flat plate with stainless steel structural or formed members welded to the plate. Provide disc components with a minimum material thickness of 1/4 inch.

B. Reinforcement: Provide a minimum of two horizontal stiffeners welded to the slide and two vertical stiffeners welded to outside of the horizontal stiffeners.

C. The slide shall be a one-piece plate, reinforced with ribs so that the disc will not deflect more than 1/720 the gate span when the upstream side of the gate is subjected to the specified seating head and the downstream side of the gate contains no liquid. Design the disc to limit deflection to a maximum of 1/8 inch when the disc is subjected to the maximum specified unseating head. Attach reinforcing ribs to disc by welding; do not use bolting. Reinforcing ribs shall extend into the guides such that they overlap the seating surface of the guide. Design the disc so that all surfaces are free of metal-to-metal contact with the frames.

2.05 SEALS:

A. Provide a self-adjusting seal system suitable for the leakage, frequent cycling and velocities specified herein, and mounted such that there is no obstruction to the specified gate opening size.

B. Provide gates equipped with UHMW polyethylene seat/seals to restrict leakage and to prevent metal to metal contact between the frame and slide.

C. Extend the seat/seals to accommodate the 1.50 x the slide height with the gate in the fully open or fully closed position.

D. Provide all upward opening gates with a resilient flush bottom seal for sealing the invert of the gate.

E. Provide all downward opening weir gates with self-adjusting UHMW seat/seals across the invert member.

F. Provide all seals mechanically fastened to the frame or slide, force fit seals or seals attached with adhesive are not acceptable.

G. Provide all seats and seals to be field replaceable without the need to remove grout or concrete and without the need to remove the frame from the wall or wall thimble.

H. Gates using “J” or “P” seals are not acceptable.

2.06 STEMS AND STEM GUIDES

A. Lifting stems shall be one piece, with a minimum diameter of 1 1/2 inches. The stem shall withstand an actuator effort of 80 pounds without buckling, assuming the critical buckling load as determined by using the Euler Column Formula with C = 2.0. Support the stems with stem guides such that the L/R ratio for the unsupported part of the stem does not exceed 200.

B. The stem connection to the disc shall be either the clevis type, with structural members welded to the slide and containing a bolt to act as a pivot pin, or a threaded and bolted or keyed thrust nut supported in a welded nut pocket. The pocket shall be capable of withstanding a load of 80 pounds on the actuator.

C. Provide tandem stems and actuators when the gate width is more than twice the gate height.

2.07 FRAMES:

A. Provide frame assembly including guide members, invert members and yoke members constructed of formed stainless steel plate with a minimum thickness of 1/4-inch (6.3 mm).

B. Provide gussets to support the guide members for unseating gates as required by the design head specified and indicated.

a. Provide gussets extended to support the outer portion of the guide assembly and positioned to transfer the load to the anchor bolts or the wall thimble studs.

C. Provide frames for mounting type as indicated in the Slide Gate Schedule.

a. Embedded

b. Wall mounted with stainless steel anchor bolts and non-shrink, non-metallic grout or EPDM gasket

c. Thimble mounted with stainless steel mounting studs and mastic gasket

D. Provide all wall mounted and thimble mounted gates with a flanged frame. Flat frame gates are not acceptable.

E. Provide all wall mounted and wall thimble mounted frames with a minimum guide weight of 11 lbs/ft (16.37 kg/metre) and a minimum guide extension weight of 6.5 lbs/ft (9.67 kg/metre).

F. Provide guide extensions constructed of C-channel shape or similar. Angles are not acceptable guide extensions.

G. Frame Guides and Invert Members: Provide frames as a unitized one-piece, fully welded assembly.

a. Bolt together two-piece guide frames are not acceptable and will not be approved.

b. Bolt-on yokes are acceptable when necessary to facilitate slide removal.

c. Frames that require field assembly are not acceptable unless the overall frame size exceeds a size suitable for shipment on a standard flatbed truck.

H. Provide the frame guides extending to accommodate the entire height of the slide when the slide is in the fully opened position on upward opening slide gates or downward opening weir gates.

I. For self-contained gates, provide a yoke across the top of the frame guides with the yoke formed by two structural members fixed to the top of the guides to provide a one-piece rigid frame.

a. Provide the yoke designed to allow removal of the slide.

J. Provide a rigid stainless steel invert member across the bottom of the opening.

a. Invert member: Flush bottom type on upward opening gates with a minimum weight as specified

K. Provide a rigid stainless steel top seal member across the top of the opening on gates designed to cover submerged openings.

L. Provide a rigid stainless steel member across the invert of the opening on downward opening weir gates.

2.08 MATERIALS OF CONSTRUCTION

Materials of construction shall conform to the requirements listed below:

1. Frame Assembly and Retainers: ASTM A240 Type 316L stainless steel.

2. Slides and Stiffeners: ASTM A240 Type 316L stainless steel.

a. 1/4-inch (6.3 mm) minimum thickness.

3. Seat, Seals and Facing: ASTM D4020 UHMW (Ultra-high Molecular Weight Polyethylene

4. Invert Seal for upward acting gates only: ASTM D2000 Neoprene or EPDM

5. Stems: ASTM A276 Type 316 stainless steel.

a. Minimum diameter: 1-1/2-inch (38 mm).

6. Lift Nuts: ASTM B584 Bronze

7. Floorstand and Wall Brackets: ASTM A276 Type 316L stainless steel

8. Gear Operator Housing: Cast aluminum or ductile iron

9. Hardware, studs and nuts: ASTM A276 Type 316 stainless steel

Anchor bolts: Type 316 stainless steel. Minimum diameter of 1/2-inch (13 mm).

2.09 MANUAL OPERATORS:

A. Provide a manual gate operator for each gate so specified.

1. Provide all gates with slides 24 inches (600 mm) tall or taller with a gearbox operator suitable for use with a portable operator.

B. Type of operator as indicated in the Slide Gate Schedule.

C. Manually operated floorstands and benchstands:

1. Handwheel or crank operated floorstand or benchstand as indicated in the Slide Gate Schedule.

a. Handwheel: No gear reduction.

b. Handwheel or Crank Gearbox Operator: Single or double gear reduction.

c. Material: Cast ductile iron housing

2. Provide a threaded cast bronze lift nut to engage operating stem.

3. Provide roller bearings above and below a flange on the operating nut to support both opening and closing thrusts.

4. Operate gates under the operating head and design head, as specified and indicated, with no greater than a 40 pound (18 kg) effort on the crank or handwheel.

5. Gears, where required, steel with machined cut teeth designed for smooth operation.

6. Provide Type 304 or 400 Series stainless steel pinion shafts on crank operated benchstands and floorstands supported on tapered roller bearing or ball bearings with all components totally enclosed in a weatherproof housing with a removable cover.

a. Design bearing arrangement for use with portable operators specified herein.

7. Provide mechanical seals on the operating nut and the pinion shafts to exclude moisture and dirt and prevent leakage of lubricant out of the hoist mechanism.

8. Provide lubricating fittings for the lubrication of all gears and bearings.

9. Floorstands: Provide a Type 316L stainless steel pedestal, constructed of minimum Schedule 40 tube and 3/8-inch (10 mm) thick base plates, designed to position the input shaft or crank operator or handwheel approximately 36-inch (1.0 m) above the operating level.

10. Benchstands: Provide with a rectangular cast ductile iron base machined and drilled for mounting purposes. Provide all adaptor plates of Type 316L stainless steel.

11. Permanently attach or cast an arrow with the word "OPEN" on the floorstand, benchstand or handwheel indicating the direction of rotation to open the gate.

12. Handwheels: Minimum 15 inches (380 mm), maximum 24 inches (610 mm) diameter and removable.

13. Cranks: Cast aluminum or stainless steel with revolving nylon grip and removable.

14. Provide two gearboxes for all upward opening gates 60 inch (1800 mm) wide and larger and with opening widths greater than 2 x gate height. Provide two gearboxes for all downward-opening gates wider than 48 inch (1220 mm) wide and larger and with opening widths greater than 2 x gate height.

    a. Provide Type 316 stainless steel interconnecting shaft.

    b. Provide flexible couplings at each end of the interconnecting shaft.

    c. Provide a handwheel or crank mounted on the pinion shaft of one of the gear boxes.

D. Extended Operators

1. Provide an extended operator system to bring the pinion shaft to 36 inches (915 mm) above the operating level utilizing chain and sprockets when the centerline of the handwheel on a non-geared operator is located 48 inches (1200 mm) or more above the operating level.

2. Chainwheels are not acceptable.

3. Provide a removable Type 316L stainless steel cover to enclose the chain and sprockets.

4. If the centerline of the pinion shaft is 60 inches (1525 mm) or less above the operating level a handwheel may be used with a gearbox in lieu of the extended operator system specified above.

E. Operating Nut

1. When indicated or specified provide 2 inch (50 mm) square operating nut and with a non-rising stem.

    a. Nut Material: Bronze.

    b. Where indicated and specified provide a Type 316L stainless steel or cast iron floor box be set in the concrete floor above the gate as indicated.

    c. Provide one Type 316L stainless steel T-handle wrench for operation.

F. Floor stands and Wall Brackets

1. Provide Type 316L stainless steel floorstands of a height such that the handwheel or crank operated pinion shaft is located 36 inches (915 mm) above the operating level.

2. Provide Type 316L stainless steel wall brackets to support floorstands.

    a. Provide wall brackets reinforced to withstand in compression a minimum of 2 x rated output of the operator with an 80 pound (18 kg) effort on the crank or handwheel.

2.10 FLOOR STANDS

A. Design crank-operated or handwheel-operated floor stand hoists to permit gate operation with 40 pounds of maximum effort under the head conditions noted in the drawings.

B. Provide floor stand hoists that can also accommodate a portable electric actuator.

2.11 SPARE PARTS

A. Provide the following spare parts for each size of slide or weir gate:

Quantity	Description
2	Lift nuts
2	Stem guides of each type and size
2	Pivot pins
1 set	Sealing strips

B. Pack spare parts in a wooden box; label with the manufacturer's name and local representative's name, address, and telephone number; and attach list of materials contained within.

PART 3 - EXECUTION

3.01 WELDING

Welder qualification shall comply with AWS D1.6 Welding rod and electrodes shall comply with AWS A5.4. In addition to structural welds, seal weld interfaces between mating parts to prevent moisture intrusion.

3.02 PAINTING AND COATING

Coat cast-iron and steel surfaces above deck level, including actuators and floor stands, per Section 099000, System No. 10. Apply prime coat at factory. Color of finish coat shall be selected by owner.

3.03 INSTALLATION

A. Cast the anchor bolts for wall-mounted gates into the wall using templates.

B. Comply with AWWA C561, paragraph 4.6.

3.04 FIELD TESTING

A. Operate each slide gate through two complete cycles. Gates shall operate without sticking or binding.

B. Determine the pulling force required to turn the handwheel with a torque wrench. Pulling force required shall be less than the limit specified.

C. Fill channels to which the gates are attached with water. Measure leakage through each slide gate. Measure the actual field seating and unseating heads. The allowable leakage shall be as specified above. If the leakage rate is exceeded, adjust or replace the gate and retest until it passes.

END OF SECTION

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SECTION 400722 FLEXIBLE PIPE COUPLINGS AND EXPANSION JOINTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of flexible gasketed sleeve-type compression pipe couplings for steel and ductile-iron pipe; thermal expansion compensators and expansion joints 4 inches in diameter and smaller for steel, PVC, CPVC, and copper pipe; flexible expansion joints; expansion loops; and couplings for connecting different pipe materials.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Polyethylene Sheet Encasement (AWWA C105): 099754.

C. General Piping Requirements: 400500.

D. Pressure Testing of Piping: 400515.

E. Wall Pipes, Seep Rings, and Penetrations: 400762.

F. Pipe Hangers and Supports: 400764.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit manufacturer's catalog data on flexible pipe couplings, thermal expansion compensators, and expansion joints. Show manufacturer's model or figure number for each type of coupling or joint for each type of pipe material for which couplings and joints are used. Show coatings.

C. Submit manufacturer's recommended torques to which the coupling bolts shall be tightened for the flexible gasketed sleeve-type compression pipe couplings.

D. Show materials of construction by ASTM reference and grade. Show dimensions.

E. Show number, size, and material of construction of tie rods and lugs for each thrust harness on the project.

PART 2 - MATERIALS

2.01 DUCTILE-IRON FLEXIBLE PIPE COUPLINGS

A. Couplings shall have center sleeves and end rings made of ductile iron conforming to AWWA C219, Section 4.

B. Sleeve bolts in exposed service shall be Type 316 stainless steel, conforming to AWWA C219. Sleeve bolts in buried or submerged service shall be Type 316 stainless steel per AWWA C219.

2.02 FLEXIBLE PIPE COUPLINGS FOR PLAIN-END STEEL PIPE

Couplings shall be steel, Dresser Style 38, Smith-Blair Type 411, Baker Series 200, or equal.

2.03 JOINT HARNESSES

A. Tie bolts or studs shall be as shown in the following table. Bolt or stud material shall conform to ASTM A193, Grade B7. Nuts shall conform to ASTM A194, Grade 2H. Lug material shall conform to ASTM A36, ASTM A283, Grade B, C, or D, or ASTM A285, Grade C. Lug dimensions for steel pipe shall be as shown in AWWA Manual M11 (2004 edition), Figure 13-20, using the number and size of lugs as tabulated below.

B. Lugs for steel pipe shall be Type P for pipes 6 through 10 inches and Type RR for pipes 12 inches and larger. Lug or ear dimensions for ductile-iron pipe shall be as shown in the drawings.

TIE BOLTS OR STUD REQUIREMENTS FOR FLEXIBLE PIPE COUPLINGS FOR STEEL PIPE		
Nominal Pipe Size (inches)	Tie Bolt or Stud Minimum Requirements (150 psi)	
	No. Bolts or Studs and Size (inches)	Minimum Pipe Wall Thickness (inches)
6	2 x 5/8	0.193
8	2 x 5/8	0.239
10	2 x 5/8	0.312
12	2 x 3/4	0.188
14	2 x 7/8	0.188
16	2 x 1	0.250
18	2 x 1 1/8	0.250
20	2 x 1 1/4	0.250
24	4 x 7/8	0.250
30	4 x 1 1/8	0.250

TIE BOLTS OR STUD REQUIREMENTS FOR FLEXIBLE PIPE COUPLINGS FOR DUCTILE IRON PIPE			
	Tie Bolt or Stud Minimum Requirements		
Nominal Pipe Size (inches)	No. Bolts or Studs	Size (inch)	Ear[(3)] Type
4	2	5/8	A
6	2	5/8	A
8	2	5/8	A
10	2	5/8	A
12	2	5/8	A
14	4	5/8	A
16	4	5/8	A
18	4	3/4	B
20	4	3/4	B
24	5	7/8	B
30	4	1 1/8	B

C. Select number and size of bolts based on the test pressure shown in the Piping Schedule in the drawings. Stagger bolts equally around pipe circumference. Where odd number is tabulated, place odd bolt at top.

D. Provide washer for each nut. Washer material shall be the same as the nuts. Minimum washer thickness shall be 1/8 inch.

2.04 FLEXIBLE PIPE COUPLINGS FOR PLAIN-END DUCTILE-IRON PIPE

A. Couplings for pipe 12 inches and smaller shall be cast iron, Dresser Style 253 or 253 long sleeve, Smith-Blair Type 441, Baker Series 228, or equal.

B. Couplings for pipe larger than 12 inches shall be cast iron or steel, Dresser Style 38 or 253, Smith-Blair Style 411, Baker Series 228, or equal.

2.05 TRANSITION COUPLINGS

Couplings for connecting different pipes having different outside diameters shall be steel: Dresser Style 62 or 162, Smith-Blair Series 413, Baker Series 212 or 220, or equal. Couplings shall have an internal full circumference ring pipe stop at the midpoint of the coupling. Inside diameter of coupling pipe stop shall equal inside diameter of smaller diameter pipe.

2.06 FLANGED COUPLING ADAPTERS FOR STEEL PIPE

Adapters for steel pipe shall be steel: Dresser Style 128, Smith-Blair Type 913, or equal. Flange ends shall match the flange of the connecting pipe; see detail piping specifications.

2.07 FLANGED COUPLING ADAPTERS FOR CAST- AND DUCTILE-IRON PIPE

A. Adapters for cast- and ductile-iron pipe 12 inches and smaller shall be cast iron: Dresser Style 127, Smith-Blair Series 912, or equal.

B. Adapters for cast- and ductile-iron pipe larger than 12 inches shall be steel: Dresser Style 128, Smith-Blair Type 913, or equal.

C. Flange ends shall match the flange of the connecting pipe; see detail piping specifications.

2.08 DISMANTLING JOINTS

A. The dismantling joint shall consist of a flanged steel spigot piece, a flanged sleeve, and a follower ring containing a gasket through which the spigot piece slides into the sleeve. The joint shall accommodate up to 2 inches of longitudinal movement. The longitudinal adjustability shall be provided by a telescopic action of a flanged spigot and associated sleeve, which inserts into the spigot. A system of tie bolts or rods shall connect the sleeve to the end flange on the spigot piece. Provide washers and nuts on the tie bolts on both sides of the sleeve and flange and the spigot end flange to allow for adjustment of the extension length for the sleeve.

B. The minimum design pressure shall be the same as the adjacent piping. Design stresses shall not exceed 40% of the yield strength of the materials. Minimum factory test pressure shall be 150% of the design pressure.

C. The gasket shall be compressed by a separate bolting and gland system, independent of the tie bolts. Gasket shall be EPDM.

D. Dismantling joints shall have a spigot piece made of steel conforming to ASTM A36, A53 (Type E or S), or A283, Grade C having a minimum yield strength of 30,000 psi and a flange adapter and follower ring made of ductile iron conforming to ASTM A536, Grade 65-45-12.

E. Sleeve and follower ring bolts shall have a minimum yield strength of 105,000 psi, a minimum tensile strength of 125,000 psi, and shall conform to ASTM A193, Grade B7.

F. Steel flanges and gasket follower rings shall be cast, forged, or hot rolled in one piece. Do not use flanges or rings fabricated from two or more shapes. Flanges shall conform to ANSI Classes 125 and 150.

G. Wall thickness of spigot piece and sleeve shall be at least that specified for the size of pipe in which the coupling is to be used.

H. Manufacturers: Romac Industries Style DJ400 or equal.

2.09 BOLTS AND NUTS FOR FLANGES

See Section 400500.

PART 3 - EXECUTION

3.01 SHIPMENT AND STORAGE OF FLEXIBLE PIPE COUPLINGS, DISMANTLING JOINTS, EXPANSION JOINTS, AND FLEXIBLE HOSE CONNECTORS

A. Inspect on receipt for damage in shipment and conformance with quantity and description on the shipping notice and order. Unload carefully to the ground without dropping. Do not load or unload by inserting forklift tines or lifting chains inside the waterway. Use nonmetallic slings, padded chains, or padded forklift tines to lift items. Lift with eyebolts or rods through flange holes or chain hooks at ends.

B. Protect from weather and the accumulation of dirt, rocks, and debris. Do not expose rubber seats to sunlight or ozone for more than 30 days. Also, see the manufacturer’s specific storage instructions.

C. Make sure flange faces, gasket seating surfaces, and joint sealing surfaces are clean.

3.02 INSTALLATION OF FLEXIBLE PIPE COUPLINGS, SEGMENTED SLEEVE COUPLINGS, DISMANTLING JOINTS, AND EXPANSION JOINTS

A. Clean oil, scale, rust, and dirt from pipe ends. Clean gaskets in flexible pipe couplings before installing.

B. Install expansion joints per manufacturer's recommendations, so that 50% of total travel is available for expansion and 50% is available for contraction.

C. Do not spring flanges or ends of connecting piping into position. Separately work connecting piping system into position to bring the piping flanges or ends into alignment with the matching coupling flanges or joints. Do not move couplings to achieve piping alignment.

D. Line up pipe flange bolt holes with coupling or joint flange bolt holes within 1/16 inch maximum offset from the center of the bolt hole to permit insertion of bolts without applying any external force to the piping.

E. Flange face separation shall be within the gasket spacing ±1/16 inch. Use only one gasket per flanged connection.

F. Lubricate bolt threads with graphite and oil prior to installation.

G. Thoroughly clean contact surfaces of gaskets and pipe ends of flexible pipe couplings just prior to assembly for a distance equal to center-sleeve length plus 2 inches. Install flexible pipe couplings such that the center sleeves are centered over the gap between the ends of the pipes being joined. Install centerline gaps per AWWA C219, Table 5 unless otherwise indicated. Install harnessed flexible pipe couplings in straight-run piping such that 50% of the total travel of the center sleeve or permissible centerline gap is available for expansion and 50% of the travel is available for contraction. In assembling the bolted or studded harnesses of flexible pipe couplings, tighten the nuts gradually and equally at diametrically opposite sides until snug. Do not misalign the harness bolts or studs. Tighten such that bolts or studs carry equal loads. Do not use wrenches or power fastening tools to tighten the nuts.

3.03 PAINTING AND COATING

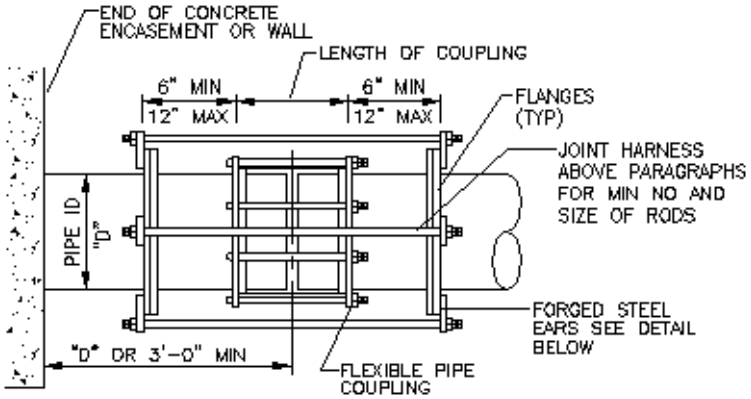
A. Coat buried flexible pipe couplings (including joint harness assemblies), transition couplings, segmented sleeve couplings, and flanged coupling adapters per Section 099000, System No. 21. Coat buried bolt threads, tie bolt threads, and nuts per Section 099000, System No. 24. Then wrap the couplings with polyethylene wrap per Section 099754.

B. Coat flexible pipe couplings (including joint harness assemblies), transition couplings, segmented sleeve couplings, and flanged coupling adapters located indoors, in vaults and structures, and above ground with the same coating system as specified for the adjacent pipe. If the adjacent pipe is not coated, coat couplings per Section 099000, System No. 10. Apply prime coat at factory.

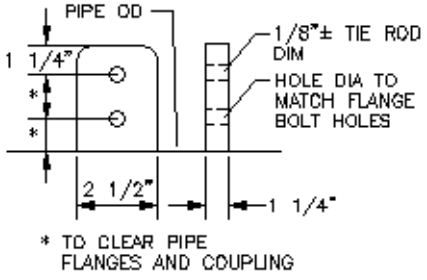
C. Line carbon steel and iron flexible pipe couplings and segmented sleeve couplings per Section 099000, System No. 7.

3.04 HYDROSTATIC TESTING

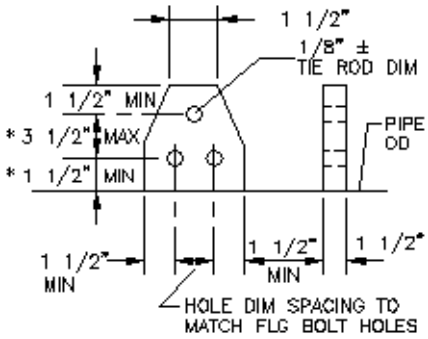
Hydrostatically test flexible pipe couplings, expansion joints, segmented sleeve couplings, and expansion compensators in place with the pipe being tested. Test in accordance with Section 400515.



FLEXIBLE PIPE COUPLING



FORGED STEEL EAR – TYPE "A"



FORGED STEEL EAR – TYPE "B"

FLEXIBLE PIPE COUPLING TIE RODS – DUCTILE IRON PIPE DETAIL

SCALE: NONE

END OF SECTION

SECTION 400762 WALL PIPES, SEEP RINGS, AND PENETRATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of steel and ductile-iron wall pipes and sleeves (including wall collars and seepage rings) and penetrations.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 030500.

B. Painting and Coating: 099000.

C. Fusion-Bonded Epoxy Linings and Coatings: 099761.

D. General Piping Requirements: 400500.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit detail drawings for fabricated steel or cast-iron wall and floor pipes and sleeves, wall flanges, seep rings, and sealing materials. Show dimensions and wall thicknesses.

C. Show flange sizes and the appropriate ANSI or AWWA flange dimensional standard where flanged end wall pipes or penetrations are used.

D. Show grooved-end dimensions and AWWA grooved-end dimensional standard where grooved-end wall pipes or penetrations are used.

E. List coating systems to be applied, manufacturer, and dry thickness of coatings. Call out coatings where coatings are to be applied.

F. List materials of construction, with ASTM material reference and grade.

G. Submit manufacturer's instructions for installing rubber annular hydrostatic sealing devices.

PART 2 - MATERIALS

2.01 GENERAL

A. Use cast-iron, ductile-iron, or fabricated steel wall sleeves when containing rubber annular hydrostatic sealing devices through which piping passes.

B. Use only cast-iron or ductile-iron wall pipes when connecting to cast-iron and ductile-iron pipe. Use only fabricated steel wall pipes when connecting to steel pipe.

C. Cast-iron flanges shall conform to ASME B16.1, Class 125 or 250, to match the flange on the connecting pipe.

D. Flanges shall conform to AWWA C207, Class D. Flanges shall be flat face. Flanges shall match the flange on the connecting pipe.

E. See Section 400500 for flange bolts and gaskets.

2.02 CAST-IRON OR DUCTILE-IRON WALL PIPES AND SLEEVES

A. Provide cast- or ductile-iron wall pipes with ends as shown in the drawings for connection to adjacent cast-iron and ductile-iron pipe or for containing pipes where they pass through concrete walls, ceilings, and floor slabs. Provide seepage ring on wall pipes and sleeves passing through concrete walls and slabs that are to be watertight. Locate collars such that the collar is at the center of the wall or floor slab, unless otherwise shown in the drawings.

B. Wall pipes and sleeves shall be of the following types:

1. Pipe or sleeve with integrally cast seep ring.

2. Pipe or sleeve with shrink-fit steel collar attached.

3. Pipe or sleeve with steel collar halves bottomed in a groove provided in the pipe or sleeve.

C. Minimum wall thickness for pipes and sleeves having integrally cast seep rings shall be as shown in the following table:

Pipe or Sleeve Size (inches)	**Minimum Wall Thickness (inches)**
3	0.48
4	0.52
6	0.55
8	0.60
10	0.68
12	0.75
14	0.66
16	0.70
18	0.75
20	0.80
24	0.89

D. Minimum wall thickness of pipes or sleeves having shrink-fit collars shall be special Class 52. Cut shrink-fit collars from a 1/4-inch-thick steel ring. Attach the collar to a cast-iron or ductile-iron pipe or sleeve by heating the steel collar and allowing it to shrink over the pipe at the necessary location. Provide an epoxy bond (Keysite 740 or 742 or Scotchkote 302) between the pipe and collar. Sandblast the area of the pipe to be epoxy coated per SSPC SP-10.

E. Wall pipes or sleeves having steel collar halves bottomed in a groove shall be ductile iron Special Class 54 minimum unless otherwise shown. Wall flanges shall consist of 1/4-inch-thick steel seep ring halves for pipes through 24-inch and 3/8-inch-thick halves for pipe 30 inches and larger, bottomed in a groove provided on the pipe. The pipe groove shall be machine cut to a depth of 1/16 to 5/64 inch to provide a press fit for the seep ring. Seep ring halves shall be welded together after fit into groove but shall not be welded to pipe. Seep rings shall be sealed completely around the pipe with silicon sealant manufactured by Dow-Corning No. 790, General Electric Silpruf, or equal.

F. The material used in cast- or ductile-iron wall flanges, wall sleeves, and wall penetrations shall conform to ASTM A395, A436, A536, A48 (Class 35), or A126 (Class B).

2.03 FABRICATED STEEL WALL PIPES AND SLEEVES

A. Provide fabricated steel wall pipes and sleeves with ends as shown in the drawings for connection to adjacent steel pipes, or for containing pipes, where they pass through concrete walls. Provide seepage ring or wall flange on wall pipes and sleeves passing through concrete walls and slabs that are to be watertight. Wall thickness shall be the same as the pipe wall thickness when connecting to steel pipe. Minimum wall thickness for sleeves containing pipes shall be standard weight per ASME B36.10 for sleeves 72 inches and smaller and 1/2 inch for sleeves greater than 72 inches through 96 inches.

B. Wall flanges shall be in the form of a steel wall collar welded to the steel sleeve or penetration. Cut welded wall collars from a 1/4-inch steel ring. Attach the collar to a steel wall pipe or sleeve with full circle, 3/16-inch fillet welds. Welding procedures shall be in accordance with ASME B31.3, Chapter V.

C. Steel pipe used in fabricating wall sleeves containing pipes shall comply with ASTM A53 (Type E or S), Grade B; ASTM A135, Grade B; ASTM A139, Grade B; or API 5L or 5LX. Wall pipes connecting to steel pipe shall be of the same material as the connecting pipe. Wall collar material shall comply with ASTM A36, A105, A181, or A182.

2.04 RUBBER ANNULAR HYDROSTATIC SEALING DEVICES

A. Rubber annular hydrostatic sealing devices shall be of the modular mechanical type, utilizing interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe sleeve and the passing pipe. Assemble links to form a continuous rubber belt around the pipe, with a pressure plate under each bolthead and nut.

B. Materials of construction shall be as follows:

C. Use Delrin plastic or reinforced nylon polymer pressure plates in water and wastewater applications. Use the carbon steel pressure plates in services that require fire rating per FM or NFPA requirements. Civil/process and mechanical engineers should coordinate: if both types are required on a project, then provide two specifications and clearly show in the drawings which type is used in which locations.

Compound	Material
Pressure plate	Reinforced nylon polymer
Bolts and nuts for links	Type 316 stainless steel
Sealing element	EPDM rubber

D. The size of the wall sleeve needed to accommodate the passing pipe shall be as recommended by the rubber annular seal manufacturer.

E. Provide centering blocks in 25% of the sealing elements on pipelines larger than 12 inches in diameter.

F. The rubber annular hydrostatic sealing devices shall be Link Seal as manufactured by Thunderline Corporation; Innerlynx as manufactured by Advance Products & Systems, Inc.; or equal.

2.05 BOLTS, NUTS, AND GASKETS FOR FLANGED-END WALL PIPES

See Section 400500.

2.06 POLYETHYLENE FOAM FILLER FOR PIPE PENETRATIONS

Packing foam shall be an extruded closed-cell polyethylene foam rod, such as Minicel backer rod, manufactured by Industrial Systems Department, Plastic Products Group of Hercules, Inc., Middletown, Delaware; Ethafoam, as manufactured by Dow Chemical Company, Midland, Michigan; or equal. The rod shall be 1/2 inch larger in diameter than the annular space.

2.07 POLYURETHANE SEALANT FOR PIPE PENETRATIONS

Sealant shall be multipart, polyurethane sealant, to cure at ambient temperature, for continuous immersion in water. Install as recommended by the manufacturer. Products: SIKA Sikaflex 2C or equal.

2.08 PAINTING AND COATING

A. Coat penetrations and sleeves exposed, above ground, or in vaults and structures in accordance with Section 099000, System No. 10 unless fusion-bonded epoxy coatings are shown in the drawings or specified elsewhere.

B. Coat submerged sleeves and penetrations per Section 099000, System No. 7 unless fusion-bonded epoxy coatings are shown in the drawings or specified elsewhere.

C. Coat buried sleeves and penetrations per Section 099000, System No. 21.

D. Do not coat stainless steel sleeves and penetrations.

PART 3 - EXECUTION

3.01 LOCATION OF PIPES AND SLEEVES

A. Provide a wall or floor pipe where shown in the drawings and wherever piping passes through walls or floors of tanks or channels in which the water surface is above the pipe penetration.

B. Provide a floor sleeve where shown in the drawings and wherever plastic pipe, steel, or stainless steel pipe 3 inches and smaller or stainless steel or copper tubing passes through a floor or slab. Provide a rubber annular sealing device in the annular space between the sleeve and the passing pipe or tubing.

C. Provide wall sleeves where shown in the drawings and wherever plastic, steel or stainless steel pipe 3 inches and smaller, or stainless steel or copper tubing passes through a wall. Provide a single rubber annular seal when the wall is 8 inches thick or less. Provide two rubber annular seals (one at each end of the sleeve) when the wall is more than 8 inches thick.

D. Where wall sleeves are installed in which water is on one or both sides of the channel or wall, provide two rubber annular seals (one at each end of the sleeve).

E. Where pipes pass through walls or slabs and no sleeves or wall or floor pipe with seep ring is provided, pack the annular space with polyethylene foam filler and fill the ends of the penetration with 2 inches of elastomeric sealant on both sides of the structure.

3.02 INSTALLATION IN EXISTING CONCRETE WALLS AND SLABS

Core drill holes 1 to 2 inches larger in diameter than the outside diameter of the wall flange or collar. Install wall pipe and collar assembly axially aligned with the piping to which it will be connected or will contain. Pack the void space between the sleeve and concrete with grout. See Section 030500 for grouting specifications.

3.03 INSTALLATION IN NEW CONCRETE WALLS AND SLABS

Install wall pipes and sleeves in walls before placing concrete. Do not allow any portion of the pipe or sleeve to touch any of the reinforcing steel. Install wall pipe or sleeve and collar assembly axially aligned with the piping to which it will be attached or will contain. Provide supports to prevent the pipe or sleeve from displacing or deforming while the concrete is being poured and is curing.

3.04 INSTALLATION IN DRY FLOORS AND SLABS

Install pipe sleeves and spools in concrete floors and slabs which do not have water over them such that the sleeve or pipe extends from the bottom of the floor or slab to 2 inches above the floor or slab unless shown otherwise in the drawings.

3.05 INSTALLATION OF WALL PIPES HAVING FLANGED END CONNECTIONS

A. Check alignment before grouting in place or pouring concrete. Realign if the sleeve is not properly aligned.

B. Install flanged end wall sleeves or penetrations with bolt holes of the end flanges straddling the horizontal and vertical centerlines of the sleeve.

3.06 QUALIFICATIONS OF WELDERS

Welder qualifications shall be in accordance with AWS D1.1.

3.07 INSTALLATION OF RUBBER ANNULAR HYDROSTATIC SEALING DEVICES

Install in accordance with the manufacturer's instructions.

3.08 FIELD TESTING

Check each wall penetration for leakage at the time the hydraulic structure is tested for leakage; see Section 033000. Penetrations shall show zero leakage.

END OF SECTION

SECTION 400764 PIPE HANGERS AND SUPPORTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of pipe hangers and supports, including accessory items, such as anchor bolts and screws.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Wall Pipes, Seep Rings, and Penetrations: 400762.

C. Flexible Pipe Couplings and Expansion Joints: 400722.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Provide line drawings of each piping system to the scale shown in the drawings, locating each support or hanger. Identify each type of hanger or support by the manufacturer's catalog number or figure.

C. Provide installation drawings and manufacturer's catalog information on each type of hanger and support used. Clearly indicate the actual pipe outside diameter (not just nominal pipe size) that is used for the hangers and supports.

PART 2 - MATERIALS

2.01 DESIGN CRITERIA

A. Not all pipe supports or hangers required are shown in the drawings. Provide pipe supports for every piping system installed. Support piping by pipe support where it connects to pumps or other mechanical equipment.

B. Pipe support and hanger components shall withstand the dead loads imposed by the weight of the pipes, fittings, and valves (all filled with water), plus valve actuators and any insulation, and shall have a minimum safety factor of five based on material ultimate strength.

2.02 HANGER AND SUPPORT SYSTEMS

A. Pipe hangers and supports shall be as manufactured by Anvil, Unistrut, B-Line, Superstrut, or equal.

B. Pipe hangers and supports shall comply with MSS SP-58 for the standard types referenced in the drawings. Construct special hangers and supports if detailed in the drawings. Type numbers for standard hangers and supports shall be in accordance with MSS SP-58 as listed below:

Type Number	Description	Manufacturer and Model (or Equal)
1	Adjustable steel clevis	Anvil Fig. 590 or 260, B-Line B3100 or B3102
3	Steel double-bolt pipe clamp	Anvil Fig. 295A or 295H, B-Line B3144 or B3144A
4	Steel pipe clamp (pipes smaller than 3 inches)	Anvil Fig. 212, B-Line B3140
4	Steel pipe clamp (pipes 3 inches and larger)	Anvil Fig. 216, B-Line 3142
5	Pipe hanger	B-Line B3690
6	Adjustable swivel pipe ring	Anvil Superstrut 714, Anvil Fig. 104
7	Adjustable steel band hanger	B-Line B3172
8	Extension pipe or riser clamp	Anvil Fig. 261, B-Line B3373
9	Adjustable band hanger	Anvil Fig. 97
10	Adjustable swivel ring band hanger	Anvil Fig. 70, B-Line B3170 NF
11	Split pipe ring with adjustable turnbuckle	Anvil Fig. 108, B-Line B3173
13	Steel turnbuckle	Anvil Fig. 230, B-Line B3202
14	Steel clevis	Anvil Fig. 299, B-Line B3201
15	Swivel turnbuckle	Anvil Fig. 114, B-Line B3224
16	Malleable iron socket	Anvil Fig. 110R, B-Line B3222
17	Steel weldless eye nut	B-Line B3200
18	Steel or malleable iron concrete insert	Anvil Fig. 281, Superstrut 452
19	Top beam C-clamp	Anvil Fig. 92, B-Line B3033
20	Side I-beam or channel clamp	Anvil Fig. 14 or 217
21	Center I-beam clamp	Anvil Figure 134
22	Welded attachment type	Anvil Fig. 66 B-Line B3083
23	C-clamp	Anvil Fig. 86, B-Line B3036L
24	U-bolt	Anvil Fig. 137, B-Line B3188

Type Number	Description	Manufacturer and Model (or Equal)
26	Clip	Anvil Fig. 262, B-Line B3180
28	Steel I-beam clamp with eye nut	Anvil Fig. 228
29	Steel wide flange	Anvil Fig. 228 clamp with eye nut
30	Malleable iron beam clamp with extension piece	Superstrut CM-754, B-Line B3054
31	Light welded steel bracket	Anvil Fig. 194, B-Line B3063
32	Medium welded steel bracket	Anvil Fig. 195, B-Line B3066
33	Heavy welded steel bracket	Anvil Fig. 199, B-Line B3067
34	Side beam bracket	Anvil Fig. 202, B-Line B3062
36	Pipe saddle support	Anvil Fig. 258, B-Line B3095
37	Pipe stanchion saddle	Anvil Fig. 259, B-Line B3090
38	Adjustable pipe saddle support	Anvil Fig. 264, B-Line B3089
39	Steel pipe covering	Anvil Fig. 160, 161, 162, 163, 164, or 165; Superstrut A 789; B-Line B3160/B3165
40	Insulation protection shield	Anvil Fig. 167, B-Line B3151
41	Single pipe roll	Anvil Fig. 171, B-Line B3114
43	Adjustable roller hanger with swivel	Anvil Fig. 181, B-Line B3110
44	Pipe roll, complete	Anvil Fig. 271, B-Line B3117SL

C. Pipe hangers and supports shall be hot-dipped galvanized per ASTM A153 carbon steel (ASTM A36, A575, or A576). Bases, rollers, and anchors shall be steel as described above or may be cast iron (ASTM A48). Pipe clamps shall be steel as described above or may be malleable iron (ASTM A47).

D. Parallel pipe clamps shall be Unistrut P1563 through P1573, Superstrut AB-719, or equal. Material shall be carbon steel, coated as specified for channels and frames.

2.03 PIPE SPIDERS

Superstrut S-794 or equal.

2.04 NEOPRENE ISOLATING SLEEVES FOR METAL PIPE 6 INCHES AND SMALLER

Unistrut P2600, B-Line "Vibrocushion," or equal.

2.05 ANCHOR BOLTS AND SCREWS

Anchor bolts and screws for attaching pipe supports and hangers to walls, floors, ceilings, and roof beams shall be hot-dipped galvanized steel, ASTM A307. Nuts shall be galvanized steel, ASTM A563 and as per specification 050520.

PART 3 - EXECUTION

3.01 PIPE HANGER AND WALL SUPPORT SPACING

Install pipe hangers and wall supports on horizontal and vertical runs at the spacing shown or detailed in the drawings. Provide hanger rods (for horizontal runs) and wall supports of the sizes shown or detailed in the drawings. If no spacing or rod sizes are given in the drawings or in the specifications for a particular piping system, use the following:

A. Pipe Hanger and Wall Support Spacing for Steel and Ductile-Iron Pipe :

Pipe Size (inches)	**Maximum Support or Hanger Spacing (feet)**	**Minimum Rod Size (inches)**
3/8 and smaller	4	3/8
1/2 through 1	6	3/8
1 1/4 through 2	8	3/8
2 1/2 and 3	10	1/2
3 1/2 and 4	10	5/8
6	12	3/4
8	12	7/8
10 and 12	14	7/8
14 and 16	16	1

B. Pipe Hanger or Wall Support Spacing for PVC and CPVC Pipe:

Pipe Size (inches)	**Maximum Support or Hanger Spacing (feet)**	**Minimum Rod Size (inches)**
3/4	4	3/8
1	4	3/8
1 1/2	5	3/8
2	5	3/8
2 1/2	5	1/2
3	6	1/2

C. Pipe Hanger or Wall Support Spacing for Copper Tubing and Pipe:

Pipe Size (inches)	Maximum Support or Hanger Spacing (feet)	Minimum Rod Size (inches)
1 and smaller	4	3/8
1 1/4 through 2	6	3/8
2 1/2 through 3	8	1/2

D. Pipe Hanger or Wall Support Spacing for Stainless Steel Tubing:

Tube Outside Diameter (inches)	Maximum Hanger or Support Spacing (feet)	Minimum Rod Size (inches)
1/8 to 1/4	2	3/8
5/16 to 1/2	3	3/8
5/8 to 7/8	4	3/8
1 to 2	6	3/8

E. For piping services not described, provide hangers and supports per MSS SP-58 and SP-69.

F. Provide bracing for piping 8 inches and smaller that is installed on hangers or trapezes per MSS SP-127. Provide sway bracing for hangers for piping larger than 8 inches as detailed in the drawings.

3.02 PIPE SUPPORT SPACING FOR SUPPORTS ON TOP OF SLABS OR GRADE

Install pipe supports on horizontal runs at the spacing shown or detailed in the drawings. Provide supports of the type shown or detailed in the drawings. If no spacings are given in the drawings or in the specifications for a particular piping system, use the following:

A. Pipe Support Spacing for Steel and Ductile-Iron Pipe:

Pipe Size (inches)	Maximum Support Spacing (feet)
3/8 and smaller	4
1/2 through 1	6
1 1/4 through 2	8
2 1/2 and 3	10
3 1/2 and 4	10
6	12
8	12
10 and 12	14
14 and 16	16
18	16
20 through 24	18
30	18

B. Pipe support spacing for other pipe materials shall be the same as described above in paragraph entitled “Pipe Hanger and Wall Support Spacing.”

3.03 INSTALLING PIPE HANGERS AND SUPPORTS

A. Provide separate hangers or supports at each valve. Provide one hanger or support around each end of the valve body or on the adjacent connecting pipe within one pipe diameter of the valve end. Provide additional hangers or supports to relieve eccentric loadings imposed by offset valve actuators.

B. Provide separate hangers or supports at each pipe elbow, tee, or fitting. Provide separate hangers or supports on both sides of each nonrigid joint or flexible pipe coupling.

C. Adjust pipe hangers per MSS SP-89, paragraph 10.6.

D. Install leveling bolts beneath support baseplates. Provide 3/4-inch thick grout pad beneath each base.

E. Install piping without springing, forcing, or stressing the pipe or any connecting valves, pumps, and other equipment to which the pipe is connected.

3.04 INSTALLING NEOPRENE ISOLATING SLEEVES

Install a sleeve around each metal pipe 6 inches and smaller at the point of bearing or contact with the pipe hanger or support.

3.05 PAINTING AND COATING

A. Grind welds of fabricated steel pipe supports smooth, prepare surface by sandblasting, and apply coating system.

B. Paint exposed pipe hangers and supports to match the color of the largest pipe on the support using System No. 10 or 15 per Section 099000.

C. Coat submerged pipe hangers and supports per Section 099000, System No. 7.

END OF SECTION

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SECTION 400775 EQUIPMENT, PIPING, DUCT, AND VALVE IDENTIFICATION

PART 1 - GENERAL

A. DESCRIPTION

This section includes materials and installation of markers, labels, and signs for pipes, ducts, and valves; for mechanical equipment; for hazardous materials warnings; and for miscellaneous plant services.

B. RELATED WORK SPECIFIED ELSEWHERE

1. Painting and Coating: 099000.

C. SUBMITTALS

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. Submit manufacturer's catalog data and descriptive literature describing materials, colors, letter size, and size of labels.

PART 2 - MATERIALS

A. LABELS FOR EXPOSED PIPING

1. Labels for each section of exposed piping shall bear the full piping service description name as shown in the Piping Schedule in the drawings. Provide separate flow directional arrows next to each label. Color, size, and labeling shall conform to ANSI A13.1 and Z535.1. Labels for piping inside buildings shall be vinyl cloth: W. H. Brady Co. B-500 vinyl cloth, Seton Name Plate Corporation Pipe Markers, or equal. Labels for piping located outdoors shall be weather- and UV-resistant acrylic plastic and shall be W. H. Brady Co. B-946, Seton Name Plate Corporation Pipe Markers, or equal.

2. Alternatively, provide preprinted, semirigid, snap-on, color-coded pipe markers. Color, size, and labeling shall conform to ANSI A13.1 and Z535.1. Label shall cover 360 degrees (minimum). Labels shall be fabricated of weather- and UV-resistant acrylic plastic. Labels shall be Seton Nameplate Corporation SetMark pipe marks or equal.

B. LABELS FOR EXPOSED VALVES

Provide each valve assigned a tag number in the drawings with an identification tag. Tag shall be 2-inch-square or circular aluminum or 1/16-inch-thick fiberglass: W. H. Brady B-60, Seton Name Plate Corp. Series SVT, or equal. Aluminum tags shall have black-filled

letters. Tag shall show the valve tag number and/or name or designation as given in the drawings.

C. LABELS FOR MECHANICAL EQUIPMENT

Provide a label for each pump, blower, compressor, tank, feeder, flocculator, flash mixer, clarifier mechanism, or other piece of mechanical equipment. Label shall show the equipment name and tag number as shown in the drawings. Labels shall be 1 1/2 inches (minimum) by 4 inches (minimum) brass, aluminum, or 1/8-inch-thick fiberglass tags: Brady B-120 Fiber-Shield, Seton Style 2065, or equal.

D. LABELS FOR EXPOSED TANKS

Signs shall be weather- and UV-resistant. Labels shall be Brady B-946, Seton Name Plate Corporation PSPL, or equal. Minimum size shall be 7 inches by 10 inches. Provide a sign on each tank bearing the tank tag number and the name of the liquid stored.

E. LAMINATED PLASTIC WALL SIGNS

Wall signs shall be 1-1/2 inches by 4 inches (minimum dimensions), 1/16-inch-thick satin-surfaced material conforming to ASTM D709 (Grades ES-1, ES-2, or ES-3). Lettering shall be 1/2-inch-high white letters on black background. Do not provide mounting holes. Legends shall be as shown in the drawings.

F. LABELS FOR AUTOMATIC START/STOP EQUIPMENT

Provide a sign reading "CAUTION--EQUIPMENT STARTS AND STOPS AUTOMATICALLY" on each piece of equipment. Signs shall be pressure-sensitive vinyl with adhesive for application to equipment. Signs mounted on adjacent walls are also acceptable. Size shall be 10 inches by 7 inches minimum. Products: Seton, Brady, or equal.

G. HAZARDOUS MATERIALS WARNING AND DANGER SIGNS

1. Provide hazardous materials warning diamond signs complying with NFPA 704 at all entrances to the chemical storage area and at all chemical storage tanks and feed pumps. Size shall be 10 inches square. Wall signs shall be 1/8-inch-thick fiberglass: Brady B-120 Fiber-Shield or equal. Signs attached to tanks, cabinets, or pieces of equipment shall be self-adhesive vinyl cloth: Brady B-946 or equal.

2. Provide signs reading "DANGER" followed by the name of the chemical, gas, or hazard at all entrances to the chemical storage area and at all chemical storage tanks and feed pumps. Size shall be 10 inches by 14 inches. Signs shall be 1/8-inch-thick fiberglass: Brady B-120 or equal.

H. UNDERGROUND PLASTIC WARNING TAPE FOR METALLIC PIPE

Provide permanent, bright-colored, continuous-printed plastic tape, intended for direct burial service, not less than 6 inches wide by 3.5 mils thick. Provide tape with printing

which most accurately indicates type of service of buried pipe. Provide the following colored tape for the various piping services:

Service	Color
Cable TV	Orange
Chemical	Yellow
Electric	Red
Fuel Oil, Gasoline	Yellow
Gas	Yellow
Reclaimed Water	Violet
Sewer	Green
Telephone	Orange
Water	Blue

A. UNDERGROUND DETECTABLE METALLIC PIPE WARNING TAPE FOR NONMETALLIC PIPE

Provide permanent, bright-colored, continuous-printed tape consisting of an aluminum or steel foil sheathed in a plastic laminate, not less than 2 inches wide by 3 mils thick. Provide tape with printing which most accurately indicates type of buried service. Provide the following colored tape for the various piping services:

Service	Color
Cable TV	Orange
Chemical	Yellow
Electric	Red
Fuel Oil, Gasoline	Yellow
Gas	Yellow
Reclaimed Water	Violet
Sewer	Green
Telephone	Orange
Water	Blue

B. NO SMOKING SIGNS

Provide a sign reading "NO SMOKING" at each entrance to the chemical storage area and at the standby generator. Signs shall be weather and UV resistant, minimum size 10 inches by 7 inches, 1/18-inch thick fiberglass. Products: Brady, Seton, or equal.

C. ADDITIONAL SIGNAGE

Install additional signage required by Cal/OSHA.

PART 3 - EXECUTION

A. INSTALLING PIPE LABELS

1. Provide label and flow arrow at each connection to pumps or other mechanical equipment, at wall boundaries, at tees and crosses, and at 20-foot centers on straight runs of piping.

2. On piping having external diameters less than 6 inches (including insulation, if any), provide full-band pipe markers, extending 360 degrees around pipe at each location.

3. On piping having external diameters of 6 inches and larger (including insulation, if any), provide either full-band or strip-type pipe markers but not narrower than three times letter height (and of required length), fastened by one of the following methods:

   a. Laminated or bonded application of pipe marker to pipe or insulation.

   b. Strapped-to-pipe or insulation application of semirigid type with Type 304 or 305 stainless steel bands.

B. INSTALLING VALVE AND EQUIPMENT LABELS

4. Attach labels to the valve or piece of equipment with Type 304 or 316 stainless steel chains or wires.

5. Attach valve labels to the valve handwheels. If the valve has no handwheel, attach the label to the valve by tying the tag wire or chain around the operating shaft or nut.

C. INSTALLING MISCELLANEOUS SIGNS

Attach per sign manufacturer's recommendations and per CAL/OSHA requirements.

D. INSTALLING WALL AND DOOR SIGNS

Attach to walls and doors using epoxy adhesive.

E. INSTALLING LABELS FOR AUTOMATIC START/STOP EQUIPMENT AND HAZARDOUS MATERIALS WARNING SIGNS FOR EQUIPMENT

6. Attach signs for exposed equipment directly to the equipment.

7. Attach signs for sump pumps near the sump pump.

F. INSTALLING UNDERGROUND PLASTIC WARNING TAPE FOR METAL PIPE

During backfilling of each exterior underground piping system, install continuous underground-type plastic line marker, located directly over buried line at 6 to 8 inches above the top of the pipe. Where multiple small lines are buried in common trench and do not exceed overall width of 16 inches, install single line marker.

G. INSTALLING UNDERGROUND DETECTABLE METALLIC PIPE WARNING TAPE

Install tape 4 to 6 inches below finished ground surface, located directly over buried pipelines. Where multiple small pipelines are buried in a common trench and do not exceed an overall width of 16 inches, install a single marker tape.

END OF SECTION

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SECTION 402040 DUCTILE-IRON PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials, testing, and installation of ductile-iron pipe and fittings 24 inches and smaller.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Polyethylene Sheet Encasement (AWWA C105): 099754.

C. Trenching, Backfilling, and Compacting: 312316.

D. Disinfection of Piping and Structures: 331300.

E. General Piping Requirements: 400500.

F. Pressure Testing of Piping: 400515.

G. Wall pipes, Seep Rings, and Penetrations: 400762.

H. Pipe Hangers and Supports: 400764.

I. Equipment, Piping, Duct, and Valve Identification: 400775.

J. Flexible Pipe Couplings and Expansion Joints: 400722.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300

B. Provide an affidavit of compliance with standards referenced in this specification, e.g., AWWA C151. Submit a copy of the report of pressure tests for qualifying the designs of all sizes and types of AWWA C153 fittings that are being used in the project. The pressure test shall demonstrate that the minimum safety factor described in AWWA C153, Section 5.5, is met.

C. Provide the following information:

1. Mortar lining thickness.

2. Wall thickness.

3. Show deflections at push-on and mechanical joints.

4. Submit joint and fitting details and manufacturer’s data sheets.

D. Submit calculations and test data proving that the proposed restrained joint arrangement can transmit the required forces with a minimum safety factor of 1.5.

E. Submit certificate that cement for mortar lining complies with ASTM C150, designating type.

F. Submit test report on physical properties of rubber compound used in the gaskets.

G. Submit drawing or manufacturer's data sheet showing flange facing, including design of facing serrations.

H. Submit weld procedure specification, procedure qualification record, and welder's qualifications prior to any welding to ductile-iron pipe.

PART 2 - MATERIALS

2.01 PIPE

Pipe shall be cast ductile (nodular) iron, conforming to AWWA C151.

2.02 PIPE MARKING

Plainly mark each length of straight pipe to identify the design pressure class, the ductile-iron wall thickness, and the date of manufacture. Mark the spigot end of restrained joint pipe to show clearly the required depth of insertion into the bell.

2.03 DESIGN CRITERIA

A. Obtain the following information from the drawings and contract documents:

1. Elevation of the pipe centerline and of the completed ground.

2. Alignment of the pipeline.

3. Field test hydraulic gradient elevation (HGL).

4. Nominal internal diameter, ID.

5. Design internal pressure class and thickness class.

6. Joint types.

B. The design pressure (in psi) shall be the difference in HGL elevation and the pipeline centerline elevation (in feet) multiplied by 0.433.

2.04 PIPE WALL THICKNESS

A. Minimum wall thicknesses for pipe having grooved-end joints shall be as shown in the following table:

Pipe and Fitting Sizes (inches)	Wall Thickness*
16 and smaller	Special Class 53
18	Special Class 54
20	Special Class 55
24 to 36	Special Class 56
*Special Class and Pressure Class per AWWA C151.	

B. Minimum wall thickness for pipe having threaded flanges shall be Special Class 53 or Pressure Class 350.

C. Minimum pipe wall thickness required for corporation stops and tapped outlets shall be in accordance with Table A.1 of AWWA C151 for three full threads for design pressures up to 250 psi and four full threads for design pressures over 250 to 350 psi.

2.05 FITTINGS

A. Fittings 48 inches and smaller shall conform to AWWA C110 with a minimum pressure rating of 250 psi. Material shall be ductile iron. Flanges shall be flat faced.

B. Mechanical joint fittings conforming to AWWA C153 may be used in lieu of AWWA C110 fittings. Mechanical joint ductile-iron fittings 18 through 48 inches conforming to AWWA C110 (except for laying length) with a minimum pressure rating of 250 psi may also be used.

C. Grooved-end fittings shall conform to AWWA C110 with grooved ends conforming to AWWA C606, radius cut rigid joints. Fitting material shall conform to ASTM A48, Class 30; ASTM A126, Class B; or ASTM A536, Grade 65-42-10. Wall thickness of ductile-iron (ASTM A536) fittings shall conform to AWWA C110 or C153; wall thickness of cast-iron fittings shall conform to AWWA C110. Fittings and couplings shall be furnished by the same manufacturer.

D. Material for fittings with welded-on bosses shall have a Charpy notch impact value of minimum 10 ft-lbs under the conditions defined in AWWA C151. Test completed welds by the liquid penetrant method per ASTM E165.

2.06 FLANGES

A. Flanges shall be solid back, Class 125 per AWWA C115. Flanges on pipe shall be either cast or threaded. Material shall be ductile iron.

B. Flanged pipe and fittings shall be shop fabricated, not field fabricated. Threaded flanges shall comply with AWWA C115. Flanges shall be individually fitted and machine tightened in the shop, then machined flat and perpendicular to the pipe barrel. Flanges shall be backfaced parallel to the face of flange. Prior to assembly of the flange onto the pipe, apply a thread compound to the threads to provide a leak-free connection. There shall be zero leakage through the threads at a hydrostatic test pressure of 250 psi without the use of the gasket.

C. Loose areas of cement-mortar lining are not acceptable. Remove and reconstruct lining in areas where quality is defective, such as sand pockets, voids over sanded areas, blisters, drummy areas, cracked areas, and thin spots. Repair longitudinal cracks in excess of 1/32 inch in width or where crack extends to metal with epoxy. Repair all cracks larger than 1/16 inch with epoxy.

2.07 GROOVED-END COUPLINGS

A. Grooved-end pipe couplings shall be ductile iron, ASTM A536 (Grade 65-45-12). Gaskets shall be halogenated butyl rubber or EPDM and shall conform to ASTM D2000.

B. Bolts in exposed service shall conform ASTM A193, Grade B8, Class 2. Bolts in buried or submerged service shall be ASTM A193, Grade B8, Class 2.

C. Couplings for pipe 24 inches and smaller shall conform to AWWA C606 for flexible radius ductile-iron pipe, except where rigid radius couplings are required to connect to fittings. Couplings for pipe sizes 30 and 36 inches shall be in accordance with the coupling manufacturer's published literature for tolerances and dimensions for flexible and rigid radius cut joints. Couplings shall be Victaulic Style 31, Gustin-Bacon No. 500, or equal.

D. Grooved-end adapter flanges for piping 24 inches and smaller having an operating pressure of 150 psi and less shall be Victaulic Style 341 or 342 or equal. Flange dimensions shall conform to ASME B16.1, Class 125.

E. Grooved-end transition couplings for connecting ductile-iron pipe 12 inches and smaller to steel pipe shall be Victaulic Style 307 or equal.

2.08 GASKETS FOR FLANGES

See Section 400500.

2.09 GASKETS FOR MECHANICAL, PUSH-ON, AND RESTRAINED JOINTS

Synthetic or natural rubber in accordance with AWWA C111.

2.10 BOLTS AND NUTS FOR FLANGES

See Section 400500.

2.11 OUTLETS AND NOZZLES

A. Provide outlets 2 inches and smaller by tapping the pipe and attaching a service clamp. Use bronze clamps for exposed, buried and submerged piping.

B. For outlets larger than 2 inches, use a tee with a flanged outlet.

C. For outlets larger than 2 inches in buried piping, use a tee with a restrained joint outlet.

2.12 JOINTS

A. Joints in aboveground or submerged piping or piping located in vaults and structures shall be flanged.

B. Joints in buried piping shall be of the push-on or mechanical-joint type per AWWA C111 except where flanged joints are required to connect to valves, meters, and other equipment.

C. Restrained joints for piping 6 inches and larger shall be American Cast Iron Pipe "Lok-Ring" or "Flex-Ring," U.S. Pipe "TR-Flex," or equal. Weldments for restrained joints shall be tested by the liquid penetrant method per ASTM E165. Restrained joints for field closures shall be “Megalug” by EBAA Iron.

D. Restrained joints in 4-inch-diameter buried piping shall be American Cast Iron Pipe Company “Fast-Grip,” U.S. Pipe Field-lok gasket within Tyton joint pipe and fittings, or equal. Joint restraint shall be certified to four times rated pressure of 200 psi by Factory Mutual.

E. Where thrust restraint is called for in the drawings, provide pipe with restrained joints capable of transmitting 1.5 times the thrust, as calculated by the following equation:

$$T = 1.5 * (0.785 * P * D^2)$$

where:

P = Pressure class of pipe in psi.
D = Outside diameter of pipe in inches.
T = Thrust in pounds.

2.13 MECHANICAL JOINT RESTRAINT SYSTEM USING FOLLOWER RING AND WEDGES

The restraining mechanism shall consist of a follower gland having a seal gasket and individually actuated wedges that increase their resistance to pullout as pressure or external forces increase. The system manufacturer shall provide all the components (follower ring, wedges, and gaskets) for the restraining device. The device shall be capable of full mechanical joint deflection during assembly, and the flexibility of the joint shall be maintained after burial. The joint restraint ring and its wedging

components shall be constructed of ductile iron conforming to ASTM A536, Grade 60-42-10. The wedges shall be ductile iron, heat-treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with mechanical joint bells conforming to AWWA C111 and AWWA C153. The design shall use torque limiting twist-off nuts to provide actuation of the restraining wedges. The mechanical joint restraint shall be available in the size range of 3 through 48 inches. Minimum rated pressure shall be 350 psi for sizes 16 inches and smaller and 250 psi in sizes 18 inches and larger. Products: Megalug Series 1100 as manufactured by EBAA Iron, Inc., or equal.

2.14 DUCTILE-IRON PIPE WELDMENTS

A. All welding to ductile-iron pipe, such as for bosses, joint restraint, and joint bond cables, shall be done at the place of manufacture of the pipe. Perform welding by skilled welders experienced in the method and materials to be used. Welders shall be qualified under the standard qualification procedures of the ASME Boiler and Pressure Vessel Code, Section IX, Welding Qualifications.

B. Welds shall be of uniform composition, neat, smooth, full strength, and ductile. Completely grind out porosity and cracks, trapped welding flux, and other defects in the welds in such a manner that will permit proper and complete repair by welding.

C. Completed welds shall be inspected at the place of manufacture by the liquid penetrant method. Conform to the requirements specified in ASTM E165, Method A, Type I or Type II. The materials used shall be water washable and nonflammable.

PART 3 - EXECUTION

3.01 DELIVERY, UNLOADING, AND TEMPORARY STORAGE OF PIPE AT SITE

A. Use unloading and installation procedures that avoid cracking of the lining. If necessary, use plastic sheet bulkheads to close pipe ends and keep cement-mortar lining moist.

B. Deliver the pipe alongside the pipelaying access road over which the pipe trailer-tractors can travel under their own power. Place the pipe in the order in which it is to be installed and secure it from rolling.

C. Do not move pipe by inserting any devices or pieces of equipment into the pipe barrel. Field repair linings damaged by unloading or installation procedures.

3.02 FIELD CUT PIPE END PREPARATION AND COATING

All ductile iron pipe cut in the field shall have all bare metal surfaces properly prepared and coated immediately after cutting with a 100% solids epoxy coating or a manufacture - approved coating suitable for the specific application. Coating applications shall be in accordance with the pipe manufacturer's recommendations and shall restore corrosion protection equivalent to the original pipelining and coating system at the cut end."

3.03 SANITATION OF PIPE INTERIOR

A. During laying operations, do not place tools, clothing, or other materials in the pipe.

B. When pipelaying is not in progress, close the ends of the installed pipe by a child- and vermin-proof plug.

3.04 INSTALLING FLANGED PIPE AND FITTINGS

Install in accordance with Sections 400500. Cut the bore of the gaskets such that the gaskets do not protrude into the pipe when the flange bolts are tightened.

3.05 INSTALLING GROOVED-END PIPE AND FITTINGS

See Section 400500.

3.06 INSTALLING BURIED PIPING

A. Install in accordance with AWWA C600, Section 312316, and as follows.

B. When installing piping in trenches, do not deviate more than 1 inch from line or ¼ inch from grade. Measure for grade at the pipe invert.

C. Provide thrust blocks at fittings per Section 312316.

D. Assemble restrained joints per manufacturer's instructions.

E. Bond buried joints as described in Section 264213.

3.07 JOINT DEFLECTIONS FOR BURIED PIPE

A. Do not exceed the following deflection angles for unrestrained buried pipe joints:

Pipe Size (inches)	Maximum Deflection (degrees)	
	Push-On Joint	Mechanical Joint
4	4	6 1/2
6	4	5 1/2
8	4	4
10	4	4
12	4	4
14	2 1/2	3
16	2 1/2	3
18	2 1/2	2 1/2
20	2 1/2	2 1/2
24	2 1/2	2
30	2 1/2	N/A

B. For restrained joints, do not exceed 80% of the manufacturer's recommended maximum deflections.

C. Assemble joints in accordance with AWWA C600 and the manufacturer's recommendations.

3.08 INSTALLING ABOVEGROUND OR EXPOSED PIPING

See Sections 400500.

3.09 PAINTING AND COATING

A. Coat pipe located above ground and in vaults and structures as per Section 099000, System No. 10. Apply prime coat in the shop before transporting pipe to the jobsite. Apply intermediate and finish coats in the field before installing the pipe, then touch up after installation.

B. Provide asphaltic coating on buried pipe per AWWA C151.

C. Coat buried flanges and buried mechanical and restrained joint bolts, nuts, and glands per Section 099000, System No. 21.

3.10 POLYETHYLENE ENCASEMENT OF BURIED PIPE AND FITTINGS

Wrap buried pipe, fittings, grooved-end couplings, and joints with polyethylene per Section 099754.

3.11 INTERIOR JOINT RECESSES FOR BURIED PIPING 30 INCHES AND LARGER

A. Point interior joint recesses of 30-inch and larger nominal diameter pipes with cement-mortar. Do not point interior joints until after backfilling the pipe section.

B. Working inside the pipe, remove foreign substances from joint recesses and pack with cement-mortar. Finish the surface with a steel trowel to match adjoining pipe.

3.12 CLEANING PIPE

After interior joints have been pointed and mortar has hardened, sweep pipe clean of all dirt and debris. If hardened mud exists in the pipe, remove with the use of pressurized water hoses.

3.13 FIELD HYDROSTATIC TESTING

Test pressures are shown in Section 400515. Test in accordance with Section 400515.

3.14 PIPE LABELING

Label exposed pipe above grade or in buried vaults per Section 400775.

3.15 BURIED WARNING AND IDENTIFICATION TAPE

Provide detectable warning tape per Section 400775. Warning and identification shall read “CAUTION BURIED SEWER PIPING BELOW” or similar wording.

END OF SECTION

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SECTION 402090 PVC PIPE, 3 INCHES AND SMALLER

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of PVC pipe and fittings of size 3 inches and smaller for use in process piping having a maximum design pressure of 150 psi and having a maximum design temperature of 105°F.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Trenching, Backfilling, and Compacting: 312316.

C. General Piping Requirements: 400500.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the Special Provisions Section 10-7.

B. Submit materials list showing materials of pipe and fittings with ASTM reference and grade. Submit manufacturer's certification of compliance with referenced standards, e.g., ASTM D1784, D1785, and D2467. Show wall thickness of pipe and fittings. Show fitting dimensions.

C. Submit data sheets for solvent cement demonstrating compliance with ASTM D2564 and F656.

PART 2 - MATERIALS

2.01 PIPE

Pipe shall be Schedule 80, Type I, Grade 1 (Class 12454-B), conforming to ASTM D1784 and D1785.

2.02 FITTINGS

Fittings shall be Schedule 80 and shall conform to ASTM D2464 for threaded fittings and ASTM D2467 for socket-type fittings.

2.03 UNIONS

A. Unions shall have socket-type ends, O-rings, and shall be Schedule 80. Material shall be Type I, Grade 1 PVC, per ASTM D1784.

B. Union connections to other metal piping materials shall comply with MSS SP-107. The fitting end for connection to PVC pipe shall be a female socket. Provide wrought or cast copper tailpieces for connection to copper piping and tubing. Provide Type 316 stainless steel tailpieces for connection to steel piping.

2.04 JOINTS

Pipe and fitting joints shall be socket welded except where threaded and flanged joints are required to connect to valves and equipment.

2.05 SOLVENT CEMENT

Solvent cement for socket joints shall comply with ASTM D2564 and F656.

2.06 WYE STRAINERS

PVC wye strainers shall be manufactured of the same material as the pipe, with 30-mesh screens and Viton seals. Connecting ends shall be the socket type, solvent welded. Provide one spare screen for each strainer.

PART 3 - EXECUTION

3.01 GENERAL

A. Do not install PVC pipe when the temperature is below 40°F or above 90°F. Store loose pipes on racks with a maximum support spacing of 3 feet. Provide shades for pipe stored outdoors or installed outdoors until the pipe is filled with water.

B. Store fittings indoors in their original cartons.

C. Store solvent cement indoors or, if outdoors, shade from direct sunlight exposure. Do not use solvent cements that have exceeded the shelf life marked on the storage container.

D. Before installation, check pipe and fittings for cuts, scratches, gouges, buckling, kinking, or splitting on pipe ends. Remove any pipe section containing defects by cutting out the damaged section of pipe.

E. Do not drag PVC pipe over the ground, drop it onto the ground, or drop objects on it.

3.02 SOLVENT-WELDED JOINTS

A. Prior to solvent welding, remove fittings and couplings from their cartons and expose them to the air at the same temperature conditions as the pipe for at least one hour.

B. Cut pipe ends square and remove all burrs, chips, and filings before joining pipe or fittings. Bevel solvent-welded pipe ends as recommended by the pipe manufacturer.

C. Wipe away loose dirt and moisture from the inside and outside of the pipe end and the inside of the fitting before applying solvent cement. Clean the surfaces of both pipes and fittings that are to be solvent welded with a clean cloth moistened with acetone or methylethyl ketone. Do not apply solvent cement to wet surfaces.

D. The pipe and fitting socket shall have an interference fit. Perform a dry fit test at each joint before applying solvent cement. The pipe shall enter the fitting socket between one-third and two-thirds of the full socket depth when assembled by hand.

E. Make up solvent-welded joints per ASTM D2855. Application of cement to both surfaces to be joined and assembly of these surfaces shall produce a continuous bond between them with visual evidence of cement at least flush with the outer end of the fitting bore around the entire joint perimeter.

F. Allow at least eight hours of drying time before moving solvent-welded joints or subjecting the joints to any internal or external loads or pressures.

G. Acceptance criteria for solvent-welded joints shall be as follows:

1. Unfilled Areas in Joint: None permitted.

2. Unbonded Areas in Joint: None permitted.

3. Protrusion of Material into Pipe Bore, Percent of Pipe Wall Thickness: Cement, 50%.

3.03 ASSEMBLING THREADED JOINTS

A. Cut threaded ends on PVC to the dimensions of ASTM F1498. Ends shall be square cut. Follow the pipe manufacturer's recommendations regarding pipe hold-down methods, saw cutting blade size, and saw cutting speed. Gauges, gauge tolerances, and gauging procedures shall comply with ASTM F1498, Sections 7 and 8. Perform field gauging on every field-cut threaded connection.

B. Pipe or tubing cutters shall be specifically designed for use on PVC pipe. Use cutters manufactured by Reed Manufacturing Company, Ridge Tool Company, or equal.

C. If a hold-down vise is used when the pipe is cut, insert a rubber sheet between the vise jaws and the pipe to avoid scratching the pipe.

D. Thread cutting dies shall be clean and sharp and shall not be used to cut materials other than plastic.

E. Apply Teflon® thread compound or Teflon® tape lubricant to threads before screwing on the fitting.

F. Assemble threaded flanges and fittings per ASTM F1498, Sections 4, 7, and 8. Do not tighten threaded connections more than two turns past finger tightness for both internal and external threads.

G. Never install a metal male fitting onto a female pvc fitting.

3.04 INSTALLING UNIONS

Provide unions on exposed piping 3 inches and smaller as follows:

A. At every change in direction (horizontal and vertical).

B. 6 to 12 inches downstream of valves.

C. Every 40 feet in straight pipe runs.

D. Where shown in the drawings.

3.05 INSTALLING BURIED PIPE

A. Install in accordance with Section 312316 and as follows.

B. Trench bottom shall be continuous, smooth, and free of rocks. See the details in the drawings for trench dimensions, pipe bedding, and backfill.

C. After the pipe has been solvent-welded and the joints have set, snake the pipe in the trench per the pipe manufacturer's recommendations in order to allow for thermal expansion and contraction of the pipe.

D. Do not backfill the pipe trench until the solvent-welded joints have set. Support the pipe uniformly and continuously over its entire length on firm, stable soil. Do not use blocking to change pipe grade or to support pipe in the trench.

E. Install buried PVC pipe in accordance with ASTM D2774 and the pipe manufacturer's recommendations. Backfill materials in the pipe zone shall be imported sand per Section 312316.

3.06 INSTALLING ABOVEGROUND OR EXPOSED PIPING

A. See Section 400500.

B. Fill empty piping with water and provide temporary shading or other means to keep the surface temperature of the pipe below 100°F.

3.07 HYDROSTATIC TESTING

Perform hydrostatic testing for leakage in accordance with Section 400515.

END OF SECTION

SECTION 405000 PROCESS CONTROL AND INSTRUMENTATION SYSTEM (PCIS) GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section of the specifications includes materials, testing, and installation of process control and instrumentation system as specified herein and indicated on the drawings.

B. These specifications shall not be interpreted as permission or direction to violate any governing code or ordinance. Equipment, materials, and workmanship shall comply with the latest revisions of the following codes and standards:

1. Instrumentation: ISA - The Instrumentation, Systems, and Automation Society.

2. Wiring: National Electrical Code (NEC), ISA S5.3 and S5.4.

3. Control Panels: NEMA Standards Publication 250-2003.

4. Control Logic: NFPA 79.

5. Piping: ANSI B31.3 (instrumentation piping).

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Programmable Logic Process Controllers (and Network Equipment): 409443.

1.03 SCOPE OF WORK AND COORDINATION

A. The work involves furnishing all hardware and software, programming, installation, labor, material, equipment, and engineering in strict compliance with the contract documents for the RCSD Grit Chamber project.

B. Local Control Panels (LCPs supplied by packaged equipment suppliers and/or process suppliers (”Packaged LCPs”) are required to interface with the existing SCADA System utilizing Fiber Optic communication network. The system integrator shall interface with the following package PLCs.

C. Packaged equipment LCPs suppliers shall cooperate and coordinate communication and interfacing requirements with the Integrator and assist the Integrator to interface the packaged LCPs with the plant supervisory control and data acquisition (SCADA) System. Integrator to coordinate and take responsibility for complete integration, creating loop drawings, startup and testing.

D. Provide all other hardware, software, converters, adapters, protocol converters, etc. for complete functional and working system. Owner’s Engineer will review and approve use of any such additional items.

1.04 SUBMITTALS

A. Detailed System Drawings and Data:

1. The submittal shall consist of six sets of detailed drawings and data prepared and organized by the Contractor. All drawings, schematics, layouts, and diagrams shall be done on 11" x 17" sheets utilizing AutoCAD.

2. Drawings shall contain only relevant simplified details using a symbol approach. Photographic images of components depicting irrelevant details (screws, holes, logos, etc.) are not allowed.

3. Drawings prints shall not contain details and texts smaller than 3/64 inch.

B. Submit these drawings and data as a complete package at the same time.

C. Submittals shall be in three-ring hardcover binders and arranged for convenient use including tab sheets, all indexed, and cross referenced with a separate index for each item.

D. Provide manufacturers with cut sheets and manuals for all hardware to be provided.

E. Provide ISA type instrumentation data sheets for each component, together with a technical product brochure or bulletin. The data sheets, as a minimum, shall show:

1. Instrument tag designation.

2. Component name.

3. Manufacturer's model number.

4. Calibrated range.

5. Instrument location.

6. Input and output characteristics.

7. Scale range and units (if any) and multiplier (if any).

8. Requirements for electric supply.

F. Group the data sheets together in the submittal by type. Provide individual data sheets for each instrument with one brochure or bulletin to cover all identical uses of that component.

G. The detailed construction drawing submittal shall include, as a minimum, the following types of drawings and diagrams required for the construction of this project:

1. Legend, Symbols, and Index.

2. System Block Diagrams.

3. Power Distribution Diagrams.

4. Instrument Control Panel Layouts/Construction Drawings/Details.

5. PLC Rack Elevation Drawings.

6. Internal Panel Wiring Diagrams.

7. Digital I/O Module Wiring Diagrams.

8. Analog I/O Module Wiring Diagrams.

9. Detailed NFPA 79-style Ladder Diagrams (for discrete wiring) to meet the following minimum requirements:

10. Each subassembly shall be shown as a rectangle in the diagram with all external terminals identified. Terminals unknown at the time of the submittal shall be left blank, to be filled later. Single contacts internal to the subassemblies shall be shown in the rectangle connected to their terminal points.

11. Where the internal wiring diagrams of subassemblies are furnished on separate sheets, they shall be shown as a rectangle in the schematic diagram with all external points identified and cross-referenced to the separate sheets of the control circuit. Coils and contacts internal to the subassemblies shall be shown in the rectangle connected to their terminal points.

12. Show unique rung numbers on the left side of each rung. A cross-referencing system shall be used in conjunction with each relay coil so that associated contacts may be readily located on the diagram. The contacts shall be referenced to coils as well, so that associated coils may be readily located on the diagram. Where a relay contact appears on a sheet separate from the one on which the coil is shown, the purpose of the contact shall be described on the same sheet. Spare contacts shall be shown.

13. Limit, pressure, flow, and similar switch symbols shall be shown on the schematic (ladder) diagram with all utilities turned off (electric power, air, gas, oil, water, lubrication, etc.) and with the equipment at its normal starting position. If the equipment is shown in a specific position, the position shall be identified.

14. Contacts of multiple contact devices, e.g., selector switches, shall be shown on the line of the schematic diagram where they are connected in a circuit. A mechanical

connection between the multiple contacts shall be indicated by a dotted line or arrow. This does not apply to control relays, starters, or contactors. Additional charts or diagrams may be used to indicate the position of multiple contact devices such as drums, cam, and selector switches.

15. The purpose or function of all switches shall be shown adjacent to the symbols. The purpose or function of controls such as relays, starters, contactors, solenoids, subassemblies, and timers on the diagram shall be shown adjacent to their respective symbols. The number of positions of the solenoid valve shall be shown adjacent to the valve solenoid symbol.

16. Detailed Loop Interconnection Wiring Diagrams (per ISA S5.3 and S5.4) for the entire system showing all control equipment, instrumentation, electrical equipment, components, wiring, routing, boxes (pull, junction, and terminal junction), terminations, wire tags, and wire colors. The diagrams shall show the detailed interconnection of all electrical equipment, instrumentation, panels, enclosures, components and the like provided under this contract.

17. Arrangement and construction drawings for consoles, control panels, and for other special panels for field installation. These drawings shall include dimensions, location of all components, identification of all components, bill of materials, detailed schematics of all internal wiring, preparation and finish data, nameplates, and the like. These drawings also shall include enough other details to define the style and overall appearance of the assembly; include a finish sample for all panel surfaces.

18. Installation, mounting, and anchoring details for all field instruments and panel mounted components.

19. An instrument list including all instruments provided under this project.

20. An I/O List for each PLC in the project.

H. Detailed System Software Submittal: The submittal shall consist of six sets of software system descriptions and diagrams. Two sets of submittals will be returned to the contractor. The software submittal can be made as a separate package to be inserted in the original submittal. The following items must be submitted at least eight weeks prior to the factory witness test orientation:

1. Detailed PLC software logic diagram printouts for each PLC. Logic diagrams shall be fully annotated such that an individual unfamiliar with the diagram format can fully understand the process control logic presented.

2. An updated I/O List for each PLC in the project.

3. Narrative control descriptions for each analog and discrete control loop. Loop descriptions shall describe how each control loop will operate, the PLC control

logic, SCADA control and monitoring capabilities and in general a job specific description of each control loop in the system.

4. Sample color printouts of each CRT display, sample printouts of each Operator Interface display, report, and log for the SCADA software.

5. Complete detailed bills of material: Detailed bill of material for all components shall be provided including complete manufacturers name and model number, quantity to be provided, and cross references to data sheet sections.

I. Operation, Maintenance, and Repair Manuals (OMM):

1. The organization of the initial submittal required above shall be compatible with eventual inclusion as one volume of the operation, maintenance, and repair manuals.

2. Operation manuals shall be prepared and submitted to the Owner's Representative for preliminary review in six copies. When the Owner's Representative is satisfied that these are complete and properly prepared, six final sets shall be delivered to the Owner's Representative.

J. The complete OMM shall contain the following:

1. All the information included in the preliminary equipment submittal, the detailed installation submittal, and the additional information required herein, all bound in hard-cover binders and arranged for convenient use including tab sheets, all indexed and cross referenced with a separate index for each item.

2. All final “as-built” drawings with the AutoCAD electronic files.

3. Electronic files for all PLCs, Operator Interfaces, and SCADA programming.

4. Calibration and maintenance instructions.

5. Trouble-shooting instructions.

6. Instructions for ordering replacement parts.

1.05 QUALIFICATIONS AND RESPONSIBILTY OF CONTRACTOR

A. The Contractor shall furnish and install all proposed hardware as shown in the drawings and as specified herein. The PLC system installation and wiring connections to peripheral equipment and instruments shall be the responsibility of the system supplier using qualified personnel possessing the necessary equipment and having experience in making similar installations. Evidence of such a qualification, as well as notification of the system supplier assuming unit responsibility, shall be furnished to the Owner in writing prior to commencement of the work.

B. Qualification Evidence: The qualification evidence shall include the following:

1. Verification that the system supplier shall have had a minimum of five years' experience with the installation and programming of industrial control systems similar in type to those to be installed in this project.

2. A list of completed similar installations including name, address, and telephone number of the owner, name of project, and date of completion.

3. The name and qualifications of supervisory personnel to be directly responsible for the programming and installation of the control system.

4. PCIS work shall be performed by qualified system integrators with the following requirements:

    a. Control Systems Integrators Association (CSIA) Certified member

    b. Rockwell Automation Silver Level Certified or Schneider Electric Alliance Partner or Inductive Automation Gold Certified

    c. At Least Three Certified Programmer for Hardware and Software used in the project.

C. Software Training Verifications:

1. An integrator shall employ a minimum of two individuals who have been formally trained in the application of the latest revisions releases of hardware and software specified. The names of programming individuals and the certificates of successful course completion shall be provided upon request.

2. Under this section, the Contractor shall furnish the following:

    a. Instrumentation equipment (Section 405020).

    b. PLC, HMI, and UPS (Section 405040).

    c. SCADA Hardware and Software (Section 405060).

    d. Spare parts per Sections 405020, and 405040.

    e. Special tools and test equipment required by the supplier.

    f. Installation, integration and testing.

    g. Documentation.

    h. Operator training.

    i. Warranty (one year).

    j. Shipping and receiving.

3. All calibration and final checkout of the process control and instrumentation system shall be witnessed by the Owner's Representative to determine if the system complies with the contract documents.

4. The Contractor shall be responsible for coordinating and interfacing with equipment supplied under these contract documents, which are an integral part of the system. Interfacing shall be incorporated in the detailed systems drawings and data section of the contract documents.

5. The system supplier shall be experienced in the design, programming, and service of this type of equipment. In the event of a dispute as to the acceptability of the system supplier, the Owner's Representative shall make the final determination.

1.06 GUARANTEE

A. The Contractor shall repair or replace defective components, rectify malfunctions, correct faulty workmanship, all at no additional cost to the Owner during the guarantee.

B. To fulfil this obligation, he shall utilize technical service personnel designated by the Contractor who was originally assigned project responsibility. Services shall be performed within five calendar days after notification by the Owner's Representative.

PART 2 - MATERIALS

2.01 DESIGNATION OF COMPONENTS

A. In these specifications and on the plans, all systems, and other elements are represented schematically and are designated by numbers, as derived from criteria in Instrument Society of America Standards. The nomenclature and numbers designated herein and, on the plans, shall be employed exclusively throughout shop drawings, data sheets, and the like. Any other symbols, designations, and nomenclature unique to a manufacturer's standard methods shall not replace those prescribed above, as used herein, and on the plans.

2.02 INSTRUMENT TAGGING

A. Attach a stainless-steel tag to the instrument at the factory. Permanently mark the stainless-steel tag with the instrument tag number and the instrument calibration range. The manufacturer's standard metal nameplate as a minimum shall denote model number, serial number, operating electrical voltage and amperage (when applicable), and date of manufacture.

2.03 INSTRUMENT SYSTEM POWER

B. Power provided for the instrument system at the facility shall be 120-volt a-c, single phase, 60 Hz.

C. Where d-c power supplies are not furnished integral with any one instrument system loop, then provide separate solid-state power supplies.

2.04 MATCHING STYLE, APPEARANCE, AND TYPE

D. All display instruments of each type shall represent the same outward appearance, having the same physical size and shape and the same size and style of numbers and pointers.

PART 3 - EXECUTION

3.01 UNIFORMITY OF COMPONENTS

A. Components which perform the same or similar functions shall, to the greatest degree possible, be of the same or similar type, the same manufacture, the same grade of construction, the same size, and the same appearance.

3.02 MOUNTING OF EQUIPMENT AND ACCESSORIES

A. Mount equipment in accordance with the installation detail drawings as prepared by the Contractor and reviewed by the Owner's Representative. Mount equipment so that they are rigidly supported, level and plumb, and in such a manner as to provide accessibility; protection from damage; isolation from heat, shock, and vibration; and freedom from interference with other equipment, piping, and electrical work. Do not install consoles, cabinets, and panels until heavy construction work adjacent to computer and telemetry equipment has been completed to the extent that there shall be no damage to the equipment.

B. Locate devices, including accessories, where they shall be accessible from grade, except as shown otherwise.

C. Mount local equipment in cabinets or existing panels as specified. Mount associated I/O terminals on a common panel or rack; mounting panels and rack shall be baked enamel.

D. Coordinate the installation of the electrical service to components related to the system to assure a compatible and functionally correct system. All accessories shall be coordinated, and installation supervised by the Contractor.

E. Test the completed system after installation to ensure that all components are operating with the specified range and all interlocks are functioning properly.

F. Tubing Valves, and Fittings: All instrument tubing manifolds shall be Type 316 stainless steel, unless otherwise specified elsewhere in these specifications. Tubing runs to transmitters shall be installed with a positive slope in one direction. Fittings and valves shall be Type 316 stainless steel.

3.03 CALIBRATION

A. Each instrument requiring factory calibration shall be furnished with calibration data. The calibration data shall be factory certified.

B. Calibrate systems after installation in conformance with the component manufacturer's instructions. This shall provide that those components having adjustable features are set carefully for the specific conditions and applications of this installation and that the components and/or systems are within the specified limits of accuracy. Defective elements, which cannot achieve proper calibration or accuracy, either individually or within a system, shall be replaced. Accomplish this calibration work by a technical field representative of the single instrument supplier. He shall certify in writing to the Owner's Representative that all calibrations have been made and that all systems are ready to operate.

3.04 FACTORY TESTING

A. The fully assembled packaged Control Panels shall be successfully submitted to a factory acceptance test before shipment to the jobsite.

B. Factory testing will take place at the PCIS Integrator's facility located in California.

C. Assume the control panels will be shipped from the supplier's facility to the PCIS Integrator's facility in California. The factory test will be for a minimum of 3 days. Allow additional time for setup, breakdown and pre-testing.

D. Prior to factory system testing, submit a written detailed test procedure for review by the Owner. Notify the Owner in writing four weeks in advance of the scheduled testing.

E. Factory witness tests shall demonstrate that the system will perform each operation required for all specified conditions, including both normal and emergency operations and conditions. Provide a certification and log of all tests to the Owner for review and comment.

F. Check panel wiring against approved submittal drawings. Record any changes made during testing of the equipment on the record drawings.

G. The system shall be exercised through operational tests, under factory-simulated conditions to demonstrate that the system is fully configured to perform all control, logic, monitoring, reporting, logging, archiving and communications functions as specified, and that the system is ready for field installation. All test equipment required to simulate actual field conditions shall be provided by the control system contractor.

H. The factory witness test shall take as long as necessary to demonstrate to the Owner and the Owner's Representative that the system performs each operation.

I. A return visit to the PCIS Integrator's facility for re-testing will be at the total expense of the control panel supplier.

3.05 FIELD TESTING

A. Field Test shall only be conducted when all Shop Drawings are approved, and FAT is successfully completed.

B. Exercise systems through field tests in the presence of the Owner in order to demonstrate achievement of the specified performance.

C. Coordinate field tests dependent upon completion of work specified elsewhere. Schedule tests among all parties involved so that the tests may proceed without delays or disruption by uncompleted work.

3.06 5-DAY ACCEPTANCE TEST

A. When systems are assessed to have been successfully carried through a complete field acceptance test and the Owner concurs in this assessment, a date to start the system acceptance test involving the Owner's operating personnel will be agreed upon.

B. The PICS system supplier shall recheck the systems at this time to verify proper operation and make final adjustments. The PICS system testing shall consist of 5 consecutive calendar days of continuous testing by the PICS supplier utilizing the Owner's Day shift working hours. The PCIS supplier shall be on call ready to respond to the site within two hours after day shift working hours and on weekends. The Owner’s representative will determine the severity of the problem to the best of his ability and contact the Contractor for disposition. This arrangement will in no way relieve the system supplier of responding within 2 hours and resolving the problem in a mutually agreed upon time frame not greater than 48 hours.

C. The acceptance tests shall have a success factor of 95% system uptime. If the system should fail below the 95% factor, the PCIS supplier shall correct the system problems. System start-up shall start over again from day one. This will continue until the system functions for thirty-five consecutive days with a 95% uptime success factor.

3.07 OPERATOR TRAINING

A. Provide the Owner's operating personnel and/or the Owner’s Representative with 3 days of formal instruction in the functions and operations of each system provided under this contract. The training shall cover overall system theory, hardware architecture, the operating system, programming instruction in the applicable languages, utility, programs, system generation, and diagnostics. The programming instruction shall include program development, coding, sample programs, and debugging at every programming level. Actual programming exercises and hands-on experience shall be emphasized. Emphasis shall also be placed on safety features and features, which may require readjustment, resetting or checking, and recalibration by them from time to time.

B. Provide the training sessions at the Owner's facilities and on the equipment furnished under this contract. The training and instruction of operating personnel shall be by a qualified instructor familiar with the requirements for this project. Each training session

shall be for eight hours of formal instruction. Session dates shall be directed by the Owner. There will be three one-day training sessions, which shall not coincide with any system testing or start-up activities. Training session days shall be non-consecutive.

END OF SECTION

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SECTION 409115 MAGNETIC FLOWMETERS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes requirements for magnetic flowmeters.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 099000.

B. Pressure Testing of Piping: 400515.

C. Equipment, Piping, Duct, and Valve Identification: 400775.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Provisions and Section 013300.

B. Submit manufacturer's catalog data and detail drawings showing dimensions, pressure rating, coatings, and meter parts and describe by material of construction specifications (such as AISI, ASTM, SAE, or CDA) and grade or type. Identify each meter by tag number to which the catalog data and detail sheets pertain.

C. Furnish manufacturer’s application performance guarantee with submittals.

D. Show meter laying lengths.

PART 2 - MATERIALS

2.01 MANUFACTURERS

A. The meter flow tube and transmitter shall be by the same manufacturer.

B. The magnetic flowmeter and transmitter shall be manufactured by one of the following:

1. Krohne

a. Magnetic Flowmeter: Enviromag 2000

b. Transmitter/Signal Converter: IFC-300

2. ABB Instrumentation

a. Magnetic Flowmeter: WaterMaster

3. Or approved equal.

C. Specify d-c meters. D-C meters have better zero-point stability and consume less power than A-C meters.

D. The manufacturer shall have a minimum of five years' experience in the manufacture of bipolar d-c magnetic flowmeters.

2.02 METER DESIGN

A. The magnetic flowmeter shall be an obstructionless pipeline-mounted instrument to magnetically measure the flow of the process media. The output signal shall not be affected by changes in fluid viscosity or density and shall have zero point stability and auto zeroing functions. Provide the magnetic flowmeter with the following features:

1. Drip- and splash-proof sensor, capable of withstanding temporary submersion of up to 30 feet of water for 48 hours.

2. Integral terminal box with watertight cable seals.

3. Interconnecting cables.

B. Provide stainless steel grounding rings and grounding straps per manufacturer’s requirements.

2.03 MATERIALS OF CONSTRUCTION--FLANGELESS METERS

A. The flow tube shall be flangeless wafer construction with cast aluminum enclosure. Provide bolting kit.

B. Liner and electrodes shall be as indicated in the subsection on "Service Conditions."

2.04 MATERIALS OF CONSTRUCTION-FLANGED METERS

A. The flow tube shall be Type 304 stainless steel with carbon steel flanges.

B. Liner and electrodes shall be as indicated in the subsection on "Service Conditions."

2.05 INDICATOR/TOTALIZER

The indicator/totalizer shall accept the process flow signal from the magnetic flowmeter and convert its electrical output signals directly proportional to the instantaneous metered flow rate. The housing shall be suitable for field mounting.

2.06 TRANSMITTER

A. The transmitter shall be microprocessor based with flow rate indicator in engineering units, forward, reversed, and net flow totalizer, all in user-selectable engineering units.

The display shall also be capable of indicating alarm status and velocity of fluid. The transmitter shall be mounted as indicated in the instrument list.

B. The preamplifier input impedance shall be a minimum of 10E+11 ohms.

C. Power Requirements: 120-volt ac, ±10%, 60 hertz.

D. Totalized flow and programmed configuration shall be maintained in memory for up to 10 years.

2.07 INTERCONNECTING CABLE

The interconnecting cable between the sensor and the transmitter shall be furnished by the magnetic flowmeter manufacturer.

2.08 PERFORMANCE

The overall system's performance shall be as follows:

A. Accuracy: 0.5% of flow rate with minimum fluid velocity of 1 fps.

B. Repeatability: ±0.1% of flow rate.

C. The accuracy of each meter shall be verified by calibration in a flow laboratory traceable to the U.S. National Institute of Standards and Technology.

D. Adjustable full-scale range.

E. Outputs: Bidirectional, isolated 4- to 20-mA d-c and either 24-volt d-c scaled pulse, or 0- to 10-KHz frequency.

F. Minimum Conductivity: 5 micromho/centimeter.

G. Power Consumption: 20 watts maximum.

H. Temperature Limits, Ambient: -20°F to +140°F.

I. Temperature Limits, Process: Elastomers +160°F, Teflons +300°F, ceramic 350°F.

J. Field Selectable Low Flow Cutoff: 0% to 10%.

K. The flowmeter shall have a positive zero return (PZR) input controlled by an external dry contact.

L. Environmental Rating: NEMA 4X, Class I, Division 1, Groups B, C, and D for both sensor and electronics whether remote or sensor mounted.

M. The meter shall have empty pipe detection.

N. A common alarm discrete output (a dry contact or a transistor switch) shall be provided for remote indication of fault conditions.

2.09 METER IDENTIFICATION

Provide an identification tag per Section 400775.

PART 3 - EXECUTION

3.01 SERVICE CONDITIONS

MAGNETIC FLOWMETER AND INDICATOR/TOTALIZER

1.	P&ID No.	N03
2.	Service	RAW SEWAGE
Sensor		
3.	Tag No.	FIT-211
4.	Metering Tube	
	Size Flg.	8”
	Rating (psi)	150
5.	Metering Tube Material	Stainless Steel
6.	Liner Material	Polyurethane
7.	Electrode Material	316 SST
8.	Elec. Class.	NEMA 4X Suitable for Class I, Div 2
9.	Flow Rate Ind. Scale	0-1000 GPM
10.	Flow Totalizer Multiplier	1x
11.	Elec. Class.	NEMA 4X
12.	Mounting	As per drawing

3.02 PAINTING AND COATING

Coat exposed carbon steel components of the meter tube and sensor the same as the adjacent piping. If the adjacent piping is not coated, components of the meter tube and sensor shall be lined and coated. Apply the specified prime, intermediate, and finish coats at the place of manufacture. The finish coat shall be the same as that of the adjacent piping.

3.03 TESTING

A. All magnetic flowmeters shall be prepared for operational use in accordance with the manufacturer's written instructions, including factory testing, field testing, and calibration.

B. Each magnetic flowmeter shall be subjected to a factory performance test over the total range of the equipment. The tests shall be conducted in accordance with the Test Standards of the Hydraulic Institute, where applicable. The Contractor shall submit copies of the factory performance testing to the Engineer for approval.

END OF SECTION

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SECTION 409443 PROGRAMMABLE LOGIC PROCESS CONTROLLERS (AND NETWORK EQUIPMENT)

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes requirements for materials, testing, and installation of a valve local control panel.

PART 2 - MATERIALS

2.01 DESIGNATIONS OF COMPONENTS

In these specifications and on the plans, all systems and other elements designated by numbers, as derived from criteria in ISA standards. The nomenclature and numbers designated herein and, on the plans, shall be employed exclusively throughout shop drawings, data sheets, and the like. Any other symbols, designations, and nomenclature unique to a manufacturer's standard methods shall not replace those prescribed above, as used herein, and on the plans.

2.02 PROGRAMMABLE LOGIC CONTROL SYSTEM

A. A fully integrated programmable logic control system shall be furnished as specified in this section. The programmable logic control system hardware shall be intelligent process control units with analog and discrete I/O for process interface.

B. The a-c power of the control system will be 120-volt ±10% a-c, 60 hertz, single phase derived from line power. The system shall be designed to operate satisfactorily from 0 °C to 60 °C ambient temperature for the PLC.

2.03 PANEL ENCLOSURES

A. Fabricate panel enclosures from minimum 11 gauge steel panels complete with necessary stiffening to form a wall-mounted panel. The structures must be suitable for carrying the weight of the equipment mounted inside the panel and on the doors. Provide removable top and bottom cable entry plates. The enclosure shall be NEMA 4X classified.

B. Minimum enclosure outer dimensions shall be 30” high by 24” wide by 12” deep. The PLC shall each be wall mounted supported by 4 mounting feet.

C. Provide panels with front access only. Doors shall be pad lockable and fitted with three (3) point heavy duty latching assemblies. Provide a continuous piano hinge and a pneumatic hold open device or door stop kit on each door.

D. Finish the interior of the enclosure with white paint. Provide a switched light fixture and 120 VAC duplex convenience receptacle inside the enclosure.

2.04 PROGRAMMABLE LOGIC CONTROLLER (PLC)

A. The PLC shall be a 16-bit programmable logic controller microprocessor-based stand-alone device. It shall be a process and logic controller designed for industrial environments. It shall be capable of a mix of logic, timing, counting, computation, library of preprogrammed subroutines, and PID loop control capabilities necessary for the unit process application. The PLC shall utilize a "prepackaged"/"preprogrammed" approach to functionality to allow its use by personnel who have no formal training in digital equipment, digital communications, or software programming.

B. The PLC shall come complete with central processor, memory, power supply, interconnecting cables, and discrete and analog I/O interfaces.

C. The logic and variable memory shall be read/write RAM. All RAM shall have integral battery backup that will maintain the memory for a minimum of six months upon a utility power failure. The logic and variable memory shall have a sufficient function block location for programming all specified functions plus 25% spare memory.

D. The PLC shall have the following features:

E. Logic Control: The PLC shall be capable of performing the same functions as conventional logic systems including on delay timers, off delay timers, counters, and drum sequencers.

F. Compare Function: The PLC shall perform the compare function that compares two integers or floating-point numbers for less than, equal to, greater than, and not equal to. The programmed function shall energize when true and de-energize it when false.

1. Move Function: The PLC function shall move an integer or floating-point value from one memory location to another memory location when an internal permissive is enabled.

2. Math Function: The PLC shall be capable of performing addition, subtraction, multiplication, and division on integer or floating-point numbers.

3. Analog Controllers: The PLC processor shall perform all the functions of the conventional three-mode (PID) analog controller. The controller shall perform proportional only control, proportional plus reset, and proportional plus reset plus derivative and integral only control. The controller shall be the conventional three-mode controller.

4. The PLC shall be able to generate PID loops with a minimum sample time of 1.0 second. PID tuning constants shall have the following adjustable range:

Proportional Gain	0.0% to 99.99%
Reset Time	0.01 to 999.99 minutes
Derivative Time	0.00 to 999.99 minutes

5. Time-of-Day Clock: The PLC shall have an internal time-of-day clock/calendar running independently of the CPU.

6. PLC System Alarm: The PLC processor shall monitor the internal operation of the PLC system for failures. If a failure is detected, the system shall shut down and freeze all inputs and outputs in their last states until the error is cleared. As a minimum, the following failures shall cause the PLC to shut down:

    a. Memory failure.

    b. Memory parity error.

    c. I/O cycle failure.

    d. Operating system error.

G. Input/Output:

1. The PLC discrete input 16-channel modules shall be 24-volt DC or 120-volt AC and have noise filters or use other techniques to reject short-time constant noise and 60-Hz pickup.

2. The PLC discrete output modules shall be 120-volt AC, or 24-volt DC solid-state drivers suitable for operating control relays. Each discrete output module shall include fuses and fuse blown indicators.

3. The PLC analog inputs shall be suitable for accepting 4 mA to 20 mA from either 2- or 4-wire transmitters. The input power shall be from an external 24-volt DC power supply. The analog to digital converter shall have a 12-bit minimum resolution with an overall accuracy of 0.5% at 60 °C.

4. Discrete PLC I/O modules shall have individual LED status lights for each I/O point.

5. All discrete and analog modules shall have terminal blocks for termination of the I/O wires.

6. Individual I/O points shall be capable of withstanding low energy common mode transients to 1,500 volts.

H. Each PLC shall be able to communicate on an Ethernet network.

I. Where new I/O modules are required, provide the following:

1. I/O Termination: provide a prefabricated cable and interface module for each I/O module wiring. The system shall be by the PLC manufacturer.

2. Spare I/O

   a. Pre-wired Spare I/O: For each control panel provide PLCs with the following minimum unused pre-wired I/O for future plant expansion:

      (1) Analog Inputs: 25% of used.

      (2) Analog Outputs: 25% of used.

      (3) Discrete Inputs: 25% of used.

      (4) Discrete Outputs: 25% of used.

J. Provide Allen-Bradley CPU system using ControlLogix PLC controllers or CPU system using Schneider Electric M580 platform, or equal.

2.05 PLC SOFTWARE

A. All PLC programming shall be in ladder logic using a standard Windows-based package developed for this purpose.

B. All programming, monitoring, searching, and editing shall be accomplished with the PLC programming software. The programming software shall be usable while on-line, off-line, and shall have the ability to emulate/run the PLC program using the programming unit. The PLC program shall display multiples of series and parallel contacts, coils, timers, counters, and mathematical function blocks. The software shall be able to monitor the status of all inputs, outputs, timers, counters, and coils. It shall have the capability to disable/force all inputs, outputs, and coils to simulate the elements of the ladder logic by means of color change. The software shall include a search capability to locate any address or element and its program location. PLC status information, such as error indication and amount of memory remaining shall be shown on the display screen.

C. A licensed copy of a programming package registered to the Owner shall be provided. The programming package shall be latest version of Studio 5000 Logix Designer by Rockwell Automation.

2.06 SPARE PARTS

The Contractor shall furnish to the Owner all necessary spare parts of components required to maintain the system. Prior to final acceptance of work, the Contractor shall provide a spare parts listing of all necessary spare parts and quantities for review by the Owner's Representative. The spare parts shall include the following minimum requirements:

	Part Description	Quantity
a.	PLC Power Supply	1
b.	CPU and Memory Module	1
c.	Analog Input Module	1
d.	Analog Output Module	1
e.	Discrete Input Module	1
f.	Discrete Output Module	1

The Contractor shall deliver to the Owner all the required spare parts upon final acceptance of the work. The spare parts shall not be used as replacement parts during the guarantee period.

PART 3 - EXECUTION

A. Refer to Section 405000.

END OF SECTION

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SECTION 409510 PACKAGED EQUIPMENT CONTROL PANELS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section describes materials and installation of custom control panels as indicated and in compliance with Contract Documents.

1.02 REFERENCES:

A. Underwriters' Laboratories, Inc., (UL):

1. 486A: UL Standard for Safety Wire Connectors and Soldering Lugs for Use with Copper Conductors

2. 508: Electrical Industrial Control Equipment.

3. 508A: Industrial Control Panels.

4. 1059: Safety Terminal Blocks.

1.03 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01 33 00.

B. Submit shop drawings and manufacturers' product data in accordance with the requirements of Section 26 05 00.

C. Submit a complete list of equipment, materials, and any details required to demonstrate that the equipment will function properly as a unit. This material shall include:

1. System configuration with single-line diagrams.

2. Detailed descriptions of equipment including weights, dimensions, installation requirements, and heat dissipations.

3. Internal panel layouts indicating spacing and dimensions.

4. Panel front layouts.

5. Catalog cuts of devices used.

6. Control schematics, ladder diagrams, and interconnection drawings.

7. Nameplates.

8. Program and programming data for the PLC including logic diagrams.

1.04 MANUFACTURER'S SERVICES:

A. Services of Manufacturer’s Representative as stated in Section 01 43 00 and as specified herein.

B. Provide services of factory-trained Service Technician, specifically trained on type of equipment specified:

1. Service Technician must be present on site for all items listed below. Person-day requirements listed are exclusive of travel time, and do not relieve Contractor of the obligation to place equipment in operation as specified.

2. Installation: Check installation and calibrate the equipment:

a. [1] person-days.

3. Functional Testing: Calibrate, check alignment and perform a functional test with water. Tests to include all items specified.

a. [1] person-days.

4. Performance Testing: Field performance test equipment specified.

a. [1] person-days.

5. Vendor Training: Provide classroom and field operation and maintenance instruction including all materials, slides, videos, handouts and preparation to lead and teach classroom sessions.

a. [1] person-days.

6. Credit to the Owner, all unused service person-days specified above, at the manufacturer’s published field service rate.

7. Any additional time required of the factory trained service technician to assist in placing the equipment in operation, or testing or to correct deficiencies in installation, equipment or material shall be provided at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 DIAGRAMS:

A. Schematic diagrams shall show the equipment serial or tag number, the Owner's drawing number, contract number, or similar identification which will indicate the particular equipment to which the diagrams apply. Diagrams shall show all equipment in the electrical system including internal wiring of subassemblies. Diagrams of subassemblies may be furnished on separate sheets.

B. Identify each device by a unique number or number-letter combination.

C. Conductor Identification: Identify each conductor by a unique number, letter, or number-letter combination. Consecutive numbering is preferred. Conductors connected to the same terminal or tie point shall have the same identification. Where multiconductor cable is used, a color code may be used to supplement the above identification. Where color-coded multiconductor cable is used for wiring identical components, such as limit switches, the color code used shall be consistent and charted on related diagrams.

D. Provide a schematic diagram for each electrical system. The schematic diagram shall be drawn between vertical lines that represent the source of control power. Show control devices between these lines. Show actuating coils of control devices on the right-hand side. Show contacts between the coils and the left vertical line.

1. Where the internal wiring diagrams of subassemblies are furnished on separate sheets, they shall be shown as a rectangle in the schematic diagram with external points identified and cross-referenced to the separate sheets of the control circuit. Show coils and contacts internal to the subassemblies in the rectangle connected to their terminal points.

    a. Exception No. 1: Where relay and electronic circuits are mixed, diagrams may be drawn between horizontal lines that represent the source of control power.

    b. Exception No. 2: Overload relay contacts may be connected to the right of the coil (common) if the conductors between such contacts and the coils of the magnetic devices do not extend beyond the control enclosure.

2. For clarity, show control device symbols in the order in which the controls are positioned on the diagram.

3. Use a cross-referencing system in conjunction with each relay coil so that associated contacts may be readily located on the diagram. Where a relay contact appears on a sheet separate from the one on which the coil is shown, describe the purpose of the contact on the same sheet.

4. Show spare contacts.

5. Show quanties of spare Discrete and Analog I/O.

6. Show limit, pressure, float, flow, temperature sensitive, and similar switch symbols on the schematic diagram with utilities turned off (electric power, air, gas, oil, water, lubrication, etc.) and with the equipment at its normal starting position.

7. Show contacts of multiple contact devices, e.g., selector switches, on the line of the schematic diagram where they are connected in a circuit. Indicate a mechanical connection between the multiple contacts by a dotted line or arrow. This does not apply to control relays, starters, or contactors.

8. Additional charts or diagrams may be used to indicate the position of multiple contact devices such as drum, cam, and selector switches.

9. Show the purpose or function of switches adjacent to the symbols.

10. Show the purpose or function of controls such as relays, starters, contactors, solenoids, subassemblies, and timers on the diagram adjacent to their respective symbols. Show the number of positions of solenoid valves adjacent to the valve solenoid symbol.

11. Show values of capacitors and resistors on the diagram.

12. Descriptive terms for command and status functions shall be in the present or past tense. For example, Raise Transfer-Transfer Raised; Advance Transfer-Transfer Advanced. Do not use terms such as "Transfer Up."

E. The panel front and internal layouts shall show the general physical arrangement of components on the control panel. Identify devices with the same marking as used on the schematic diagram. Spare panel space shall be dimensioned. The drawings shall include a layout of the operator's console or push-button station, but terminal numbers need not be shown.

2.02 CONTROL ENCLOSURES:

A. Design and test control enclosures in conformance with UL 508. Enclosure types shall be as follows unless noted otherwise in the drawings:

Outdoor AND/OR Indoor Use	NEMA Type 4X

B. The depth of the control enclosure or compartment shall be a minimum consistent with the maximum depth of the control devices plus the required electrical clearance. In no case shall the depth of the enclosure be less than 8 inches.

C. Provide mounting panel for mounting of interior components. Panel finish shall be white enamel.

D. Provide Conduit seals to isolate wiring from classified areas.

E. Where heating from control devices results in a temperature rise which is detrimental to the contained equipment or its operation, provide louvers or forced air ventilation. Design ventilating openings to prevent the entrance of any deleterious substance. When forced air ventilation is required, the cabinets shall be pressurized. Air filters shall be of commercially available types and sizes.

F. Provide a permanent metal data pocket attached to the inside of the enclosure. If space permits, the pocket shall be at least 10 1/2 inches (267 mm) wide and of depth and thickness to accommodate electrical diagrams.

G. Enclosure construction shall be minimum 14 gage steel. Finish shall be white enamel inside and gray prime outside over phosphatized surface. Provide continuous hinges for enclosure doors with external screw clamps. Provide hasp and staples for padlocking.

2.03 CONTROL WIRING:

A. 120-volt control wiring shall be Type THWN, or THHN. Conductors shall not be smaller than No. 18 AWG. Refer to drawings E05 for control wiring sizes and type requirements. Cable ampacity shall be in accordance with the NEC.

B. Instrumentation signal cables shall be of the type used for field wiring.

2.04 MARKING:

A. Identify wire terminations with a number to correspond with the schematic diagrams. Identification tags shall be preprinted white heat-shrinkable tubing, Raychem Thermofit TMS or equal.

B. Plainly and permanently identify control and power devices using the same identification as shown on the schematic diagrams. Show identification for devices inside the enclosure on a plate adjacent to, not on, the device.

1. Exception No. 1: Where the size or location of the devices make individual identification impractical, such as on electronic assemblies, use group identification.

2. Exception No. 2: Where panel layouts do not permit mounting identification plates adjacent to components, such as relays, place the permanent relay identification on the relay where it is plainly visible, and provide a second identification on the top of the panel wireway cover directly below the relay. Identify the wireway covers to show their proper location.

C. Identification plates for devices mounted inside and outside the control enclosure shall be one of the following:

1. Laminated phenolic for engraving stock; a minimum of 0.062 inch (1.57 mm) thick. Hold plates in place with metallic drive screws or the equivalent. Use permanent adhesives for attaching nameplates to wireway covers.

2. Noncorrodible metal; a minimum of 0.031 inch (0.78 mm) thick for engraving stock or 0.012 inch (0.30 mm) thick for embossing stock. Hold plates in place with metallic drive screws.

2.05 SUPPLY CIRCUIT DISCONNECTING MEANS:

A. Provide a supply circuit disconnect for each control panel. Disconnect shall be a circuit breaker mounted within the control enclosure operated by a variable depth flange-mounted circuit breaker operating mechanism.

2.06 CONTROL DEVICES:

A. Provide 120 volt control circuit transformer if incoming power supply is not 120 volts. Provide 100 volt-ampere spare capacity that is in addition to the loads specified. Fuse one side of secondary winding and ground other side. Provide primary winding fuses on both lines.

B. Provide indicator lights, selector switches, push buttons, meters, etc., as shown in the schematic diagrams, single-line diagrams, and as required for correct operation. Mount on the front panel of the control enclosure.

C. Push buttons and selector switches shall be NEMA Type 4X for outdoor classified locations. Provide with quantity of contact blocks required for correct operation. Units shall be UL listed with NEMA A600 rated contacts.

D. Push buttons shall be standard size, round, flush head with momentary contacts.

E. Selector switches shall be round with standard operator.

F. Indicating lights shall be round, transformer type, NEMA Type 13, complete with color of lens indicated in drawings or as required and legend plate. Lamps shall be high-density LEDs, Indicating lights shall be push-to-test type.

G. Elapsed time meters shall be synchronous motor driven, 0 to 99,999.9-hour range, nonreset type, suitable for semiflush panel mounting. Provide General Electric Type 240, 2-1/2-inch Big Look unit; Eagle Signal HK series; or equal.

H. Control relays shall be magnetically held and shall have convertible contacts. Control relays shall be UL listed with NEMA A300 rated contacts and coil voltage, number of poles, and pole arrangement as indicated in the drawings. All relays shall be of the same manufacturer. Relays shall be Allen-Bradley Bulletin 700, or equal.

I. Time delay relays shall be UL listed with contacts rated 10 ampere noninductive load, 120 volts, with coil voltage, number of poles, pole arrangement, and maximum timing adjustment as indicated in the drawings. Relays shall be plug-in, solid-state type with timing knob adjustment. Provide Potter Brumfield, Syracuse Electronics, ISSD, Allen-Bradley Type RT, or equal.

J. Mechanically held relays shall have coil voltage, number of poles, and pole arrangement and rating as shown in the drawings. Provide integral coil clearing contacts.

K. D-C power supplies shall have ratings as required by the powered equipment. Provide integral overcurrent protection.

2.07 TERMINAL BLOCKS:

A. Provide terminal blocks for incoming and outgoing control wires. Wire and mount terminal blocks so that internal and external wiring do not cross over the terminals. Do not terminate more than two conductors at each terminal connection.

B. Field wiring shall terminate on the "field side" of the terminal blocks. Do not connect internal panel wiring to the "field side" of the terminal blocks. Do not connect field wiring to the "panel side" of the terminal blocks.

C. Terminal blocks shall be modular, rail mounted, rated at 20 amperes, 600 volts capable of terminating wire sizes No. 12 through No. 24 AWG and constructed of polyamide thermoplastic. Terminal blocks shall be UL listed in accordance with UL 486A and UL 1059. Current-carrying parts shall be copper or brass electroplated with tin/lead. Terminal connection shall be a screw clamp pressure plate connection, designed such that the clamping screw does not clamp the screw directly to the wire.

D. Provide symmetrical steel assembly rails, end brackets, jumper bars, and other accessories as required for a complete terminal block assembly.

E. Consecutively number terminal blocks from top to bottom with preprinted marking tags. Tags shall be white polyamide and hot printed with black symbols so that the print is permanent.

2.08 WIRING METHODS:

A. Panel wiring shall be neatly contained in panel wireways, including incoming and outgoing field control wiring. Panelways shall be white or light gray colored, restricted slot design, with matching snap-on covers. Provide panelways with mounting holes and nylon "push" rivets for mounting. Panelways material shall be PVC or noryl.

B. Provide minimum 2 inches (50 mm) of clearance between panelway and wire terminations to allow for clear viewing of wire identification marking.

C. Tie wiring run to control devices on the front door together at short intervals and secure to the inside front door with adhesive mounts. Mounts shall be adjustable releasable-clamp type for wire bundles 0.69 inch (17 mm) in diameter or smaller or releasable nylon cable ties for bundles larger than 0.69 inch (17 mm) in diameter. Attach mounts to front panel with adhesive.

2.09 FACTORY TESTS:

A. Inspect and test control panel for correct operation. Test each circuit for continuity, short circuits, and fault grounds.

PART 3 - EXECUTION

3.01 FIELD TESTS:

A. Test control panel with field wiring connected. Set adjustable set points and time delays for proper operation of equipment. Check operation of control panel and field devices to verify correct operation. Perform required adjustments for correct operation.

3.02 CLOSEOUT ACTIVITIES:

A. Provide in accordance with Section 01 77 00.

END OF SECTION

SECTION 444239 GRIT COLLECTING EQUIPMENT

PART 1 - GENERAL

A. Description

This section includes materials and installation of grit removal systems consisting of a grit trap tank, steel supports, gratings, and other appurtenances.

B. Related Work Specified Elsewhere

1. Painting and Coating: 099000.

2. Grit Classifiers (Dewatering Screws): 444240.

3. Packaged Equipment Electrical Panels: 409510.

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. Submit dimensional drawings. Show arrangement of inlet, outlet, supports, valves and fluidizing assembly etc.

3. Submit manufacturer's catalog data and descriptive literature. Show materials of construction by ASTM reference and grade. Show coating types and where applied.

4. Submit installation drawings for the unit, Fluidization system, and associated piping and show anchor bolt location and size.

5. Submit erection drawings and diagrams for the process tank supports, grating, ladder and other items required. Include the weights of each piece as shipped.

6. Submit engineering design calculations for structural support, anchorage, process tanks, Calculations shall be signed and stamped by a civil or structural engineer registered in the state of California.

7. Submit anchorage and support details for all equipment. Provide an anchor bolt template for grit removal tanks.

8. Submit documentation of performance for a similarly sized unit to meet Part 2.C requirement.

D. Manufacturer's Services

Provide equipment manufacturer's services at the jobsite for the minimum man-days listed below, travel time excluded:

1. One man-day to check the installation and advise during start-up, testing, and adjustment of equipment.

2. One man-day to instruct the Owner's personnel in the operation and maintenance of the equipment.

E. Measurement and Payment

Payment for the work in this section shall be included as part of the lump-sum bid amount stated in the Proposal.

PART 2 - MATERIALS

A. Manufacturer

Grit removal system shall be the "Grit King" system manufactured by Oldcastle/Hydro International. There is no or accepted equal. The pre-negotiated proposal with pricing from Hydro International is attached at the end of this specification.

B. Equipment Design

1. The grit removal system shall be a vortex-type, non-mechanical system designed to remove grit by induced vortex flow and gravitational settling. The system shall operate effectively over the full range of design flows without excessive head loss, short-circuiting, or organic carryover.

2. Grit shall be removed from the system by a vortex-controlled underflow system. There is no accepted equal.

3. Each grit collecting unit shall include equipment necessary for grit separation, collection, and removal, compatible with the selected system type:

   a. Non-mechanical systems shall include a vortex separator chamber, grit collection and concentration zone, and controlled grit underflow or discharge system, with a fluidization system if required.

   b. Common to all systems, it shall include a tank or standalone separator structure, structural supports, stairs, grating, and handrailing as noted or shown in the drawings.

C. Performance Guarantee

The Contractor shall guarantee through the submittal process that the grit removal system will achieve not less than 95 percent removal of grit particles 106 microns and larger at average flow conditions and 150 microns and larger at peak conditions and not less than 95 percent removal of grit particles 75 microns and larger at average flow conditions. If the system fails to meet the specified performance requirements during field testing or operation, the Contractor shall, at no additional cost to the Owner, make all necessary modifications, adjustments, or equipment replacements required to achieve compliance.

D. Non-Mechanical Grit Removal System

1. The grit removal system shall be non-mechanical and shall not require drive motors, gear assemblies, paddles, or rotating components for grit separation. The system shall operate using hydraulic vortex action and gravity settling.

2. Provide all ancillary equipment required for system operation, including fluidization water systems, control valves, and associated piping, as recommended by the manufacturer. All components shall be designed for continuous duty in wastewater service and shall be suitable for the specified operating conditions.

E. Paddle Mechanism

N/A.

F. Grit Tanks

1. The grit removal system shall be provided as a standalone vortex separator unit or integral structure as recommended by the manufacturer. The unit will be constructed of Type 304 stainless steel (SS304) suitable for wastewater service. Minimum material thickness shall be as required by the manufacturer for structural integrity and performance.

2. Inlet and outlet connections shall be flanged or otherwise compatible with the piping system as shown in the drawings. Flange size and bolt pattern shall conform to applicable ANSI standards. Provide gaskets and appurtenances as required to ensure watertight connections.

3. Flanges integral to the stainless-steel tank transitions shall be Type 304 stainless steel and shall match the mating pipe flange drilling and pressure class with piping provided.

4. The bottom of the tank shall incorporate a 4-inch flanged outlet for grit removal.

5. Provide a 1-inch threaded outlet located within 1-inch from the bottom of the tank rotated 90º from the 4-inch outlet as shown in the drawings.

6. Provide a fluidization assembly for grit removal, including piping, control valves, and appurtenances, as recommended by the manufacturer. The fluidization system shall be designed to supply non-potable water at the required flow and pressure to facilitate grit transport and prevent clogging.

G. Structural Requirements

Structural supports, support legs, anchors, anchor bolts, and other structural components shall be provided as required for the grit removal system and shall be designed in accordance with the current California Building Code (CBC), ASCE 7, OSHA, and applicable local requirements and as shown in the drawings. Design support legs, anchors, anchor bolts, stairs, handrails, and other structural requirements per CBC requirements using the following:

Risk Category	III
Soil Class	Default
Importance Factor, I	1.25
S_1	0.44
S_S	1.27
S_{D1}	0.79
S_{DS}	1.05
Basic Wind Speed, mph	101
Exposure Category	C

1. Anchorage

Equipment manufacturer shall design the anchorage system using cast in place stainless steel anchor bolts. Wedge style anchor bolts shall not be acceptable.

2. Access Platform

Equipment manufacturer shall design a grated access platform on top of the grit trap tank, around the center shaft and overflow/outlet, to support a uniform live load of 50 pounds per square foot (psf). The exterior edge of the platform shall have a flat surface capable of supporting welded guardrail posts, with a point live load of 200 lbs applied in any direction at any location on the perimeter of the platform at a distance of 3 feet - 6 inches above the top of the platform.

3. Access Ladder

Equipment manufacturer shall design the tank shell to support welded ladder connections near the top and bottom of the vertical cylindrical surface of the tank,

with a vertical point live load of 150 lbs acting concurrently at the top and bottom of the tank combined with a live load of 200 lbs applied in any horizontal direction (to produce maximum stress) at the top of tank and bottom of tank. Horizontal live loads at top and bottom of tank do not need to be applied concurrently.

H. Control Panel

1. Provide one stainless steel, NEMA 4X, control panel per Section 409510 containing the following components.

2. Main disconnect circuit breaker type switch

3. Provide terminal blocks for field wiring. Provide the following for the grit removal unit:

   a. Motor circuit protector and VFD for the grit classifier motor:

   b. Motor running lights.

   c. HAND-OFF-AUTO switch for and classifier.

   d. Elapsed time meter for each motor.

   e. Undervoltage and phase protection.

   f. Alarm lights.

   g. Remote signals for instrumentation for each motor:

      (1) Run status (output).

      (2) Start/Stop (input).

      (3) Alarms (output).

   h. Control Logic: Start and stop motor of system components in proper sequence as shown in the schematic diagrams on the electrical drawings.

4. Timers: Automatic operation as follows:

   a. Simultaneously turn on grit classifier which can run an additional 1 to 10 minutes after grit pump has shut off.

   b. Equipment shuts off and controls reset for another grit removal cycle controlled by an adjustable timer at an interval of 2 hours or less.

   c. A solenoid shall be energized to open when the classifier starts, and shall close when the classifier shuts off.

I. Spare Parts

1. Provide the following spare parts for each grit-collecting unit:

Quantity	Description
1 set	Solenoid valve

2. Pack the spare parts in a wooden box; label with the manufacturer's name and local representative's name, address, and telephone number; and attach list of materials contained therein.

J. Equipment Labels

1. Signs and labels shall be pressure sensitive vinyl with adhesive for application to equipment located outdoors in a corrosive area. Size shall be 10-inch by 7-inch minimum as manufactured by Brady, Seton, or equal.

2. Labels shall be UV-resistant, chemical-resistant, and moisture-resistant.

PART 3 - EXECUTION

A. Installation

Install equipment in accordance with the manufacturer’s written instructions and as shown on the Drawings.

B. Painting and Coating

Provide painting and coating in accordance with Section 099000

C. Service Conditions

1. Performance conditions and design data shall be as shown below.

2. Design Parameters

Avg/Maximum flow:	1.5 MGD Average/3.0 MGD Peak
Diameter of the unit	10 feet
Diameter of the Inlet	12 inches
Diameter of the Outlet	20 inches
Max. Head loss at peak flow	14 inches

D. Field Testing

After installation, operate the grit removal system continuously or intermittently under normal operating conditions for a period of 30 consecutive days in the presence of the Owner's Representative and perform all necessary adjustments to ensure proper operation; demonstrate that all equipment, including the grit system, classifier (dewatering screw), and associated components, operates smoothly without excessive vibration, noise, or overheating; verify that the automatic sequencing and control system, including timers, interlocks, solenoid valves, and alarms, functions properly and that all manual and automatic start/stop operations perform as intended; confirm proper operation of all instrumentation and remote signals to the control system; and repair or replace any defective equipment or controls and repeat testing as required until satisfactory performance is achieved. Manufacturer's representative shall be present during startup and testing.

E. Certification

Provide a written certification from the equipment manufacturer stating that the grit removal system has been properly installed in accordance with the Contract Documents, including the Drawings, Specifications, and manufacturer's written instructions, and that the equipment has been tested and is operating satisfactorily under normal operating conditions; the certification shall be submitted to the Owner upon completion of field testing, and the Contractor shall make all necessary corrections and adjustments, including labor, materials, parts, and freight, at no additional cost to the Owner, until the system performs as specified.

END OF SECTION

COOMBS HOPKINS COMPANY

REVISION 01 October 29, 2026
ORIGINAL September 17, 2026

TO: Mr. Kim Domingo, General Manager
Rosamond Community Services District

SUBJ: WWTP Grit Removal System Improvements
RCSD Project No. 22515

Dear Mr. Domingo:

In general conformance with the engineer's plans and specifications dated August 2026 and in accordance with the terms and conditions named herein, we are pleased to offer the following equipment for your consideration on the subject project.

SPECIFICATION SECTION 444239 Grit Collecting Equipment
SPECIFICATION SECTION 444240 Grit Classifiers

Hydro International (10' diameter Grit King).....$644,400.00 + Sales Tax

Past PO justifications for Grit King projects:

- Bakersfield, CA – NORSD WWTP (April 2026) – 12" GK Sold for $934K
- Americus, GA – Mill Creek WWTP (February 2025) - 9' GK Sold for $770K
- Okaloosa County, FL - Shoal River Ranch WRF (October 2024) - 12' GK sold for $575K

GENERAL NOTES:

1. A budgetary quote was provided to the engineer in April 2026 and it was noted that the price may be impacted with changes made into a final specification. We noted an increase in scope from the April proposal upon review of 100% bid documents that included the following adders: explosion proof upgrades, anchor bolts, spare parts for the SpiraSnail, upgraded PLC controls and temperature control, structural design revisions for walking surface and wind design loads. These costs are simply being passed through without any additional markup.
2. Prices quoted herein are firm for your acceptance for a validity period through January 18, 2027. Please note price escalation is based on Producers Price Index for Construction as developed by Association of General Contractors.
3. Prices and equipment are quoted on the basis of F.O.B. Jobsite.
4. Payment schedule: See attached Manufacturer's Scope.
5. Submittal Lead Time: See attached Manufacturer's Scope.
5. Standard Terms and Conditions apply.
6. If this proposal makes reference to certain section numbers in the specifications, these are listed for reference only. We will not be responsible for furnishing all the equipment in these sections, but only that equipment which is specifically listed in our proposals; nor will we furnish any items of equipment, which are omitted from the engineer's drawings or specifications, unless specifically listed in our proposals.

The Scope letter for the above named manufacturer is attached. I trust the aforementioned along with the enclosed will meet with your satisfactory review; however, should you have any questions or comments, please do not hesitate to advise.

Sincerely,

COOMBS HOPKINS COMPANY by: Brian Villacorta, P.E.

October 29, 2026

To: Mr. Ben Stewart
Rosamond CSD

RE: Grit Collecting Equipment & Grit Classifiers - Spec Section 444239 & 444240
Rosamond WWTP
Rosamond, CA
File #22_11_0501 r2

Oldcastle Infrastructure Inc. dba Hydro International is pleased to present our quote for a Grit King® Grit Removal and Dewatering System. The system will meet the requirements described in Section 444239 & 444240 with comments noted below.

Comments

1. Hydro's requested Payment Terms are as follows and are prefaced on the following timeline:
   Receipt of a purchase order by January 18, 2027, release to fabrication by July 19, 2027 and shipment of the equipment prior to December 6, 2027.

Milestone	Incremental Payment	Cumulative Payment
Upon Approval of Shop Drawings	10%	10%
Upon Delivery of Equipment to Site	80%	90%
Upon Final Acceptance or 45 days following completion of equipment start up	10%	100%

2. 444239 Part 3 D: Hydro has not included 30 days of site time. We assume this section is contractor's responsibility.
3. 444240 Part 1 C.2 / Part 2 A.1.d: There is no "discharge chute" being supplied. Hydro will supply the classifier with the discharge opening as shown on the drawings.
4. N03: Shows the SCADA is providing a flow control setpoint to the grit system control panel over Ethernet. (FIC-01). Flow control/regulation will be provided by an all hydraulic device supplied by Hydro (Hydro-Brake Vortex Valve) that requires no electrical connection located at the influent flange of the Grit Classifier. Grit slurry will flow through the Hydro-Brake intermittently determined by the on/off operation of 10PV-04.
5. Freight pricing is subject to change based on current market conditions at the time of shipment.
6. Screening with a ½" opening or better is necessary prior to the Hydro equipment.
7. Velocity through the bar screen openings/slots/aperture should not exceed 4 ft/s at peak flow.
8. All piping connected to Hydro equipment must be supported by other means than the Hydro equipment.
9. Discharge from Hydro's equipment shall be to the atmosphere. There shall be no backpressure created by downstream piping connected to Hydro's equipment.
10. The dumpster receiving the discharged grit shall have a drain.
11. Please see the exclusions detailed in the proposal below.

Equipment Summary

1. One (1) 10 ft diameter, 304 SS, Grit King® Dynamic Separator shall be supplied. The unit shall remove 95% of all grit (S.G. 2.65) 150 micron and larger at a peak flow of 3.0 mgd. The unit shall have 14 inches of headloss at a peak flow of 3.0 mgd. The unit shall remove 95% of all grit (S.G. 2.65) 106 micron and larger at a average flow of 1.5 mgd. . The unit shall have 4 inches of headloss at a peak flow of 1.5 mgd

   The free-standing Grit King® shall consist of a cylindrical vessel with a sloping base and flat top, cylindrical grit collection pot, center shaft support frame, and overflow annulus. The internal components shall include a dip plate,

center shaft and cone with support frame and deflector plate. A 12" flanged inlet pipe located on the vessel body and a 24" overflow channel with overflow channel extension and 20" flanged drop pipe located on the overflow annulus shall be mounted tangentially. A 4" flanged underflow pipe at the base of the unit complete with a 1" NPT connection for fluidizing shall be provided.

Brackets for the Contractor supplied access ladder and railing/kick plate will be coordinated with the contractor.

2. One (1) 0.75 yd^3/hr SpiraSnail® Compact dewatering unit shall be supplied. The unit shall be capable of handling a 100 gpm grit slurry feed rate. The unit shall be equipped with a 12" diameter screw, 60" clarifier, and a 1 hp inverter duty motor. One (1) 6" flanged overflow discharge connection and one (1) 3" flanged drain connection shall be supplied. Flanges will be rotatable and conform to ANSI B16.1 bolt patterns. The unit shall be fabricated from 304 SS. The support structure at the head end shall be an A-frame.

3. One (1) wall mount control panel shall be supplied per Dwg N03 (10G-LCP2). The control panel shall have a NEMA 4X stainless steel enclosure, and shall be rated at three phase, 480 VAC. The panel shall include an AB Micro850 PLC with PanelView 800 4" HMI and contain all relays, timers, switches, variable frequency drive, Ethernet, and indicator lights to operate one (1) Grit King® unit and one (1) SpiraSnail® Compact in either fully automated or manual mode.

Appurtenances Per Unit

Free Standing – Grit King® Grit Concentrator

DESCRIPTION	Part Number	QTY
Fluidizing Water Shut-off 1" Apollo Ball Valve, Bronze	77-105-01	2
Fluidizing Valve and Supply Water Shutoff 1" ASCO Solenoid valve, Brass (NEMA 7, 120V AC)	EF8221G7	1
Pressure regulating valve 1" Wilkins, Bronze	NR3	1
Pressure Gauge 2 1/2" Face, 0-100 psi, Ashcroft	251009SW02L-100 25-101SS-02T-CG	1
4" Milliken Plug Valve, Cast Iron, w/ RCS Electric Actuator (NEMA 7, 120V)	601N RCS MAR250-16	1
Hydro-Brake® Vortex Valve, 304 stainless steel	SXV	1
Anchor Bolts – SpiraSnail® Compact Frames Hilti 316SS 3/4" x 9 5/8" HAS Anchor Rods for use with HIT HY 500 V3	HAS-R 316SS 3/4 x 9-5/8	12
Hilti HY 500V3 Refill Pack Anchor Adhesive Material for use with HAS Rods	2123401	4

SpiraSnail® Compact Dewatering Unit

DESCRIPTION	Part Number	QTY
Drain Valve 3" Apollo Ball Valve, Stainless Steel	76f-104-01	1
Inverter Duty Drive Motor 1 hp, Baldor 3 phase 460 VAC Motor, XPFC	CXM14142T	1
Gear Reducer SEW Eurodrive Reducer (ratio=170.85:1)	FAS87 AMS143 r:179.97	1

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Anchor Bolts – SpiraSnail® Compact Frames Hilti 316SS 3/4” x 9 5/8” HAS Anchor Rods for use with HIT HY 500 V3	HAS-R 316SS 3/4 x 9-5/8	12
Hilti HY 500 V3 Refill Pack Anchor Adhesive Material for use with HAS Rods	2123401	3

Utility Requirements

Clarified NPW or Reuse Water:

The Grit King® unit requires intermittent 50 gpm @ 50 +/- 10 psig of clarified water to function properly.

Spare Parts

The following spare parts will be supplied:

- One (1) spare solenoid valve for the Grit King®
- One (1) complete set of bearings for the SpiraSnail® Compact unit
- One (1) complete set of gaskets for the SpiraSnail® Compact unit

Start-up

One (1) factory trained representative, two (2) trips, for start-up and instruction services as required totaling two (2) days.

Seismic / Wind Analysis

Seismic / Wind anchorage calculations by a CA PE.

Exclusions

Any item(s) not specifically described above are excluded and are not to be supplied by Hydro International including but not limited to the following:

- Field assembly, erection and installation
- Interconnecting piping and valving not expressly stated above
- Pipe connections and fittings not expressly stated above
- All pipe supports, hangers and braces
- Controls, switches, control panels and instrumentation of any kind not expressly stated above
- Wiring and conduit
- Grit pump(s) and associated piping, valving, gauges, sensors
- Field or touch-up paint, painting, blasting and touch-up of surface finish
- Spare parts not specifically stated above
- Unloading, hauling and storage charge
- Lubricating oil and greases
- Grit study, field performance testing, laboratory testing and sample collection and analysis
- All concrete and grouting work
- Insulation and heat tracing of any kind, including controls/powering
- Bonds of any kind (Performance, Payment, Warranty, Efficacy and/or Supply Bond)
- Grit dumpsters
- Translation Services
- Extended Discharge chutes (flexible or rigid)
- Access platforms, ladders, stairs, walkways, railing, hatches
- Equipment covers/grating
- AI&S, BABA or other similar procurement requirement

Insurance Limitations

- Commercial General Liability is limited to $2,000,000 each occurrence
- Automobile combined single limit of $2,000,000 each occurrence
- Worker’s Compensation is limited to $1,000,000 each accident

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Warranty

Hydro International's Warranty shall apply per the Terms and Conditions of Sale (estimated start date 6/6/28).

Delivery

Please allow 20-22 weeks after receipt of purchase order for approval drawings. Shipment is typically a maximum of 18-20 weeks after receipt of "Approved" or "Approved As Noted, Resubmittal Not Required" submittal package. In current market conditions, these times may require adjustment. Price includes truck freight to jobsite, but does not include any state or local taxes if required. Timelines are based on typical workloads and with current market conditions they are taking longer. The grit removal system shall be delivered to site fully fabricated, subject to size, packaging and transportation constraints. The General Contractor must inspect equipment prior to unloading and notify Hydro International of any damage to equipment within 5 days to effect proper remedial action. Failure to notify Hydro International of damage to equipment prior to unloading will void all warranties pertaining to subject equipment.

Terms & Conditions

Hydro International payment terms are detailed in the attached terms and conditions. The pricing submitted herein is based on specification sections and drawings issued to Hydro on 9/2/25. Any changes to the scope of supply required by changes to these specification sections or other sections and drawings not provided to Hydro International as listed above may require the price to change. Hydro International reserves the right to amend the price if changes are required due to changes to the provided specifications or to meet requirements for sections not made available at the time of this quote. Price includes truck freight to jobsite and does not include any state or local taxes if required. The prices quoted are firm based on a receipt of a purchase order January 18, 2027, release to fabrication by July 19, 2027 and shipment of the equipment prior to December 6, 2027. For any delays in delivery which are beyond Hydro International's responsibility, a finance charge of 1.5% of the contract value per month will be due and payable to Hydro.

Purchase Order

Please make purchase orders to:
Oldcastle Infrastructure, Inc. dba Hydro International
Attn: Lindsey Schweitzer
2925 NE Aloclek Drive, Suite 140
Hillsboro, OR 97124
Lindsey.Schweitzer@oldcastle.com

Local Representative

Plant Representative:
Mr. Brian Villacorta
Coombs-Hopkins Company
2011 Palomar Airport Rd, Suite 303
Carlsbad, CA 92011
Phone 760-931-0555
brian@chcwater.com

If you have any questions or concerns, do not hesitate to contact me.

Regards,
Hydro International



Lindsey Schweitzer
Sr. Manager - Application Engineering

Standard Terms and Conditions of Sale

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1. **DEFINITIONS.** “Hydro” is Oldcastle Infrastructure, Inc. dba Hydro International with an address of 2925 NE Aloclek Drive #140 in Hillsboro, Oregon. "Buyer" is the party purchasing the goods from Hydro.

2. **ENTIRE AGREEMENT**. Hydro’s agreement is based on these terms and conditions of sale. This document, together with any additional writings signed by Hydro, represents a final, complete, and exclusive statement of the agreement between the parties and may not be modified, supplemented, explained, or waived by parol evidence, Buyer’s purchase order, any course of dealing, Buyer’s payment or acceptance, or in any other way except in writing signed by Hydro through its authorized representative. These terms and conditions are intended to cover all activity of Hydro and Buyer hereunder, including sales and use of products, parts, and work, and all related matters (references to products include parts and references to work include construction and installation). Hydro’s obligations hereunder are expressly conditioned on Buyer’s assent to these terms and conditions. Hydro objects to any terms that are different from, or additional to, these terms and conditions. Any applicable detail drawings and specifications are hereby incorporated and made a part of these Terms and Conditions of Sale insofar as they apply to the material supplied hereunder.

3. **SPECIFICATIONS.** Products are supplied in accordance with information received by Hydro, or its duly authorized agent, from Buyer. Hydro shall have no responsibility for products created or sold based upon inaccurate and/or incomplete information supplied to it. Buyer shall ensure that Hydro receives all relevant information in time to enable it to supply the appropriate products.

4. **INSTALLATION AND APPLICATION OF PRODUCTS.** Products supplied hereunder shall be installed and used only in the application for which they were specifically designed. Buyer should not presume that any products supplied by Hydro may be utilized for any applications other than those specified; nor shall Hydro’s obligations, including, without limitation, any warranty obligations, survive Buyer’s transfer of products supplied hereunder to third parties unless the products are transferred with Hydro’s consent. In addition, Buyer shall not use any product supplied hereunder at any location other than at the location for which Hydro has previously received notice from Buyer. Any breach of any of the foregoing restrictions may amount to an infringement of the patent for the products in question and will in any event void all express or implied warranties relating to the products supplied hereunder.

5. **PURCHASE PRICE AND PAYMENT TERMS.** All prices are in U.S. dollars and all payments shall be made in U.S. dollars. Payment terms are as follows:

Milestone	Incremental Payment	Cumulative Payment
Upon Approval of Shop Drawings	10%	10%
Upon Delivery of Equipment to Site	80%	90%
Upon Final Acceptance or 45 days following completion of equipment start up	10%	100%

If payments are not made in conformance with the terms stated herein, any unpaid balance shall be subject to interest at a rate 1½% per month, but not to exceed the maximum amount permitted by law. If shipment is delayed by Buyer, the previously agreed date of readiness for shipment shall be deemed to be the date of shipment for payment purposes. If manufacture is delayed by Buyer, a payment shall be made based on purchase price and percentage of completion, with the balance payable in accordance with the terms as stated. If at any time in Hydro's judgment Buyer may be or may become unable or unwilling to meet the terms specified, Hydro may require satisfactory assurance or full or partial payment as a condition to commencing, or continuing manufacture, or in advance of shipment.

Until payment in full has been received by Hydro, this Standard Terms and Conditions of Sale shall constitute a security agreement and Buyer hereby grants Hydro a purchase money security interest in and to the products produced by Hydro hereunder, and any products or proceeds thereof. In particular:

a. Hydro will retain an express purchase money security interest in and to the products and all proceeds thereof.

b. Until full payment for the products is received by Hydro, Hydro reserves the right to retake possession of the products at any time and for this purpose Buyer authorizes Hydro or its duly authorized agent to enter upon land or premises where it believes the product may be.

c. Proceeds of any disposal of the products shall be held in trust for Hydro pursuant to the terms of the Maine Uniform Commercial Code.

d. Buyer grants Hydro a power of attorney for the purpose of filing a UCC-1 financing statement in the name of Buyer to evidence Hydro’s security interest in the products.

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6. **BACKCHARGES.** In the event that Buyer is required to make repairs, corrections or modifications to the goods supplied by Hydro, it shall only do so upon written approval from Hydro. Backcharges shall be limited to the costs directly associated in making the repairs, corrections or modifications to the goods supplied by Hydro. The costs of such backcharges shall be subject to approval by Hydro and shall be limited to: (1) directly related labor and material costs, (2) directly related equipment and tool rental at prevailing rates in the project location and (3) Buyer's overhead & supervision costs to make repairs, corrections or modifications to the goods supplied by Hydro. Buyer shall submit complete documentation to Hydro's satisfaction including but not limited to labor time sheets, material lists, and rental fees detailing the nature of the back charges. Backcharges shall be in the form of an adjustment to the contract price or reduction in retained payments and not a direct payment. No incidental or consequential backcharges shall be allowed.

7. **DELIVERY.** The goods are sold DDP (Incoterms 2020) jobsite, freight prepaid to Buyer at job site. Except as outlined in Paragraph 8 below, the risk of loss passes to Buyer after Hydro delivers the goods to the jobsite. Hydro reserves the right to select the method of shipment and carrier. Delivery dates are approximate only and are not a guarantee of delivery on a particular day. Hydro is not liable for failure or delays in deliveries of any cause whatsoever beyond the control of Hydro.

8. **TITLE & INSURANCE:** Title to the product(s) and risk of loss or damage shall pass to Buyer upon delivery to a carrier as outlined in Paragraph 7 above, or, in the event Buyer delays shipment, by the previously agreed date of readiness for shipment, except that a security interest in the product(s) or any replacement shall remain in Hydro's name, regardless of the mode of attachment to realty or other property, until the full price has been paid in cash. Buyer agrees to protect Hydro's interest by adequately insuring the product(s) against loss or damage from any external cause with Hydro named as insured or co-insured.

9. **ERECTION:** Unless otherwise stated in writing, the goods provided hereunder shall be assembled and erected by and at the expense of Buyer.

10. **CANCELLATION & BREACH:** Orders placed cannot be canceled, nor shipments of goods made up, or in process, be deferred beyond the original shipment dates specified, except with Hydro's written consent and upon terms which shall indemnify Hydro against all loss. In the event of cancellation or the substantial breach of Buyer's obligations, as by failing to make any of the payments when due, the parties agree that Hydro will suffer a serious and substantial damage that will be difficult, if not impossible, to measure, both as of the time of entering into this purchase agreement and as of the time of such cancellation or breach. Therefore, the parties agree that, upon such cancellation or breach, Buyer shall pay to Hydro the sums set forth herein below, which sums the parties do hereby agree shall constitute agreed and liquidated damages in such event:

    a. If cancellation or breach shall occur after the acceptance of the purchase order but prior to mailing of submittal documents by Hydro to Buyer, liquidated damages shall be 10% of the selling price.

    b. If cancellation or breach shall occur within thirty (30) days from the mailing of submittal documents by Hydro to Buyer, the liquidated damages shall be 20% of the selling price.

    c. If the cancellation or breach occurs after thirty (30) days from the mailing of submittal documents by Hydro to Buyer, but prior to notification that the order is ready for shipment, the liquidated damages shall be the total of 30% of the selling price plus the expenses incurred, cost of material, and reasonable value of the work expended to fill the order involved herein by Hydro's engineers and other employees, agents and representatives after the mailing of general arrangement drawings by Hydro to Buyer, said sums to be determined at the sole reasonable discretion of Hydro; provided, however, that the total liquidated damages under this provision shall not exceed the total selling price.

    d. If cancellation or breach shall occur after Hydro has notified Buyer that the order is ready for shipment, then the liquidated damages shall be the total selling price, less costs associated with startup or field testing.

11. **MATERIALS OF CONSTRUCTION, PAINTS AND COATINGS**: Buyer is responsible for determining the suitability of, and for giving final approval of, the materials of construction, paints, coatings, etc. to be used by Hydro.

12. **WARRANTY:** Any product that proves defective in material, workmanship or design within twelve (12) months after final completion (estimated start date 6/6/28) will be, at the discretion of HYDRO, modified, repaired or replaced, or Buyer's payment for the products will be refunded. This shall be Buyer's sole remedy. HYDRO EXPRESSLY EXCLUDES AND DISCLAIMS ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHER WARRANTIES, EXPRESS OR IMPLIED.

    This warranty does not cover any defects or costs caused by: (1) normal wear and tear of equipment from designed operation. (2) modification, alteration, repair or service of the goods by anyone other than Hydro; (3) physical abuse to, or misuse of, the goods, or operation thereof in a manner contrary to Hydro's instructions; (4) any use of the goods other than that for which they were intended; (5) chemicals or components which were not disclosed to Hydro; (6) storage contrary to Hydro's instructions; or (7) failure to maintain the goods in accordance with Hydro's instructions.

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This warranty does not apply to component parts of the goods that were not both originally designed and manufactured by Hydro, including, but not limited to, valves and controls. These component parts do not carry any warranties by Hydro, and only carry the warranties, if any, of their manufacturers.

In order for Buyer to make a claim under this warranty, Buyer must promptly, and within the warranty period, notify Hydro in writing of any defect(s) in the goods covered by this warranty. If any defect(s) in the goods covered by this warranty are visible at the time of delivery, Buyer must notify Hydro of the defect(s) in writing within five working days. To make any claim under this warranty, Buyer must also fully comply with written authorization and return instructions from Hydro.

13. **FIELD SERVICE:** Startup/Field Service will only be scheduled upon written request. Buyer shall notify Hydro of schedule requirements at least ten (10) working days in advance, or additional charges may be added to cover late-scheduled travel costs. Additional costs will be limited to those arising out of late-scheduled costs. Should Buyer have outstanding balances due Hydro, no startup / field service will be scheduled until such payments are received by Hydro. Hydro will send documents to Buyer defining the service or startup requirements. Buyer assumes all responsibility for the readiness of the system when it requests startup service. Should Hydro's Field Service Engineer arrive at the jobsite and determine that the system cannot be started up within a reasonable time, Hydro shall have the option to bring the Field Service Engineer home and bill Buyer for time, travel and living expenses. Additional field service is available from Hydro at the prevailing per-diem rate at the time of the request for service plus all travel and living expenses, portal-to-portal. A purchase order or change order will be required prior to scheduling this additional service.

14. **LIMITATION OF HYDRO'S LIABILITY.** Hydro assumes no liability or responsibility for the misuse of its products by Buyer, Buyer's employees, agents or assigns, or other use inconsistent with the use appropriate to the performance specification requirements submitted to Hydro, and Buyer agrees to indemnify and hold harmless Hydro for any loss, costs, expense or liability that it may incur or be put to as a result of misuse or inconsistent use of the products. In addition, Hydro shall have no liability to Buyer for any consequential or incidental damages incurred by Buyer in connection with the contract documents or the products purchased by Buyer. Hydro shall not be liable for any loss which results from delay in delivery caused by any reason beyond its control, including, but not limited to, acts of God, casualty, civil disturbance, labor disputes, strikes, transportation or inability to obtain materials or services, any interruption of its facilities, or act of any governmental authority. The total liability of Hydro to Buyer in the form of liquidated damages for any loss, indemnity, damage or delay of any kind will not under any circumstances exceed 25% of the Contract Sum.

15. **DELAYS AND EXTENSIONS OF TIME**. In the event of any delay in delivery caused by any reason beyond Hydro's control, including, but not limited to, acts of God, casualty, civil disturbance, labor disputes, strikes, pandemics, transportation or inability to obtain materials or services, including related to supply chain disruptions, any interruption of its facilities, or act of any governmental authority, the time for delivery shall be automatically extended during the continuance of such conditions.

16. **INTELLECTUAL PROPERTY**. Hydro shall retain sole ownership of all of its intellectual property used or produced in connection with the Project, including but not limited to all drawings, specifications, software, written materials, manuals, marks, business methods, and all other property that is capable of protection by a patent, copyright or trademark (whether or not such protection has actually been sought). Buyer shall not use such intellectual property except for the purpose of confirming the quality of design and/or manufacturing of the products and services set forth in the Proposal. Buyer shall not photocopy, duplicate or in any way copy such intellectual property except for the Buyer's internal purposes only (but not for rendering services or selling products to third persons). Buyer shall not sell, license, assign or transfer the intellectual property protected by this paragraph to anyone. Buyer shall ensure that Owner is in possession of valid licenses for all third-party software (not provided by Hydro) used for the Project, and shall indemnify and hold harmless Hydro against all claims by licensors of such software. Hydro makes no warranty regarding the effect of such third-party software on the performance of the software to be developed by Hydro for the Project and Hydro shall be released from any warranties given to Buyer to the extent that such software causes or contributes to problems. Following acceptance and final payment to Hydro, Hydro will grant to the Owner a non-transferable, non-exclusive license to use the software for the Owner's internal purposes only in the form of the license agreement attached as Exhibit A.

17. **TAXES.** Prices stated herein do not include any tax, excise, duty or levy now or hereafter enacted or imposed, by any governmental authority on the manufacture, sale, delivery and/or use of any item delivered. An additional charge will be made therefore and paid by Buyer unless Hydro is furnished with a proper exemption certificate relieving Hydro of paying or collecting the tax, excise, duty or levy in question.

18. **INTERPRETATION OF CONTRACT.** This contract shall be construed according to the laws of the State of Maine.

19. **CHOICE OF FORUM**. Buyer and Hydro hereby consent and agree that the United States District Court for the District of Maine or the District Court or Superior Court located in the City of Portland, County of Cumberland, Maine will have exclusive jurisdiction over any legal action or proceeding arising out of or relating to the contract documents, and each party consents to the personal jurisdiction of such Courts for the purpose of any such action or proceeding. Buyer and Hydro further hereby consent and agree that the exclusive venue for any legal action or proceeding arising out of or relating to the contract documents will be in the County of Cumberland, Maine. Each party hereby waives all rights it has or which may hereafter arise to contest such exclusive jurisdiction and venue.

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20. **ATTORNEYS' FEES.** If any judicial or non-judicial proceeding is initiated for the purpose of enforcing a provision of this contract, the prevailing party shall be awarded reasonable attorneys' fees in addition to all other costs associated with the proceeding, whether or not the proceeding advances to judgment.

21. **SEVERABILITY.** If any provisions of this contract are held invalid by a court of competent jurisdiction, the remainder of this contract shall not be rendered invalid, and such invalid provisions shall be modified, in keeping with the letter and spirit of this contract, to the extent permitted by applicable law so as to be rendered valid.

22. **ANTI-BRIBERY.** Hydro International will not engage in any form of bribery or corruption. The offering, giving or receiving of bribes is contrary to Hydro International's values and can play no part in the way in which it carries out its business. Hydro requires you to support our approach and implement provisions consistent with our policy through your own organization and your supply chain.

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ROSAMOND WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

Hydro International Scope Review Comments

1. Upstream Screening Requirement: Revise Item 6 of the current firm scope regarding the requirement for 1/2-inch screening. The existing bar screen has 7/8-inch bar spacing, as per existing design criteria. Hydro's April 20, 2026 proposal identified 1/2-inch or finer screening as a design recommendation, whereas the current firm scope states that 1/2-inch screening “is necessary” prior to the Hydro equipment. Revise the firm scope to maintain the screening criteria consistent with the previous proposal and the existing facility conditions.

Hydro Response – Hydro has been made aware the upstream screens are 3mm which meets our recommendations.

2. Performance Guarantee: Previous Hydro proposal included 95% removal of grit (SG 2.65) ≥75 microns at 1.5 MGD average flow and ≥150 microns at 3.0 MGD peak flow. Current firm scope identifies only the ≥150-micron performance at 3.0 MGD peak flow. Confirm the Grit King performance guarantee includes both the average-flow and peak-flow performance criteria in accordance with Section 444239.

Hydro Response – scope updated to include average flow design point.

3. Control Panel / SCADA Interface: Previous Hydro proposal identified a programmable-relay control panel and listed a PLC-based control panel as an option. Current firm scope includes an AB Micro850 PLC with PanelView 800 HMI. Confirm the vendor-supplied control panel provides all required control, status, alarm, and communication functions shown on Drawing N03 and that Ethernet communication between the vendor PLC and RCSD PLC-1 is included.

Hydro Response – Ethernet Confirmed

4. Flow Control Setpoint FIC-01: Clarify the FIC-01 flow control setpoint interface shown on Drawing N03. Confirm all required PLC hardware, programming, Ethernet communication, and coordination are included in the current scope. Identify any associated exclusion or additional cost at this time.

Hydro Response – The panel will be able to receive a ethernet signal from FIC-01 which would initiate essentially a “call to run” when the panel is in auto which would then start all the timers for the underflow of the Grit King and the operation of the Classifier.

5. Manufacturer's Services: Previous Hydro proposal included one factory-trained representative for two trips totaling four days of startup and instruction services. Current firm scope reduces this allowance to two trips totaling two days. Confirm the current allowance is sufficient to satisfy Sections 444239 and 444240 for installation verification, startup, testing, adjustment, operator training, and required manufacturer certification, or restore the previously offered four days.

Hydro Response – Hydro’s scope and pricing comply with Section 444239 and 444240.

6. Field Performance Testing / Certification: Hydro's exclusion of grit study, field performance testing, laboratory testing, and sample collection/analysis shall not relieve the manufacturer of the startup/testing support and written certifications specifically required by Sections 444239 and 444240. Confirm.

Hydro Response – Hydro’s scope and pricing comply with Section 444239 and 444240.

7. Access Platform / Ladder / Handrail: Current firm scope excludes access platforms, ladders, stairs, walkways, railing, and hatches, but states that brackets for the Contractor-supplied access ladder and railing/kick plate will be coordinated. Confirm the Grit King tank includes all brackets, attachment provisions, and structural coordination required for the access ladder, safety cage, handrail/kick plate, and platform shown on the Contract Drawings.

Hydro Response – Hydro’s scope and pricing includes brackets coordinated with the Contractor’s supplied components. This is and was stated in the scope.

8. Approval Drawing / Delivery Schedule: Previous Hydro proposal indicated 14 to 16 weeks after receipt of purchase order for approval drawings. Current firm scope indicates 20 to 22 weeks. Confirm the current anticipated submittal, approval, fabrication, and delivery schedule and coordinate the increased approval-drawing lead time

with the Project schedule.

Hydro Response – Hydro's scope is correct based on our current timelines.

9. Commercial Terms: Current firm scope introduces milestone payment terms, schedule-dependent firm pricing, freight adjustment language, and a 1.5 percent per month finance charge for delays beyond Hydro's responsibility. Confirm these commercial conditions separately with the Contractor/Owner; technical acceptance of the equipment scope shall not constitute acceptance of commercial terms.

Hydro Response – To be negotiated at the point of PO issuance to Hydro.

10. Payment Terms: The payment schedule in the current firm scope differs from the previously provided terms by adding payments upon execution of the Purchase Order and release to fabrication and reducing the amount retained through final acceptance/startup. Revise the payment terms to be consistent with the previously provided payment schedule, unless otherwise agreed upon by the District.

Hydro Response – Payment terms updated in scope.

12. Warranty: Clarify warranty commencement. Warranty period shall be coordinated with equipment startup/final acceptance requirements of the Contract Documents and shall not be prematurely reduced due to equipment shipment or storage prior to installation.

Hydro Response – wording updated in scope.

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SECTION 444240 GRIT CLASSIFIERS (DEWATERING SCREWS)

PART 1 - GENERAL

A. Description

This section includes materials and installation of a Compact grit classifier (dewatering screw), specifically the Hydro SpiraSnail Compact Grit Classifier/Dewatering. The unit shall be a self-contained, integrated assembly consisting of an inlet hopper with internal clarifier for grit settling, an inclined slow-speed screw conveyor (auger) housed within a trough for grit transport and dewatering, discharge chute, drive assembly located at the upper end of the screw, overflow outlet, drain connection, and associated supports and appurtenances. The unit shall be designed to receive grit slurry from the upstream vortex-type grit removal system and produce dewatered grit suitable for disposal.

B. Related Work Specified Elsewhere

1. Bolts, Washers, Drilled Anchors, and Eyebolts: 050520.

2. Painting and Coating: 099000.

3. Electric Motors: 262650.

4. Grit collecting equipment: 444239

5. Packaged Equipment Control Panels: 409510

C. Submittals

1. Submit shop drawings in accordance with the General Provisions and Section 013300.

2. Submit dimensional drawings showing the arrangement of the inlet hopper/clarifier, screw conveyor (auger), trough, discharge chute, drive unit and motor, overflow and drain connections, piping connections, and supports.

3. Submit manufacturer's catalog data and descriptive literature. Indicate equipment capacity, materials of construction, motor data, and operating characteristics.

4. Submit calculations for equipment anchorage stamped by a California-registered civil or structural engineer.

D. Manufacturer's Services

Provide equipment manufacturer's services at the jobsite for the minimum man-days listed, travel time excluded.

1. One man-day for each of the services listed in the section on "Service Conditions" to check the installation and advise during start-up, testing, and adjustment of the equipment.

2. One man-day to instruct the Owner's personnel in the operation and maintenance of the equipment.

3. Manufacturer’s representative shall be present during initial startup and performance testing.

E. Measurement and Payment

Payment for the work in this section shall be included as part of the lump-sum bid amount stated in the Proposal.

PART 2 - MATERIALS

A. Dewatering Screw Design

1. The dewatering unit shall consist of a single, integrated grit classifier assembly containing the following components:

   a. Inlet hopper and grit settling compartment.

   b. Single helical screw conveyor (auger)

   c. Trough containing the screw conveyor.

   d. Discharge chute (If applicable).

   e. Drive assembly and motor.

   f. Support frame and legs.

   g. Piping connection for grit inlet, hopper overflow outlet, and hopper drain.

   h. Adjustable weir or internal baffle system to control the water depth in the hopper (If applicable).

2. Design the dewatering screws to provide proper velocities and settling times to retain organic matter in suspension and to allow nonorganic material to settle and be removed. The equipment shall remove at least 80% of the incoming grit having a size that is retained on U.S. No. 150 sieve and having a specific gravity of 2.6 or greater.

3. Dewatering screws shall be SpiraSnail Compact as manufactured by Hydro International, and shall be specifically designed for grit classification and dewatering in wastewater applications. There is no accepted equal.

4. The unit shall be suitable for receiving grit slurry by gravity flow from the upstream grit removal system. Provide a flow control valve (Hydro-Brake Flow Control Valve or approved equal) at the inlet to the classifier to regulate gravity flow and maintain proper operating conditions.

B. Drive Unit

Mount the drive unit at the upper end of the screw trough. The drive unit shall consist of an electric motor and a speed reducer (gearbox) designed for continuous duty operation. The drive shall be of a direct-coupled type unless otherwise recommended by the manufacturer.

The gear reducer shall have an oil-tight housing and shall be rated for continuous 24-hour/day service with a minimum AGMA service factor of 1.5. Bearings shall have a minimum L-10 life of 20,000 hours.

The output shaft of the speed reducer shall be directly connected to the screw conveyor. The screw conveyor shall operate at a low rotational speed as recommended by the manufacturer to ensure proper grit dewatering and to minimize re-suspension of grit.

Provide guards for all exposed rotating components in accordance with applicable safety requirements.

C. Hopper and Screw Trough

1. The hopper, clarifier, and screw trough shall be constructed of Type 304 stainless steel and designed for wastewater service.

2. Hopper shall be designed as an integrated clarifier and grit settling chamber with sufficient surface area to allow settling of grit and separation of organics.

3. Screw trough and hopper shall be of welded construction. Welds shall be continuous along the full length of contact of adjoining members.

4. Provide removable covers over the hopper and screw trough. Minimum wall thickness of hopper and screw trough shall be 3/16 inch.

5. Provide PVC, FRP, or galvanized steel cover, fabricated in sections, on the hopper and trough. No section shall weigh more than 30 pounds. If PVC or FRP is used, it shall include a UV inhibitor.

D. Cyclone

Not used

E. Screw Conveyor

1. Construct screw conveyors in accordance with the Conveyor Equipment Manufacturer's Association (CEMA) Book No. 350. Limit conveyor screw deflection to a maximum of 0.20 inch. Weld finish shall be Class III minimum.

2. Provide anti-friction bearing at the outlet end. Provide a hardened iron hanger bearing and an outboard ball bearing at the inlet end.

3. Provide a hard-faced edge along the top 2 inches of the screw for abrasion resistance. Alternatively, provide removable abrasion-resistant wearing shoes along the screw edge (If applicable).

4. Screw speed shall be as recommended by the manufacturer to provide proper grit conveyance and dewatering without significant re-suspension of grit

F. Materials of Construction

Materials of construction shall be as listed below.

	Component	Material	Specification
1.	Hopper, clarifier, screw trough, discharge chute, support legs, weir	Stainless steel	ASTM A240, Type 304
2.	Screw conveyor (auger)	Stainless steel	ASTM A240, Type 304

G. Drive Overload Control System

Provide overload protection for the drive system to prevent damage under excessive loading conditions. Overload protection may be provided by a shear pin, slip clutch, mechanical torque limiting device with manual reset and limit switch, or by a variable frequency drive (VFD) configured to monitor motor load/current and provide overload alarm and shutdown protection. The overload protection system shall stop the drive under excessive loading conditions and require manual reset prior to restarting.

H. Anchorage

1. Provide Type 316 stainless-steel anchor bolts, nuts, and washers.

2. Design support connections for equipment to the concrete floor per the California Building Code (CBC), ASCE 7, UBC, and applicable local requirements.

3. Comply with the seismic design requirements as applicable in the location.

4. Comply with the wind loading requirements of the California Building Code (CBC) and ASCE 7. Wind design criteria shall be as indicated on the Structural Drawings or 100mph whichever is more stringent.

I. Spare Parts

1. Provide the following spare parts for each size or model of dewatering unit:

Quantity	Description
1 set	Bearings
1 set	Gaskets and seals
6 sets	Shear pins (If applicable)

2. Spare parts shall be those recommended by the manufacturer also.

3. Pack the spare parts in a wooden box; label with the manufacturer's name and local representative's name, address, and telephone number; and attach list of materials contained therein. Pack the spare drive unit and motor in a separate box.

J. Equipment Labels

1. Provide a label for each grit classifier that contains the equipment name and tag number. Lettering shall conform to CAL/OSHA requirements. Fasten the label permanently to the equipment.

2. Provide a sign on each grit classifier that reads “CAUTION – EQUIPMENT STARTS AND STOPS AUTOMATICALLY”. Locate the sign in a visible location.

3. Signs and labels shall be pressure sensitive vinyl with adhesive for application to equipment located outdoors in a corrosive area. Size shall be 10-inch by 7-inch minimum as manufactured by Brady, Seton, or equal.

PART 3 - EXECUTION

A. Installation

Install equipment in accordance with the manufacturer’s written instructions and as shown on the Drawings. Provide manufacturer-recommended lubricants for drive units, bearings, and other mechanical components requiring lubrication.

B. Painting and Coating

1. Do not paint or coat stainless steel surfaces.

2. Coat exposed carbon steel components, including drive units, motors, and supports, where not galvanized, in accordance with Section 099000, System No. 10. Apply the specified prime coat at the place of manufacture. Apply intermediate and finish coats in the field. Finish coat color shall match adjacent piping unless otherwise specified.

3. Hot-dip galvanize all other carbon steel components per the applicable sections of ASTM A-123, A-384 and A-385.

4. Do not paint over labels, tags and similar areas.

C. Service Conditions

1. Dewatering unit performance conditions and design data shall be as shown below.

2. Equipment Tag Numbers: 10-GC-1 (Grit Classifier)

Capacity:	0.75 CY/Hr
Minimum area of water surface at overflow level in hopper:	14.5 S.F.
Minimum screw conveyor diameter:	12 inches
Motor horsepower (minimum):	1 HP, 460V/3 phase/ 60 Hz
Motor type:	As specified
Material conveyed:	Grit slurry

D. Field Testing

Operate each dewatering screw for 30 consecutive days, during which time no repairs or adjustments shall be required. Assure that screw conveyor operates without the screw deflection exceeding the level specified. Assure that gear reducers operate without binding or sticking.

E. Certification

Provide a written certification from the equipment manufacturer that the grit classifier has been properly installed according to the plans, specifications and manufacturer's specifications, and that equipment is operating normally. Make all necessary corrections and adjustments including but not limited to labor, parts or freight at no additional cost to the Owner.

END OF SECTION

CONSTRUCTION PLANS FOR:

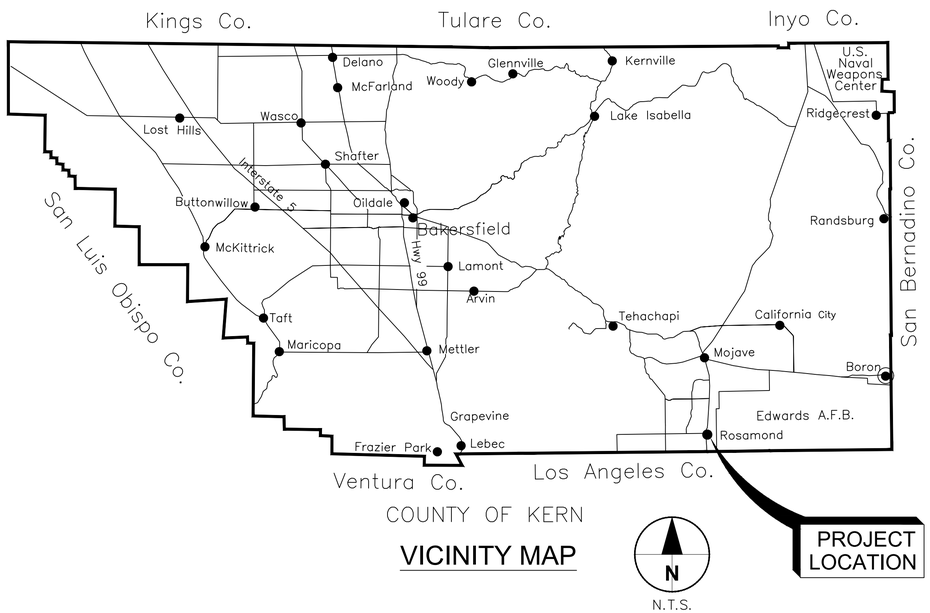
ROSAMOND COMMUNITY SERVICES DISTRICT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

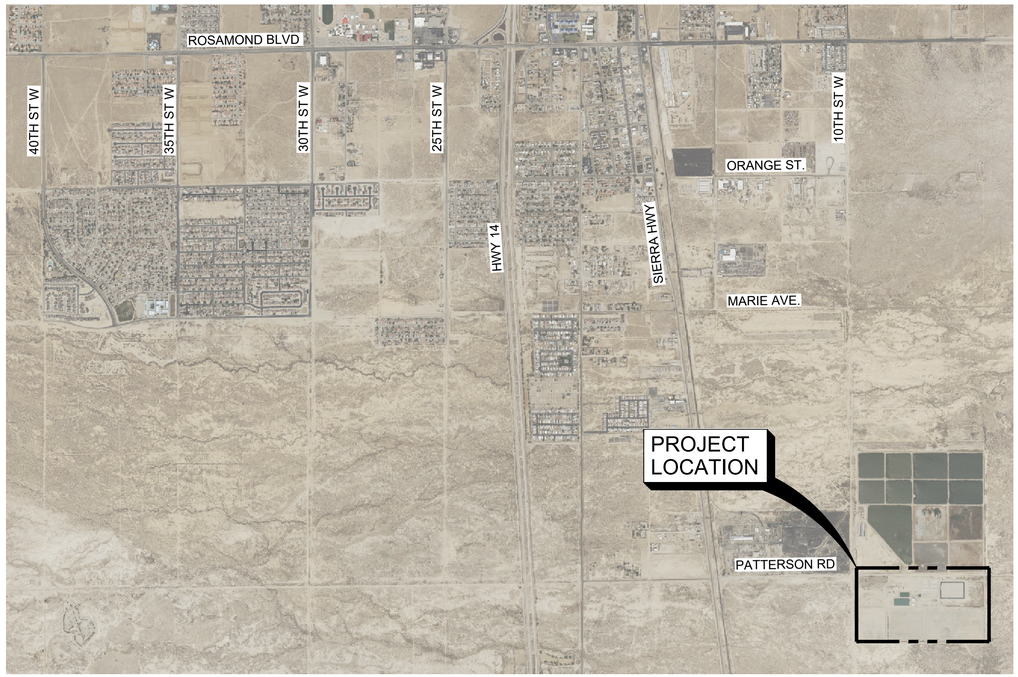
KERN COUNTY, CALIFORNIA

SEPTEMBER 2026

SHEET INDEX		
PAGE NO.	SHT. NO.	SHEET TITLE
GENERAL		
1	G01	COVER SHEET & SHEET INDEX
2	G02	GENERAL NOTES, ABBREVIATIONS, AND LEGEND
3	G03	DESIGN CRITERIA, SCHEDULES, AND MATERIALS LIST
4	G04	PROCESS FLOW DIAGRAM
5	G05	HYDRAULIC PROFILE
CIVIL		
6	C01	OVERALL SITE PLAN AND SITE SURVEY CONTROL
7	C02	STAGING AREA AND DEMOLITION PLAN
8	C03	GRADING PLAN
9	C04	GRIT REMOVAL SYSTEM SITE PLAN
10	C05	GRIT REMOVAL SYSTEM SECTIONS
11	C06	SLUDGE PUMP STATION PLAN AND SPLITTER BOX & VALVE VAULT PLAN
12	CD01	CIVIL DETAILS - 1
13	CD02	CIVIL DETAILS - 2
14	CD03	CIVIL DETAILS - 3
STRUCTURAL		
15	S01	GRIT SYSTEM FOUNDATION PLAN AND SECTIONS
16	S02	SPLITTER BOX FOUNDATION PLAN, TOP PLAN, AND SECTIONS
17	S03	GRIT REMOVAL TANK LADDER, HANDRAIL, AND SAFETY CAGE
18	SD01	STRUCTURAL GENERAL NOTES AND DESIGN CRITERIA
19		
ELECTRICAL		
20	E01	ELECTRICAL LEGEND AND ABBREVIATIONS
21	E02	PARTIAL ELECTRICAL SITE PLAN
22	E03	SINGLE LINE DIAGRAM (1 OF 2)
23	E04	SINGLE LINE DIAGRAM (2 OF 2)
24	E05	PANEL SCHEDULES
INSTRUMENTATION		
25	N01	PROCESS LEGEND
26	N02	INSTRUMENTATION LEGEND
27	N03	GRIT CHAMBER P&ID
28	N04	SLUDGE PUMP STATION - 1
29	N05	SLUDGE PUMP STATION - 2
30	N06	INSTRUMENTATION DETAILS



VICINITY MAP



LOCATION MAP

0 1500' 3000'

1" = 1500'

N

CLIENT

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

PROJECT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

APPROVED BY
RCSD BOARD OF DIRECTORS

PRESIDENT, BOARD OF DIRECTORS DATE

RECOMMENDED FOR APPROVAL

GENERAL MANAGER DATE

AECOM
5001 E. Commercenter Dr. Suite 100
Bakersfield, CA 93309
661.283.2323 tel
www.aecom.com

CONSULTANT STAMP

REGISTERED PROFESSIONAL ENGINEER WILLIAM CHARLES BECK No. C31465 CIVIL STATE OF CALIFORNIA

CONSULTANT STAMP

REGISTERED PROFESSIONAL ENGINEER AMANDA C. PARRA No. RCE 91161 CIVIL STATE OF CALIFORNIA

DATE	REV	DESCRIPTION
6-15-26	A	ISSUED FOR 90% REVIEW
9-1-26	B	ISSUED FOR BID

DATE 5/18/2026
DESIGNED BY PM
DRAWN BY DG
CHECKED BY WB
JOB NO. 60730277

SHEET NO. G01
PAGE 1 OF 30
DRAWING FILE 60730277-G01.dwg

COVER SHEET & SHEET INDEX

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GENERAL NOTES

1. THE ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD) ENGINEERING DEPARTMENT, ALSO KNOWN AS THE OWNER'S REPRESENTATIVE, SHALL BE NOTIFIED AT LEAST TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. TELEPHONE (661) 256-3411.
2. VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION. THE OWNER'S REPRESENTATIVE SHALL BE NOTIFIED OF ANY DISCREPANCIES OR INCONSISTENCIES.
3. INFORMATION SHOWN ON THE DRAWINGS RELATED TO EXISTING CONDITIONS REPRESENTS THE PRESENT KNOWLEDGE, BUT WITHOUT GUARANTEE OF ACCURACY. REPORT CONDITIONS THAT CONFLICT WITH THE CONTRACT DOCUMENTS TO THE OWNER'S REPRESENTATIVE. DO NOT DEVIATE FROM THE CONTRACT DOCUMENTS WITHOUT WRITTEN DIRECTION FROM THE OWNER'S REPRESENTATIVE.
4. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DRAWINGS. DRAWINGS SHALL NOT BE SCALED. REPORT DISCREPANCIES TO OWNER'S REPRESENTATIVE.
5. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NOTES AND DETAILS ON DRAWINGS AND THESE GENERAL NOTES AND TYPICAL DETAILS CONFLICT WITH THE PROJECT SPECIFICATIONS THE MOST STRINGENT SHALL APPLY. CONDITIONS NOT SPECIFICALLY SHOWN SHALL BE CONSTRUCTED AS SHOWN FOR SIMILAR WORK. REPORT DISCREPANCIES TO OWNER'S REPRESENTATIVE.
6. ALL WORK SHALL CONFORM TO THE STANDARDS OF THE FOLLOWING:

   ALL WORK UNLESS SPECIFICALLY CALLED OUT OTHERWISE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE RCSD AND ANY OTHER REGULATING AGENCIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK, INCLUDING BUT NOT LIMITED TO KERN COUNTY, CAL/OSHA, DIVISION OF OCCUPATIONAL SAFETY AND HEALTH, AWWA, AND THOSE CODES AND STANDARDS LISTED IN THE CONTRACT DOCUMENTS.
7. SPECIFICATIONS, CODES, AND STANDARDS NOTED IN THE CONTRACT DOCUMENTS SHALL BE OF THE LATEST APPROVED ISSUE, INCLUDING SUPPLEMENTS, UNLESS OTHERWISE NOTED. MATERIAL SPECIFICATIONS SHALL COMPLY WITH ASTM REFERENCED STANDARDS LATEST EDITION.
8. MANUFACTURED MATERIALS SHALL REQUIRE APPROVAL BY THE AUTHORITY HAVING JURISDICTION (AHJ) PRIOR TO THEIR USE.
9. CAREFULLY REVIEW THE DRAWINGS TO IDENTIFY THE EXTENT OF THE SCOPE OF WORK. VISIT THE SITE TO RELATE THE SCOPE OF WORK TO EXISTING CONDITIONS AND DETERMINE THE EXTENT TO WHICH THOSE CONDITIONS AND PHYSICAL SURROUNDINGS WILL IMPACT THE WORK WITHOUT PRIOR WRITTEN APPROVAL.
10. RESOLVE ANY CONFLICTS ON THE CONSTRUCTION DOCUMENTS WITH THE OWNER'S REPRESENTATIVE FOR REVIEW/APPROVAL BEFORE PROCEEDING WITH THE WORK. SUBSTITUTIONS OF PRODUCTS OR MATERIALS SPECIFIED ON THE CONSTRUCTION DOCUMENTS ARE NOT ALLOWED.
11. THE CONTRACT DOCUMENTS REPRESENT THE FINISHED PROJECT. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE MEANS, METHOD, TECHNIQUES, SEQUENCE, AND PROCEDURE OF CONSTRUCTION AS REQUIRED. SITE VISITS PERFORMED BY THE OWNER'S REPRESENTATIVE DO NOT INCLUDE INSPECTIONS OF MEANS AND METHODS OF CONSTRUCTION PERFORMED BY CONTRACTOR.
12. SECURE ALL EXCAVATIONS AND WORK AREAS DURING NON-WORK HOURS WITH TEMPORARY FENCING AND/OR PLATING.
13. FIELD VERIFY AND FAMILIARIZE HIMSELF/HERSELF WITH THE EXISTING CONDITIONS OF THE PROJECT PRIOR TO DEMOLITION WORK AS NOT ALL OBSTRUCTIONS MAY BE ILLUSTRATED ON THESE DRAWINGS. ANY OBSTRUCTIONS THAT MAY INTERFERE WITH THE WORK NEED TO BE ADDRESSED BY AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
14. CONTACT UTILITY COMPANIES AND AGENCIES WITH SERVICES IN THE AREA PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES AND COORDINATE WITH THE UTILITY FACILITIES AFFECTED BY THE CONSTRUCTION. CONTACT DIG ALERT (811) 48 HOURS PRIOR TO PERFORMING ANY EXCAVATION, FOR UNDERGROUND UTILITY LOCATION SERVICES.
15. VERIFY EXISTING PIPELINE SIZE, TYPE OF MATERIAL, AND WALL THICKNESS PRIOR TO PERFORMING ANY WORK ON THE EXISTING PIPE. IF THE EXISTING PIPELINE MATERIAL DIFFERS FROM THE SPECIFIED PIPE, NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY.
16. ALL EXISTING IMPROVEMENTS OR UTILITIES OUTSIDE OF THE LIMITS OF WORK ARE TO BE PRESERVED OR PROTECTED. OFFSITE IMPROVEMENTS THAT ARE REMOVED, DAMAGED, OR UNDERCUT FROM CONSTRUCTION ACTIVITIES, SHALL BE REPAIRED, OR REPLACED AS DIRECTED BY THE AHJ AT CONTRACTOR'S EXPENSE.
17. THE CONTRACTOR SHALL BE RESPONSIBLE TO PREVENT A DUST NUISANCE FROM ORIGINATING AT THE SITE AS A RESULT OF ITS OPERATIONS. THE CONTRACTOR SHALL OBTAIN A DUST PERMIT IF REQUIRED FORM THE REGIONAL AIR DISTRICT AND CONFORM TO REQUIREMENTS THEREIN.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING THE SITE AT ALL TIMES. OWNER SHALL NOT BE RESPONSIBLE FOR LOSS OR DAMAGE OF CONTRACTOR'S EQUIPMENT OR MATERIAL DURING THE COURSE OF THE PROJECT.

CONSTRUCTION NOTES

1. DESIGN INTENT: THE OVERALL DESIGN INTENT IS TO IMPROVE THE GRIT REMOVAL PROCESS BY ADDING A GRIT REMOVAL SYSTEM ALONG WITH THE REQUIRED ELECTRICAL AND INSTRUMENTATION COMPONENTS. THE WORK WILL CONSIST OF CONSTRUCTION OF GRIT REMOVAL FACILITIES INCLUDING INSTALLATION OF EQUIPMENT AND MODIFYING EXISTING PIPING.
2. ONSITE UTILITIES: VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES THAT MAY BE IMPACTED BY CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT. PRESERVE AND PROTECT UTILITIES IN PLACE THROUGH THE DURATION OF THE PROJECT. ANY DAMAGE TO EXISTING UTILITIES THAT IS A DIRECT RESULT OF CONSTRUCTION ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. PIPELINE TRENCH AND PIPE ZONE: CONFORM TO PLANS AND SPECIFICATIONS. SEE SHEETS CD01 & CD02.
4. CONCRETE: CONCRETE SHALL CONFORM TO THE PLANS AND SPECIFICATIONS
5. EXISTING PIPE LOCATIONS: FIELD VERIFY ALL EXISTING PIPE LOCATIONS FOR POINTS OF CONNECTION TO VALIDATE PLAN AND REPORT ANY DIFFERENCES TO ENGINEER. APPROVAL TO CONSTRUCT WILL BE BY DIRECTION FROM THE OWNER'S REPRESENTATIVE IN THE FIELD.
6. NOTIFICATION OF THE OWNER'S REPRESENTATIVE: NOTIFY OWNER'S REPRESENTATIVE AT LEAST TWO WORKING DAYS IN ADVANCE OF ANY WORK AND IN PARTICULAR WORK AFFECTING EXISTING IMPROVEMENTS.
7. JOB SITE CONDITIONS: CONTRACTOR ASSUMES SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS SHALL ALSO INCLUDE EXCAVATION RELATED SAFETY. CONTRACTOR SHALL NEVER LEAVE THE SITE WITHOUT PROPERLY SAFEGUARDING THE PUBLIC FROM INJURY RELATED TO CONSTRUCTION OPERATIONS. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
8. UNAUTHORIZED CHANGES AND USES: THE ENGINEER WHO PREPARED THESE PLANS WILL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO PLANS OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS SHALL BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.
9. NEATNESS TO BE MAINTAINED: KEEP SITE AND ADJACENT AREAS AFFECTED BY THE PROJECT, IN A NEAT AND ORDERLY MANNER WITH A MINIMUM OF CONSTRUCTION DEBRIS. WET DOWN DRY MATERIALS AND RUBBISH TO PREVENT BLOWING DUST. AT THE CLOSE OF EVERY BUSINESS DAY, ENSURE THAT ALL DEBRIS AND RUBBISH IS GATHERED AND DISPOSED OF AS DIRECTED BY THE OWNER'S REPRESENTATIVE. AT PROJECT COMPLETION, PROVIDE FINAL CLEANING AS DIRECTED BY THE OWNER'S REPRESENTATIVE. FINAL CLEANING SHALL INCLUDE BUT NOT BE LIMITED TO SWEEPING, GREASE REMOVAL, PATCHING, POLISHING, REPAIR, TOUCH UP MARRED SURFACES, RAKING, REMOVAL OF MATERIALS AND WASHDOWN.
10. SAMPLING AND TESTING: SOILS, AGGREGATE BASE AND CONCRETE WILL BE SAMPLED AND TESTED BY THE DISTRICT FOR CONFORMANCE TO DESIGN REQUIREMENTS.
11. PIPELINE TRENCH AND PIPE ZONE: PIPE BEDDING SHALL BE GRANULAR MATERIAL FREE FROM CLAY BALLS, ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES AND CONFORM TO THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3/8 INCH	100
NO. 4	75 TO 100
NO. 30	12 TO 50
NO. 100	5 TO 20
NO. 200	0 TO 10

MATERIAL SHALL HAVE A MINIMUM SAND EQUIVALENT OF 30 PER ASTM D2419.

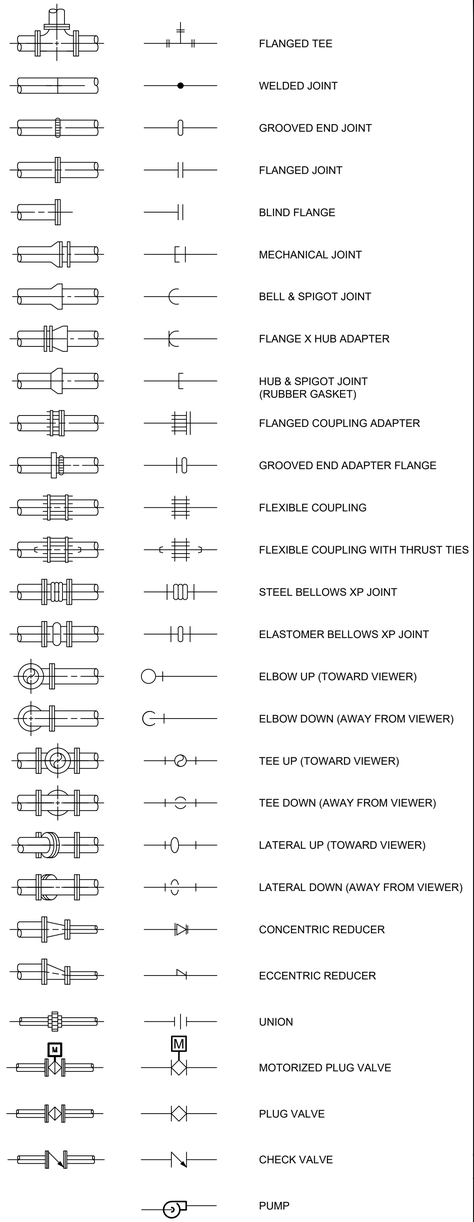
GRADING NOTES

1. CALIFORNIA BUILDING CODE REQUIREMENT: ALL GRADING AND EXCAVATION WORK SHALL CONFORM TO THE CURRENT EDITION OF THE CALIFORNIA BUILDING CODE.
2. DESIGN INTENT: THE INTENT OF THE DESIGN IS AS DESCRIBED UNDER CONSTRUCTION NOTE 1. THE PROJECT IS ANTICIPATED NOT TO REQUIRE IMPORT OR EXPORT OF MATERIAL FROM THE WASTEWATER TREATMENT PLANT CONTIGUOUS AREA. ROSAMOND COMMUNITY SERVICES DISTRICT STAFF WILL PROVIDE LOCATIONS FOR BORROW OR STOCKPILE ON THE PLANT SITE AS REQUIRED.
3. FINISH SURFACE GRADES: DESIGN GRADES SHOWN ON PLANS ARE TO FINISH SURFACE. CONTRACTOR TO SUBTRACT STRUCTURAL SECTION THICKNESS OF PAVEMENT, BASE ROCK, SLAB AND BEDDING MATERIAL THICKNESSES TO ARRIVE AT DESIGN SUBGRADE ELEVATIONS.
4. GEOTECHNICAL REPORT: A GEOTECHNICAL ENGINEERING REPORT WAS PREPARED FOR THIS PROJECT BY BSK ASSOCIATES ON AUGUST 31, 2018 (BSK PROJECT G18-169-11B). UNLESS SPECIFICALLY CALLED OUT OTHERWISE ON THE PLANS OR DIRECTED BY THE OWNER'S REPRESENTATIVE, CONTRACTOR SHALL CONFORM TO THE RECOMMENDATIONS OF THE REPORT AND AMENDMENTS THERETO.
5. SPECIFIC GEOTECHNICAL REQUIREMENTS: AS STATED IN NOTE 4 ABOVE, CONTRACTOR TO FOLLOW THE REQUIREMENTS OF THE GEOTECHNICAL REPORT. CONTRACTOR'S ATTENTION IS BROUGHT TO THE FOLLOWING SPECIFIC GEOTECHNICAL REQUIREMENTS. THE AREA PROPOSED FOR IMPROVEMENTS GRIT CHAMBER SHALL BE CLEARED OF SURFACE VEGETATION AND DEBRIS. MATERIAL RESULTING FROM CLEARING AND STRIPPING OPERATIONS SHALL BE REMOVED AND PROPERLY DISPOSED OF WHERE DIRECTED BY DISTRICT. IN ADDITION, REMOVE ALL UNDOCUMENTED FILLS WHERE FILLS OR STRUCTURAL IMPROVEMENTS WILL BE PLACED. FOLLOWING STRIPPING AND REMOVAL, OVER-EXCAVATE AND REPLACE ALL EXISTING SOIL WITH AN EXPANSION INDEX (EI) GREATER THAN OR EQUAL TO 35. REPLACE WITH NON-EXPANSIVE MATERIALS (EI LESS THAN 35) WITHIN THE UPPER 2-FEET OF THE BOTTOM OF FOUNDATIONS OR BELOW EXISTING GRADE WHICHEVER IS DEEPER. EXCAVATIONS SHALL EXTEND AT LEAST 5-FEET HORIZONTALLY FROM EDGE OF FOUNDATIONS OR TOE OF EMBANKMENTS WHICHEVER IS GREATER. THE EXISTING ON-SITE SOILS WITH AN EI GREATER THAN 35 ARE SUITABLE FOR REUSE AS FILL BELOW A DEPTH OF TWO FEET BELOW THE BOTTOM OF SLABS-ON-GRADE
6. EARTHWORK: CLEAR EXISTING DEBRIS, PLANT MATERIAL, SLUDGE, AND OTHER DELETERIOUS ITEMS WITHIN THE LIMITS OF WORK AS DIRECTED BY THE ENGINEER. SCARIFY, MOISTURE CONDITION UP TO 2% ABOVE OPTIMUM, AND COMPACT SOIL IN ACCORDANCE WITH ASTM D 1557. THE FOLLOWING PERCENTAGES OF MAXIMUM DRY DENSITY SHALL APPLY:
   a. PIPELINE TRENCH AND PIPE ZONE (CONSTRUCTION NOTE 5): 90%
   b. TOP 24" OF SUBGRADE BELOW FOUNDATIONS: 90%
   c. TOP 24" OF SUBGRADE BELOW AGGREGATE BASE BELOW SLABS ON GRADE (SEE 6.F BELOW): 90%
   d. TOP 12" OF SUBGRADE BELOW CONCRETE COLLARS: 90%
   e. TOP 12" OF SUBGRADE IN AREAS WITH AGGREGATE BASE SURFACING: 90%
   f. SLABS-ON-GRADE SHALL REST ON 4-INCHES OF COMPACTED CLASS 2 AGGREGATE BASE: 90%
7. EARTHWORK: CLEAR EXISTING DEBRIS, PLANT MATERIAL AND OTHER ITEMS WITHIN THE LIMITS OF WORK AS DIRECTED BY THE OWNER'S REPRESENTATIVE. SCARIFY, MOISTURE CONDITION, COMPACT SOIL, AND TEST FOR COMPACTION IN ACCORDANCE WITH ASTM D 1557. THE FOLLOWING PERCENTAGES OF MAXIMUM DRY DENSITY SHALL APPLY:
   c. PIPELINE TRENCH AND PIPE ZONE: 90% (NON-PAVED AREAS)
   d. PIPELINE TRENCH ZONE: 95% (PAVED AREAS)
   e. SELECTIVE MATERIAL OR SAND ABOVE PIPE (12" MIN): 90%
   f. TOP 12" OF SUBGRADE IN PAVED AREAS 95%
   g. AGGREGATE BASE IN PAVED AREAS 95%

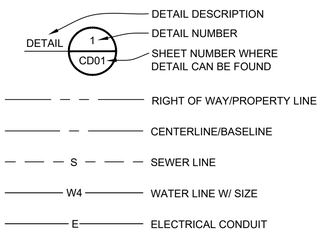
ABBREVIATIONS

ABD	AERATION BASIN DISCHARGE
ABI	AERATION BASIN INFLUENT
AC	ASPHALT CONCRETE PAVEMENT
AFF	ABOVE FINISH FLOOR
ARV	AIR RELEASE VALVE
BF	BLIND FLANGE
BFP	BACKFLOW PREVENTER
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BTM	BOTTOM
BW	BACKWASH
CLR	CLEAR
CONC	CONCRETE
CONT	CONTINUOUS
COR	CORNER
CPLG	COUPLING
CS	COLD SLUDGE
DI	DUCTILE IRON
DIA	DIAMETER
DR	DRAIN
(E)	EXISTING
E	EAST
EA	EACH
EF	EACH FACE
EG	EXISTING GRADE
EL	ELEVATION
EW	EACH WAY
EX	EXISTING
EXT	EXTERIOR
F	FAHRENHEIT
FCA	FLANGED COUPLING ADAPTER
FD	FLOOR DRAIN
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FIRE HYDRANT
FIN	FINISH
FL	FLOWLINE
FLG'D	FLANGED
FS	FINISH SURFACE
GA	GAUGE
GAL	GALLON
GDRL	GRIT DRAIN RETURN LINE
GPM	GALLONS PER MINUTE
GRE	GRIT REMOVAL EFFLUENT
GRIT	GRIT PIPING
HB	HOSE BIBB
HI	HIGH
HI PT	HIGH POINT
HP	HORSEPOWER
INT	INTERIOR
INV	INVERT
LF	LINEAR FEET
LN	LANE
LO	LOW
MAT'L	MATERIAL
MAX	MAXIMUM
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
N	NORTH
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NO	NUMBER/NORMALLY OPEN
OD	OUTSIDE DIAMETER
OC	ON CENTER
PCC	PORTLAND CEMENT CONCRETE
PE	POLYETHYLENE
PI	PRESSURE INDICATOR
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PW	PLANT WATER
R	RADIUS
RAS	RETURN ACTIVATED SLUDGE
RD	ROAD
RO	ROUGH OPENING
RS	RAW SLUDGE / RAW SEWAGE
S	SOUTH
SCH	SCHEDULE
SDR	STANDARD DIMENSION RATIO
SEC	SECTION
SG	SLIDE GATE
SPEC	SPECIFICATION
SQ	SQUARE
ST	STREET
SST	STAINLESS STEEL
T	TELEPHONE-TELEMETRY-THICKNESS
T&B	TOP AND BOTTOM
TBM	TEMPORARY BENCH MARK
TOC	TOP OF CONCRETE
TOW	TOP OF WALL
TS	TRANSFER SLUDGE
TYP	TYPICAL
USGS	UNITED STATES GEOLOGICAL SURVEY
UW	UTILITY WATER
W	WATER/WEST
WAS	WASTE ACTIVATED SLUDGE
W/	WITH
XFRM	TRANSFORMER

PIPE AND FITTING SYSTEM



LEGEND



CLIENT

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

PROJECT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

APPROVED BY
RCSD BOARD OF DIRECTORS

PRESIDENT, BOARD OF DIRECTORS DATE

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GENERAL MANAGER DATE

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CONSULTANT STAMP

REGISTERED PROFESSIONAL ENGINEER
AMANDA C. PARKER
No. RCE 91161
CIVIL
STATE OF CALIFORNIA

DATE	REV	DESCRIPTION
6-15-26	A	ISSUED FOR 90% REVIEW
9-1-26	B	ISSUED FOR BID

DATE 5/18/2026
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JOB NO. 60730277
SHEET NO. G02
PAGE 2 OF 30
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GENERAL NOTES, ABBREVIATIONS, AND LEGEND

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PIPE SCHEDULE

PIPING I.D.	FLOW STREAM I.D.	PIPE MATERIAL ABBREVIATION	PIPE MATERIAL	SPECIFICATION	TEST PRESSURE PSI*	REMARKS	COLOR CODE FOR EXPOSED PIPING	LINING	COATING
RS	RAW SEWAGE	DUCTILE IRON	DIP	402040	50	BURIED / EXPOSED	BROWN	FUSION BONDED EPOXY (SYSTEM 1)	BURIED-EPOXY (SYSTEM 21)
GRIT	GRIT PIPING	DUCTILE IRON	DIP	402040	50	BURIED / EXPOSED	BROWN	FUSION BONDED EPOXY (SYSTEM 1)	BURIED-EPOXY (SYSTEM 21)
GRE	GRIT REMOVAL EFFLUENT	DUCTILE IRON	DIP	402040	50	BURIED / EXPOSED	BROWN	FUSION BONDED EPOXY (SYSTEM 1)	BURIED-EPOXY (SYSTEM 21)
W2	POTABLE WATER	POLYVINYL CHLORIDE	PVC	402090	50	BURIED / EXPOSED	N/A	–	POLYURETHANE (SYSTEM 41-EXPOSED)
RAS	RETURN ACTIVATED SLUDGE	DUCTILE IRON	DIP	402040	50	BURIED	BROWN	FUSION BONDED EPOXY (SYSTEM 1)	BURIED-EPOXY (SYSTEM 21)
ABI	AERATION BASIN INFLUENT	DUCTILE IRON	DIP	402040	50	BURIED	BROWN	FUSION BONDED EPOXY (SYSTEM 1)	BURIED-EPOXY (SYSTEM 21)
GDRL	GRIT DRAIN RETURN LINE	DUCTILE IRON	DIP	402040	50	BURIED / EXPOSED	BROWN	FUSION BONDED EPOXY (SYSTEM 1)	BURIED-EPOXY (SYSTEM 21)
DRAIN	DRAIN LINE	DUCTILE IRON	DIP	402040	50	BURIED / EXPOSED	BROWN	FUSION BONDED EPOXY (SYSTEM 1)	BURIED-EPOXY (SYSTEM 21)

* ALL PIPING SHALL BE HYDROSTATICALLY TESTED WITH WATER UNLESS NOTED OTHERWISE.

DESIGN CRITERIA

ITEM	EQUIPMENT INFORMATION
GRIT CHAMBER	
NUMBER	1
CAPACITY (MGD)	3
TAG NUMBER	10GS-1
GRIT CLASSIFIER	
NUMBER	1
TAG NUMBER	10GC-1
CAPACITY	0.75 CY / HR
POWER REQUIREMENTS	1 HP

MAJOR PROCESS EQUIPMENT LIST

TAG NO.	DESCRIPTION	SPECIFICATION
10GS-1	GRIT CHAMBER	444239
10GC-1	GRIT CLASSIFIER	444240

VALVE SCHEDULE

TAG NO.	DESCRIPTION	TYPE	SIZE (IN)	SPECIFICATION	REMARKS
10PV-01	NEW GRIT CHAMBER INLET VALVE	510	12"	400520	-
10PV-02	EXISTING GRIT CHAMBER INLET VALVE	520	20"	400520	-
10PV-03	CONNECTION FROM SPLITTER BOX TO EXISTING GRIT CHAMBER OUTLET LINE	520	16"	400520	MOTORIZED
10PV-04	GRIT CLASSIFIER INLET VALVE	510	4"	400520	MOTORIZED
10PV-05*	GRIT CHAMBER DRAIN VALVE	500	2"	400520	-
10PV-06	DISTRIBUTION BOX OUTLET VALVE	520	16"	400520	-
10PV-07	SLUDGE PUMPING STATION OUTLET VALVE	510	6"	400520	MOTORIZED
10PV-08	SLUDGE PUMPING STATION OUTLET VALVE	510	10"	400520	MOTORIZED
10PV-09	SLUDGE PUMP TO SPLITTER BOX	510	6"	400520	-
10PV-10	DISTRIBUTION BOX OUTLET VALVE	510	16"	400520	-
10PV-11	SLUDGE PUMP TO SPLITTER BOX	510	10"	400520	-
10BV-01	GRIT CLASSIFIER OUTLET DRAIN	305	3"	400520	BALL VALVE
10SG-01	SLIDE GATE IN SPLITTER BOX	N/A	15" X 15"	400580	SLIDE GATE
FM-211	FLOW METER	N/A	8"	409115	-

CLIENT

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WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

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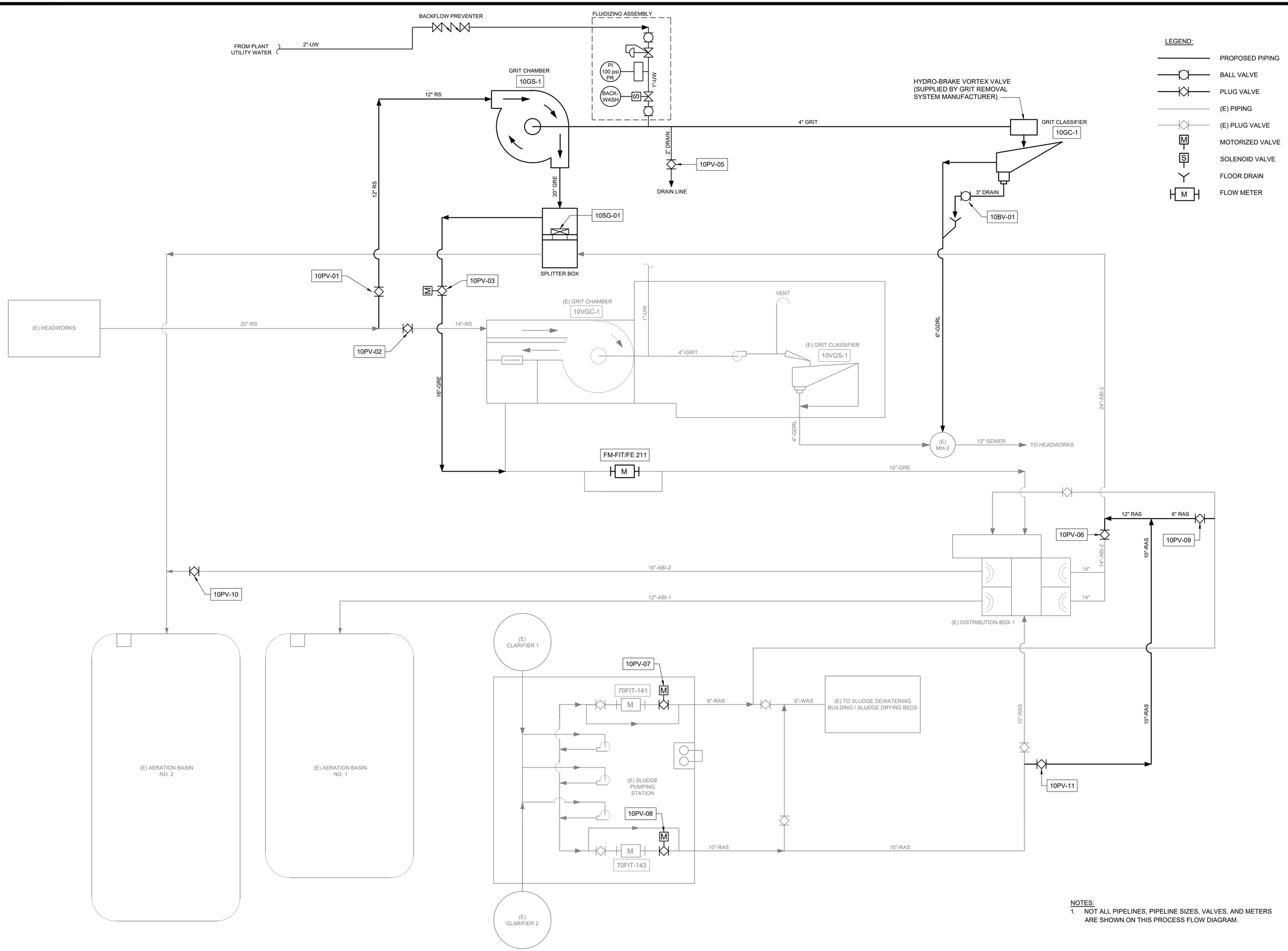
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PAGE 3 OF 30
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DESIGN CRITERIA, SCHEDULES, AND MATERIALS LIST

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NOTES:

1. NOT ALL PIPELINES, PIPELINE SIZES, VALVES, AND METERS ARE SHOWN ON THIS PROCESS FLOW DIAGRAM.

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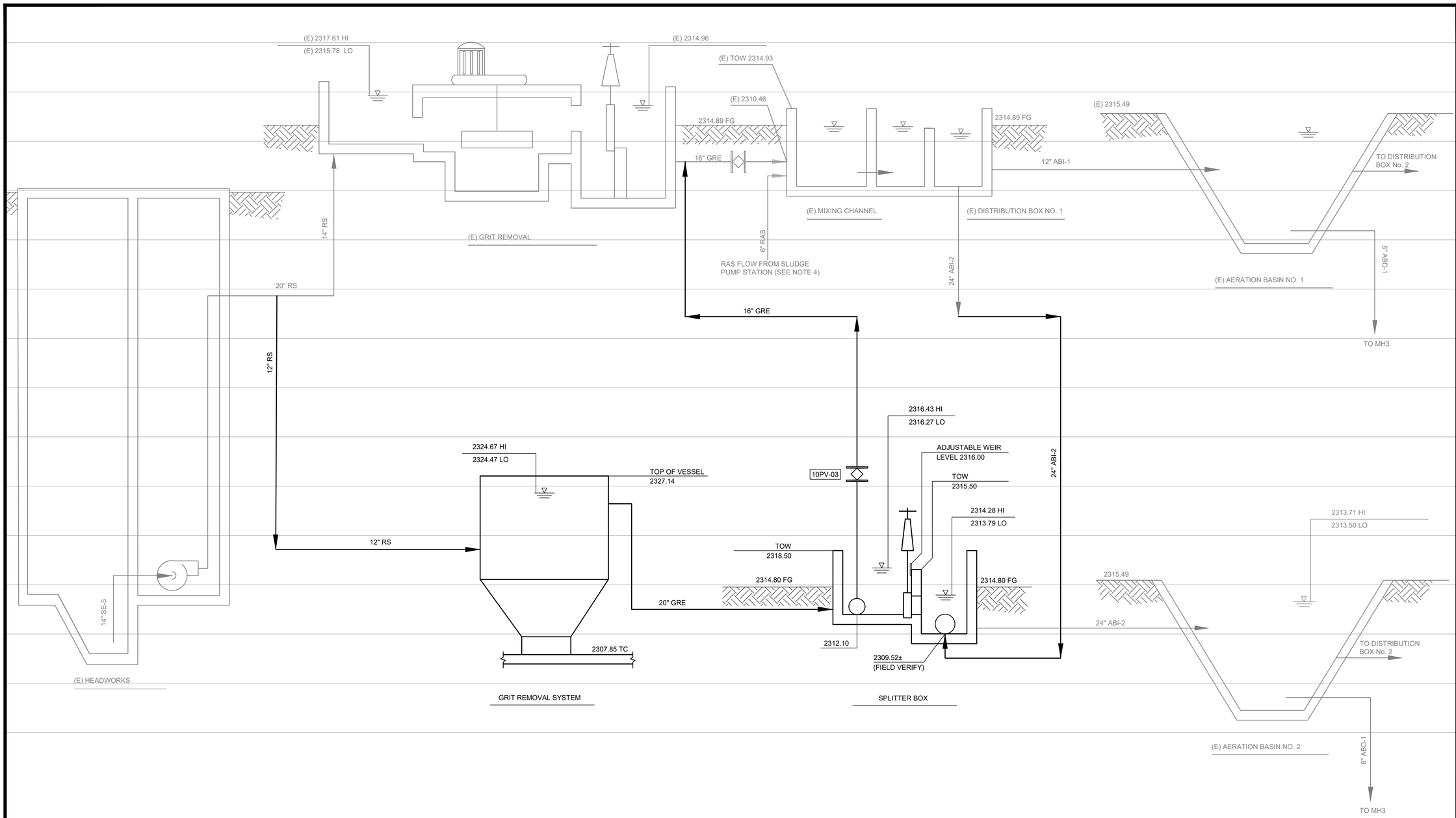
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PAGE 4 OF 30
DRAWING FILE 60730277-G04.dwg

PROCESS FLOW DIAGRAM



LEGEND:

HWL @ 3.0 MGD - HI
HWL @ 1.5 MGD - LO

ABBREVIATIONS:

TOC	TOP OF CONCRETE
TOWP	TOP OF WEIR PLATE
TOW	TOP OF WALL

NOTES:

1. ELEVATIONS IN FEET AND PLEASE REFER C01 FOR SURVEY AND CONTOUR DATA.
2. RETURN ACTIVATED SLUDGE FLOW IS EQUAL TO 150% OF THE AVERAGE FLOW.
3. NOT ALL PIPELINES AND REDUCERS SHOWN ON HYDRAULIC PROFILE FOR SIMPLIFICATION PURPOSES.
4. PIPELINES ARE DIAGRAMMATICALLY SHOWN AND DO NOT REFLECT THE CORRECT ELEVATIONS.
5. HYDRAULIC PROFILE IS BASED ON NOMINAL AND EXISTING PIPE SIZES.
6. FIELD VERIFY THE ELEVATIONS BEFORE CONSTRUCTION.
7. VALUES FOR THE EXISTING PONDS AND UNITS HAVE BEEN TAKEN FROM THE KJ RECORD DRAWINGS 2019, WHILE VALUES FOR THE PROPOSED SYSTEM HAVE BEEN CALCULATED AS PART OF THIS PROJECT.

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PAGE 5 OF 30
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HYDRAULIC PROFILE

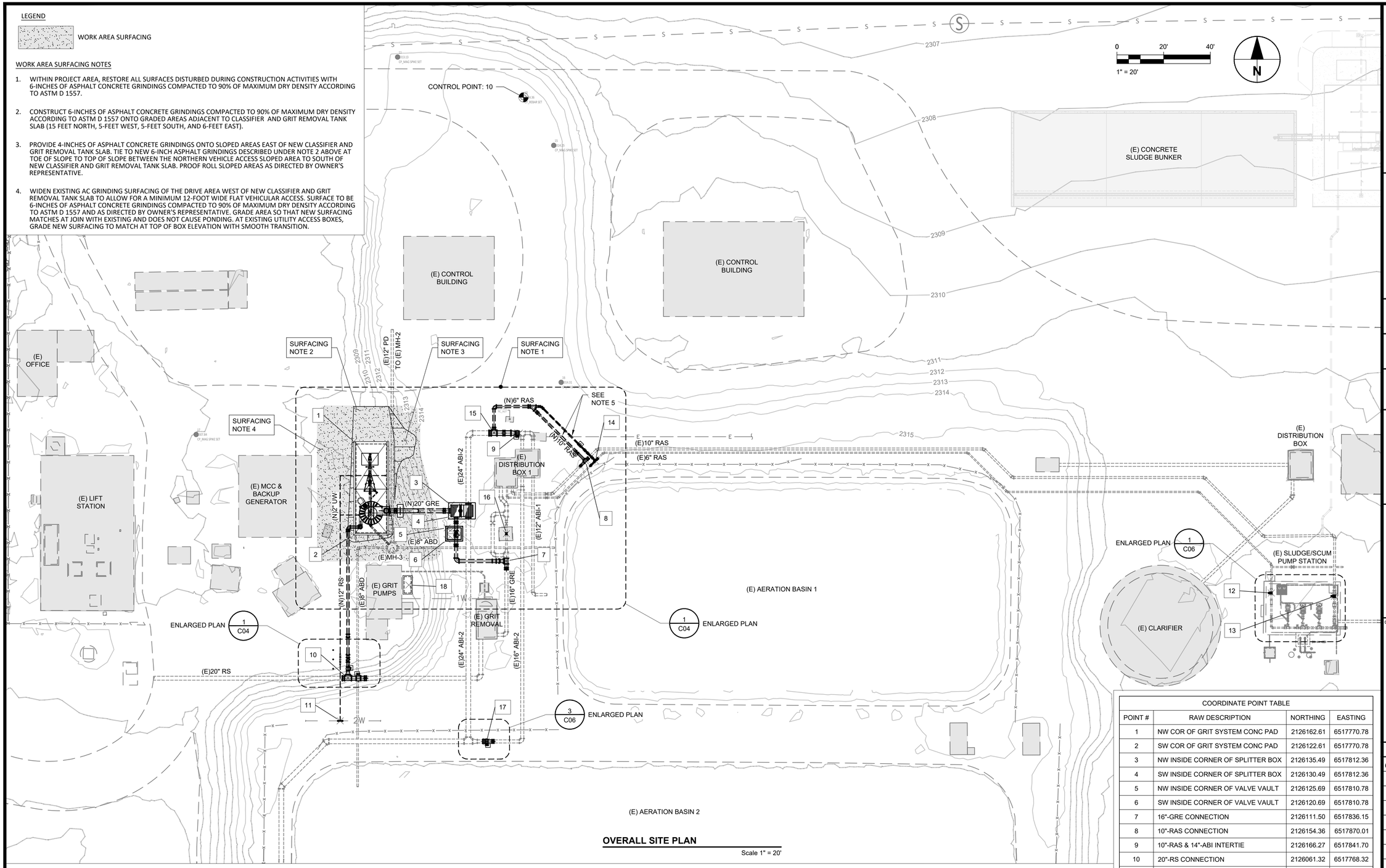
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LEGEND

WORK AREA SURFACING

WORK AREA SURFACING NOTES

1. WITHIN PROJECT AREA, RESTORE ALL SURFACES DISTURBED DURING CONSTRUCTION ACTIVITIES WITH 6-INCHES OF ASPHALT CONCRETE GRINDINGS COMPACTED TO 90% OF MAXIMUM DRY DENSITY ACCORDING TO ASTM D 1557.
2. CONSTRUCT 6-INCHES OF ASPHALT CONCRETE GRINDINGS COMPACTED TO 90% OF MAXIMUM DRY DENSITY ACCORDING TO ASTM D 1557 ONTO GRADED AREAS ADJACENT TO CLASSIFIER AND GRIT REMOVAL TANK SLAB (15 FEET NORTH, 5-FEET WEST, 5-FEET SOUTH, AND 6-FEET EAST).
3. PROVIDE 4-INCHES OF ASPHALT CONCRETE GRINDINGS ONTO SLOPED AREAS EAST OF NEW CLASSIFIER AND GRIT REMOVAL TANK SLAB. TIE TO NEW 6-INCH ASPHALT GRINDINGS DESCRIBED UNDER NOTE 2 ABOVE AT TOE OF SLOPE TO TOP OF SLOPE BETWEEN THE NORTHERN VEHICLE ACCESS SLOPED AREA TO SOUTH OF NEW CLASSIFIER AND GRIT REMOVAL TANK SLAB. PROOF ROLL SLOPED AREAS AS DIRECTED BY OWNER'S REPRESENTATIVE.
4. WIDEN EXISTING AC GRINDING SURFACING OF THE DRIVE AREA WEST OF NEW CLASSIFIER AND GRIT REMOVAL TANK SLAB TO ALLOW FOR A MINIMUM 12-FOOT WIDE FLAT VEHICULAR ACCESS. SURFACE TO BE 6-INCHES OF ASPHALT CONCRETE GRINDINGS COMPACTED TO 90% OF MAXIMUM DRY DENSITY ACCORDING TO ASTM D 1557 AND AS DIRECTED BY OWNER'S REPRESENTATIVE. GRADE AREA SO THAT NEW SURFACING MATCHES AT JOIN WITH EXISTING AND DOES NOT CAUSE PONDING. AT EXISTING UTILITY ACCESS BOXES, GRADE NEW SURFACING TO MATCH AT TOP OF BOX ELEVATION WITH SMOOTH TRANSITION.



OVERALL SITE PLAN

Scale 1" = 20'

SURVEYOR

KSI

DATE OF SURVEY

JUNE 13, 2024

BENCHMARK

CONTROL POINT: 10

DESCRIPTION
REBAR WITH KSIE CONTROL PLASTIC CAP

NORTHING: 2126310.02'
EASTING: 6517843.48'
ELEVATION: 2314.36'

BASIS OF BEARINGS

NORTH AMERICAN DATUM OF 1983 (NAD83) CALIFORNIA COORDINATE SYSTEM (CCS), ZONE 5 WAS USED AS THE BASIS OF BEARINGS AS SHOWN HEREON.

BASIS OF ELEVATIONS

THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) WAS USED AS THE BASIS OF ELEVATION AS SHOWN HEREON.

POINT OF ORIGIN:

DESIGNATION	LA WAAS 1 CORS ARP
CORS ID	ZLA1
PID	DF9223
EPOCH	2010.00
N:	2042023.83'
E:	6536425.72'
EL:	2611.38'

NOTES:

1. MATCH EXISTING COVER OVER TOP OF WATER PIPE.
2. COORDINATE THE SHUT-DOWN TIE-IN TO THE EXISTING RAW SLUDGE PIPELINE, ABI, GRIT OUTLET AND RAS PIPELINE WITH OWNER.
3. CONTRACTOR TO VERIFY EXISTING PIPELINE MATERIAL,ELEVATION AND LOCATION OF CONNECTION POINT IN THE FIELD PRIOR TO CONSTRUCTION.
4. UW AND RAS PIPELINES SHALL MAINTAIN A MINIMUM OF 3' OF COVER FROM TOP OF PIPE. UNLESS SHOWN DIFFERENTLY ON THE DRAWINGS.
5. CONTRACTOR SHALL VERIFY EXISTING ELECTRICAL LINES FROM ELECTRICAL VAULTS AT CROSSINGS WITH THE 10-INCH RAS LINE AND 6-INCH RAS LINE PRIOR TO CONSTRUCTION.

COORDINATE POINT TABLE

POINT #	RAW DESCRIPTION	NORTHING	EASTING
1	NW COR OF GRIT SYSTEM CONC PAD	2126162.61	6517770.78
2	SW COR OF GRIT SYSTEM CONC PAD	2126122.61	6517770.78
3	NW INSIDE CORNER OF SPLITTER BOX	2126135.49	6517812.36
4	SW INSIDE CORNER OF SPLITTER BOX	2126130.49	6517812.36
5	NW INSIDE CORNER OF VALVE VAULT	2126125.69	6517810.78
6	SW INSIDE CORNER OF VALVE VAULT	2126120.69	6517810.78
7	16"-GRE CONNECTION	2126111.50	6517836.15
8	10"-RAS CONNECTION	2126154.36	6517870.01
9	10"-RAS & 14"-ABI INTERTIE	2126166.27	6517841.70
10	20"-RS CONNECTION	2126061.32	6517768.32
11	2"-UW CONNECTION	2126043.07	6517764.98
12	6" MOTORIZED PLUG VALVE	2126097.80	6518163.64
13	10" MOTORIZED PLUG VALVE	2126096.43	6518190.64
14	6"-RAS CONNECTION	2126154.38	6517874.23
15	6"-RAS & 24"-ABI-2 INTERTIE	2126166.27	6517830.85
16	8" MAG METER	2126123.19	6517836.15
17	16" MANUAL PLUG VALVE	2126034.27	6517827.68
18	CENTER OF ELECTRICAL PAD	2126101.23	6517794.36

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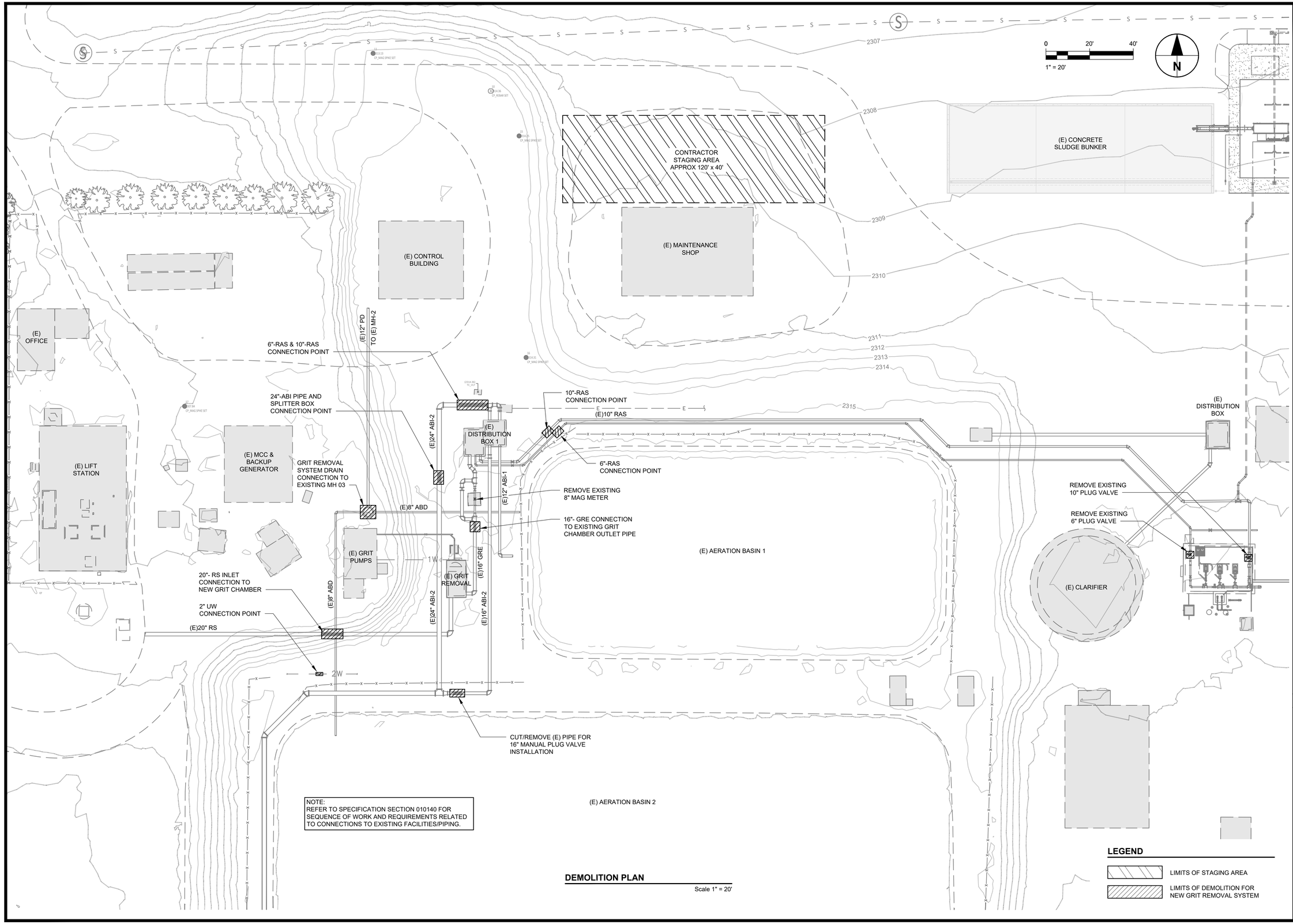
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PAGE 6 OF 30
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OVERALL SITE PLAN AND SITE SURVEY CONTROL

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NOTE:
REFER TO SPECIFICATION SECTION 010140 FOR SEQUENCE OF WORK AND REQUIREMENTS RELATED TO CONNECTIONS TO EXISTING FACILITIES/PIPING.

LEGEND

- LIMITS OF STAGING AREA
- LIMITS OF DEMOLITION FOR NEW GRIT REMOVAL SYSTEM

DEMOLITION PLAN

Scale 1" = 20'

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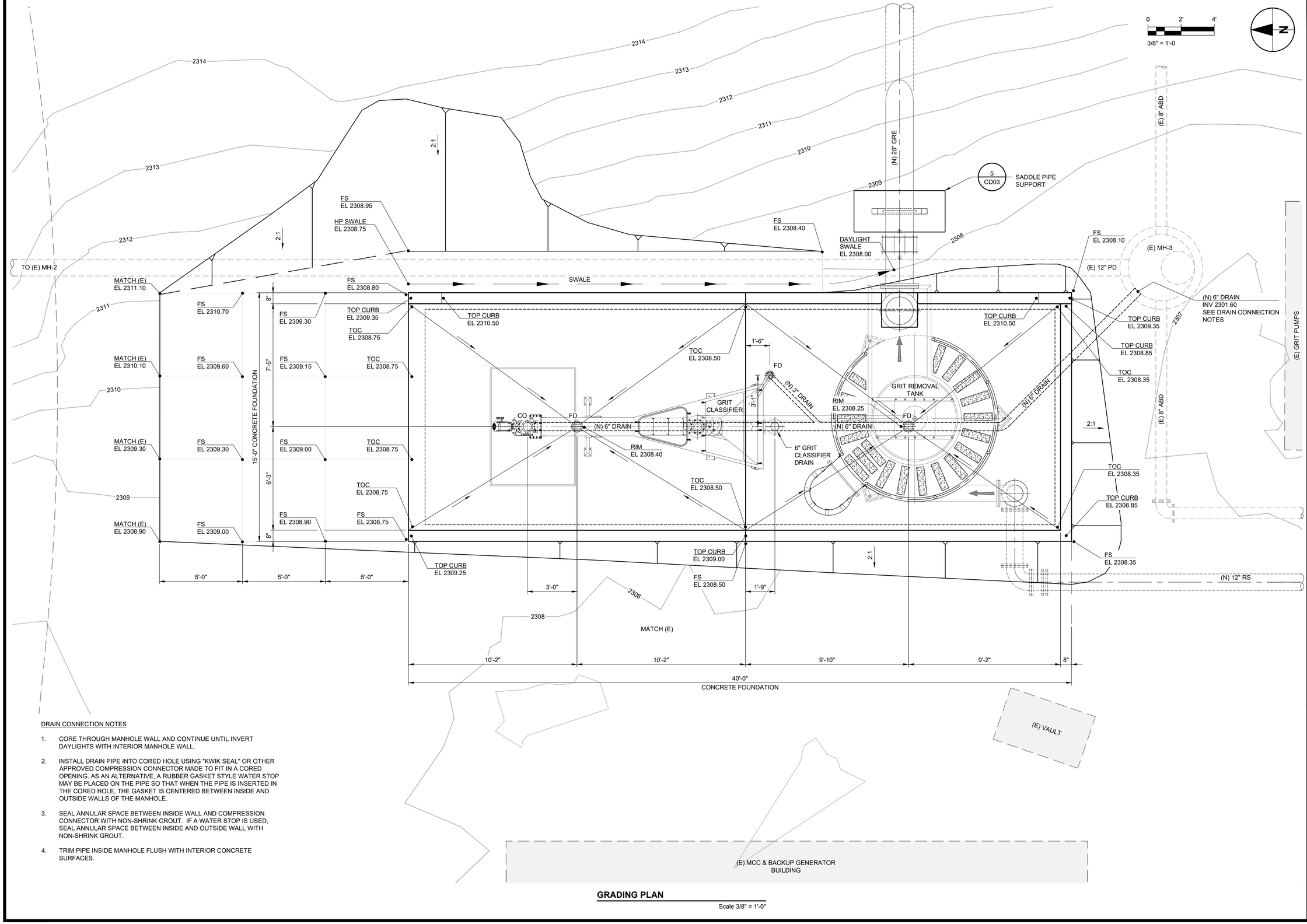
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PAGE 7 OF 30
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STAGING AREA AND DEMOLITION PLAN



DRAIN CONNECTION NOTES

1. CORE THROUGH MANHOLE WALL AND CONTINUE UNTIL INVERT DAYLIGHTS WITH INTERIOR MANHOLE WALL.
2. INSTALL DRAIN PIPE INTO CORED HOLE USING "KWIK SEAL" OR OTHER APPROVED COMPRESSION CONNECTOR MADE TO FIT IN A CORED OPENING. AS AN ALTERNATIVE, A RUBBER GASKET STYLE WATER STOP MAY BE PLACED ON THE PIPE SO THAT WHEN THE PIPE IS INSERTED IN THE CORED HOLE, THE GASKET IS CENTERED BETWEEN INSIDE AND OUTSIDE WALLS OF THE MANHOLE.
3. SEAL ANNULAR SPACE BETWEEN INSIDE WALL AND COMPRESSION CONNECTOR WITH NON-SHRINK GROUT. IF A WATER STOP IS USED, SEAL ANNULAR SPACE BETWEEN INSIDE AND OUTSIDE WALL WITH NON-SHRINK GROUT.
4. TRIM PIPE INSIDE MANHOLE FLUSH WITH INTERIOR CONCRETE SURFACES.

GRADING PLAN

Scale 3/8" = 1'-0"

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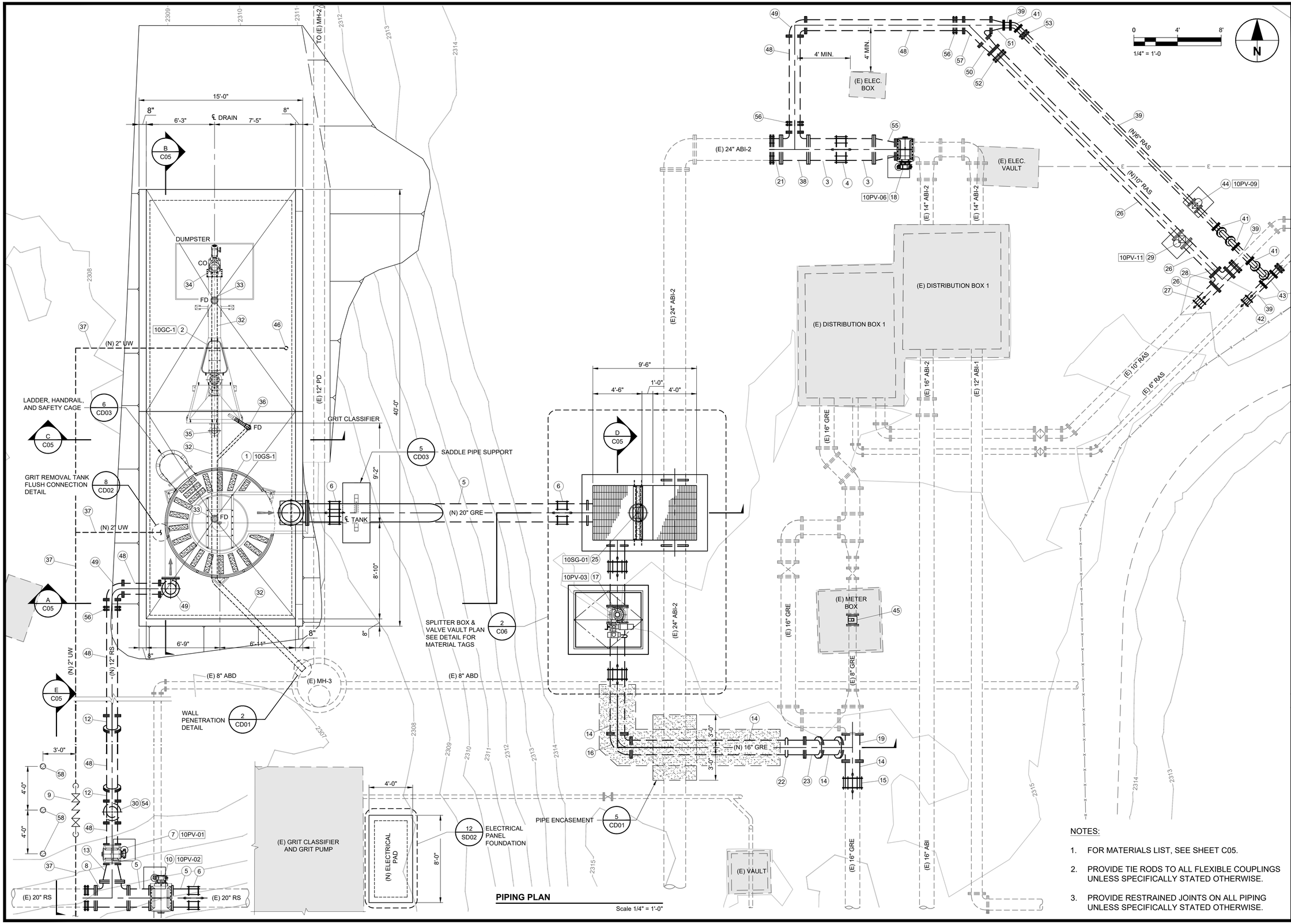
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PAGE 8 OF 30
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GRADING PLAN

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PIPING PLAN

Scale 1/4" = 1'-0"

NOTES:

1. FOR MATERIALS LIST, SEE SHEET C05.
2. PROVIDE TIE RODS TO ALL FLEXIBLE COUPLINGS UNLESS SPECIFICALLY STATED OTHERWISE.
3. PROVIDE RESTRAINED JOINTS ON ALL PIPING UNLESS SPECIFICALLY STATED OTHERWISE.

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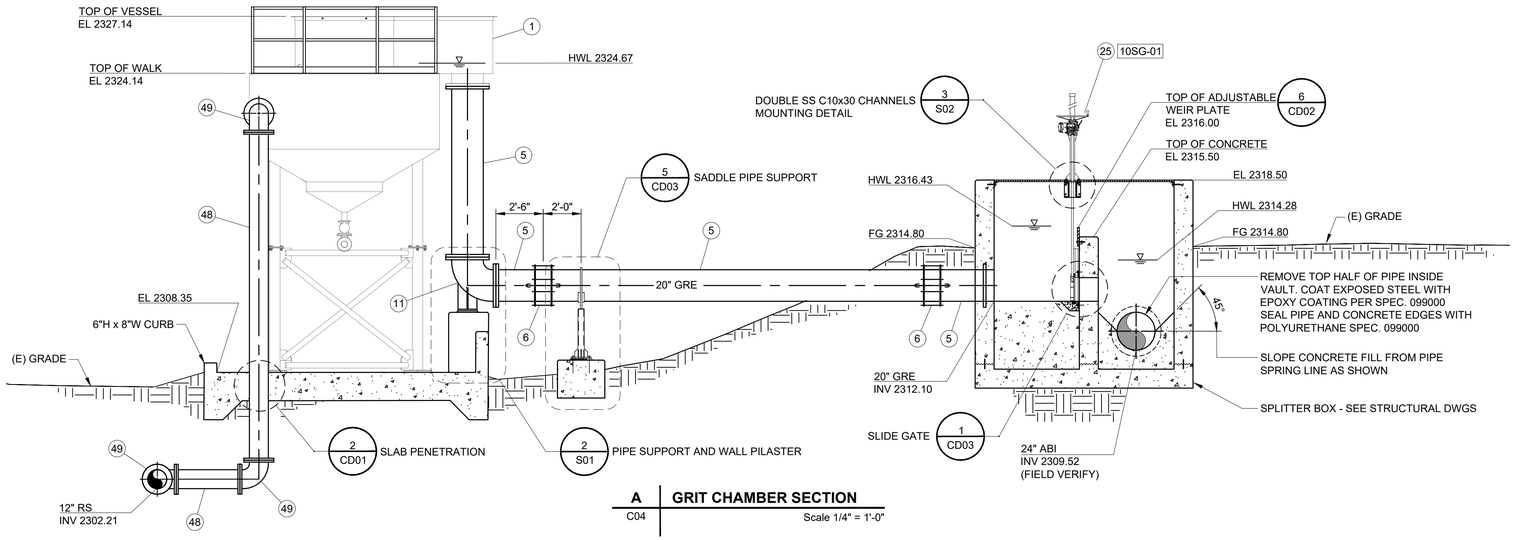
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GRIT REMOVAL SYSTEM SITE PLAN

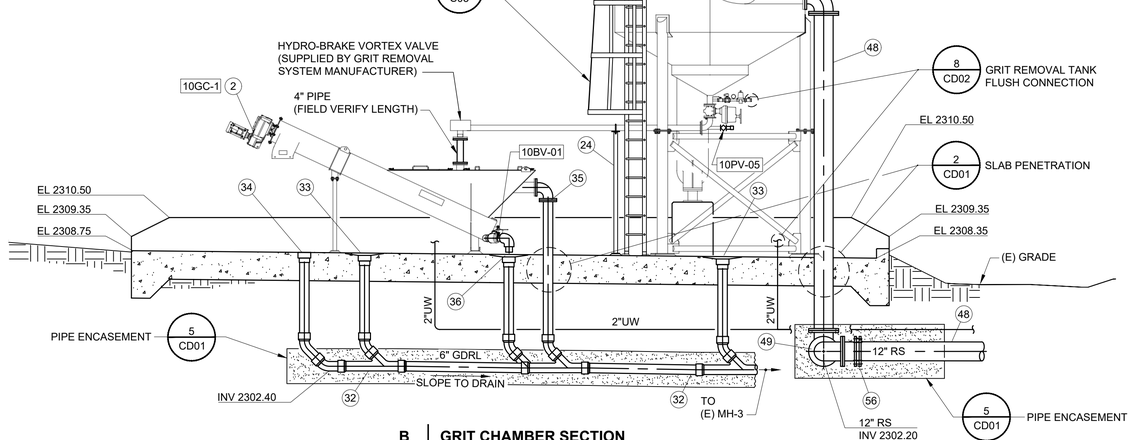
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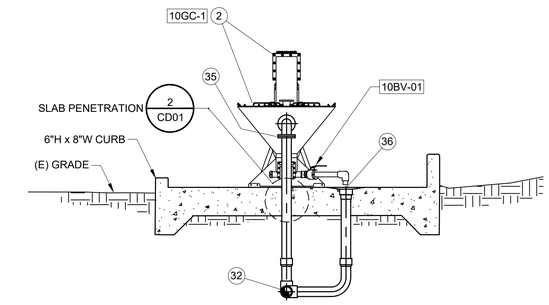
A | **GRIT CHAMBER SECTION**
C04 | Scale 1/4" = 1'-0"

MATERIALS LIST		
NO.	DESCRIPTION	DETAIL
1	GRIT REMOVAL TANK	
2	GRIT CLASSIFIER	
3	24-INCH PIPE	
4	24-INCH FLEXIBLE CPLG	
5	20-INCH PIPE	
6	20-INCH FLEXIBLE CPLG	
7	12-INCH PLUG VALVE	
8	20-INCH TEE	
9	2-INCH BACKFLOW PREVENTER, SEE DETAIL	9 CD02
10	20-INCH PLUG VALVE	
11	20-INCH 90° ELBOW WITH BASE	
12	12-INCH 22.5° ELBOW	
13	20-INCH x 12-INCH ECCENTRIC REDUCER	
14	16-INCH PIPE	
15	16-INCH FLEXIBLE CPLG	
16	16-INCH 90° ELBOW	
17	16-INCH PLUG VALVE - MOTORIZED	
18	16-INCH PLUG VALVE	

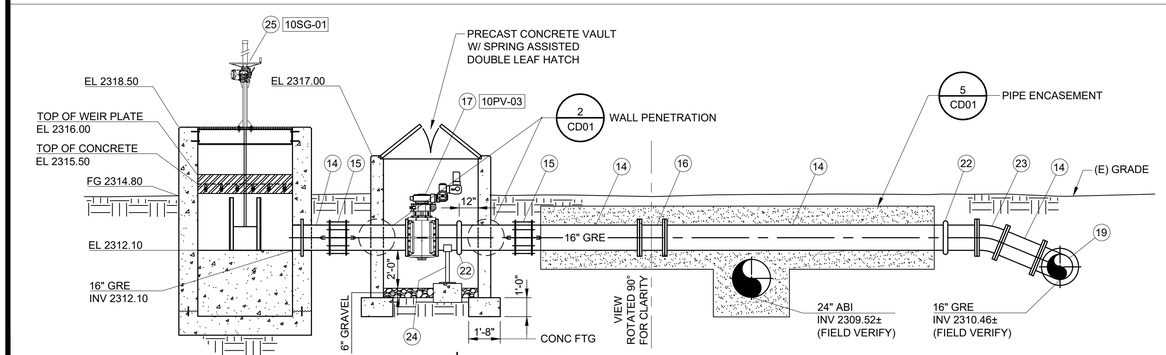
MATERIALS LIST		
NO.	DESCRIPTION	DETAIL
19	16-INCH TEE	
20	16-INCH SPOOL	
21	24-INCH FLG'D CPLG ADAPTER	
22	16-INCH GROOVED END CPLG	
23	16-INCH 22.5° ELBOW	
24	PIPE SUPPORT	1 CD01
25	SLIDE GATE	
26	10-INCH PIPE	
27	10-INCH FLEXIBLE CPLG	
28	10-INCH TEE	
29	10-INCH PLUG VALVE	
30	12-INCH TEE	
31	10-INCH 45° ELBOW	
32	6-INCH DRAIN PIPE	
33	FLOOR DRAIN, SEE DETAIL	4 CD01
34	CLEANOUT, SEE DETAIL	6 CD01
35	6-INCH GRIT CLASSIFIER DRAIN	
36	3-INCH GRIT CLASSIFIER DRAIN	4 CD01
37	2-INCH WATER LINE	
38	24-INCH x 12-INCH TEE	
39	6-INCH PIPE	
40	6-INCH 90° ELBOW	
41	6-INCH 45° ELBOW	
42	6-INCH FLEXIBLE CPLG	
43	6-INCH TEE	
44	6-INCH PLUG VALVE	
45	REPLACE EXIST. 8-INCH FLOW METER	
46	HOSE BIBB, SEE DETAIL	7 CD02
47	16-INCH FLG'D CPLG ADAPTER	
48	12-INCH PIPE	
49	12-INCH 90° ELBOW	
50	12-INCH x 10-INCH ECCENTRIC REDUCER	
51	12-INCH x 6-INCH ECCENTRIC REDUCER	
52	10-INCH FLG'D CPLG ADAPTER	
53	6-INCH FLG'D CPLG ADAPTER	
54	12-INCH BLIND FLG W/ LIFTING HANDLE	
55	24-INCH x 16-INCH REDUCER	
56	12-INCH FLG'D CPLG ADAPTER	
57	12x12x12-INCH FLG'D LATERAL	
58	BOLLARD PER DETAIL	4 CD02



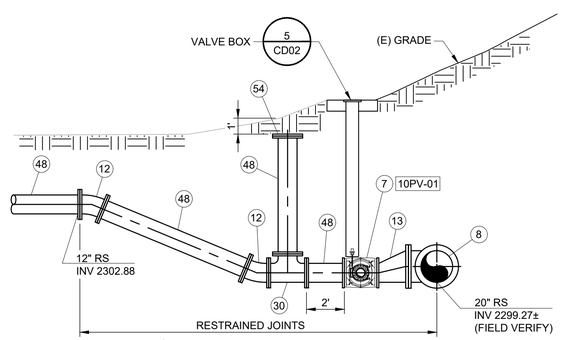
B | **GRIT CHAMBER SECTION**
C04 | Scale 1/4" = 1'-0"



C | **GRIT CHAMBER SECTION**
C04 | Scale 1/4" = 1'-0"



D | **SPLITTER BOX AND VALVE VAULT SECTION**
C04 | Scale 1/4" = 1'-0"



E | **20-INCH RS CONNECTION SECTION**
C04 | Scale 1/4" = 1'-0"

CLIENT

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

PROJECT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

APPROVED BY
RCSD BOARD OF DIRECTORS

PRESIDENT, BOARD OF DIRECTORS — DATE

RECOMMENDED FOR APPROVAL

GENERAL MANAGER — DATE

AECOM
5001 E. Commercenter Dr. Suite 100
Bakersfield, CA 93309
661.283.2323 tel
www.aecom.com

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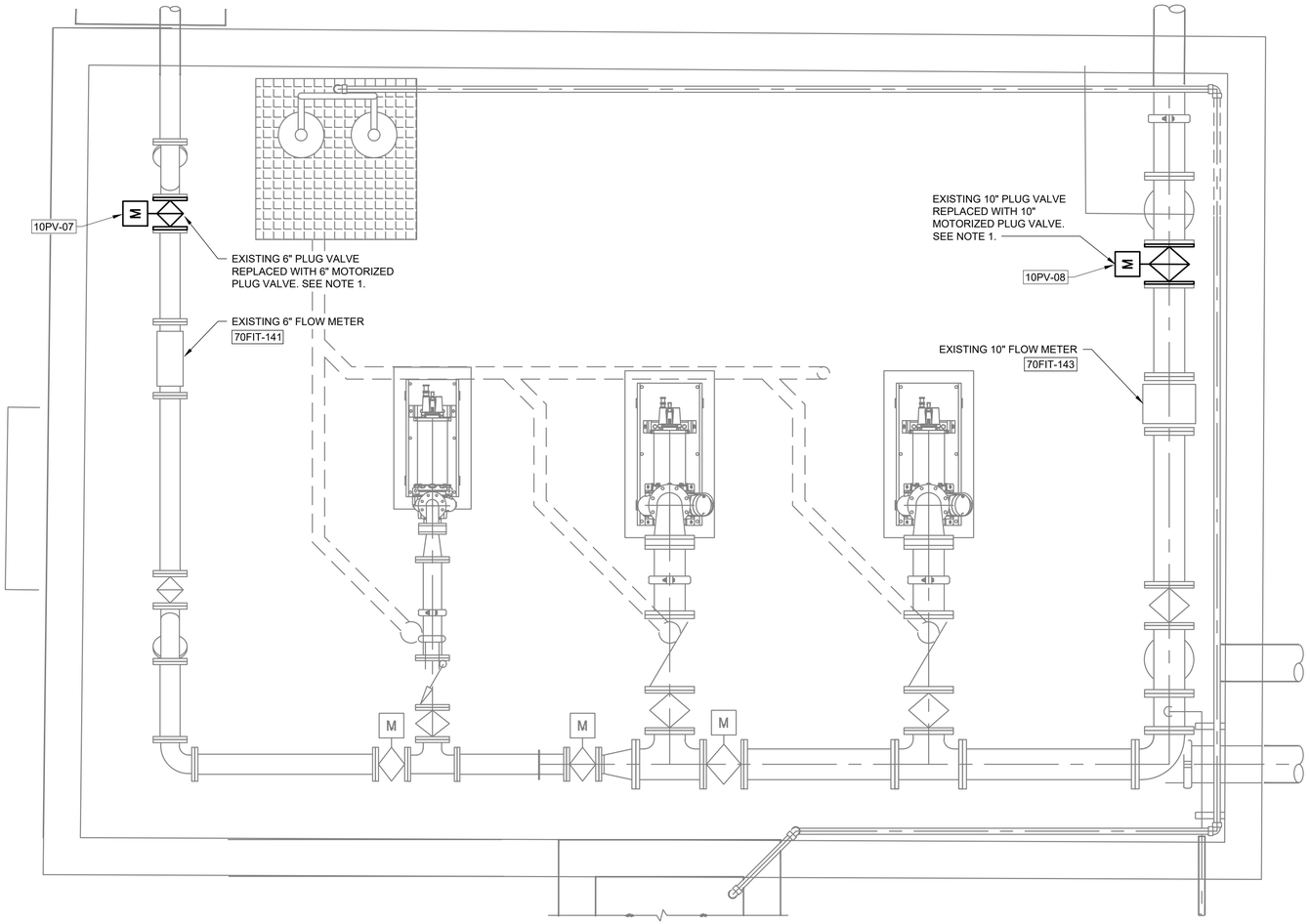
REGISTERED PROFESSIONAL ENGINEER
AMANDA C. PARRA
No. RCE 91161
CIVIL
STATE OF CALIFORNIA

DATE	REV	DESCRIPTION
6-15-26	A	ISSUED FOR 90% REVIEW
9-1-26	B	ISSUED FOR BID

DATE 5/18/2026
DESIGNED BY PM
DRAWN BY DG
CHECKED BY WB
JOB NO. 60730277
SHEET NO. C05
PAGE 10 OF 30
DRAWING FILE 60730277-C05.dwg

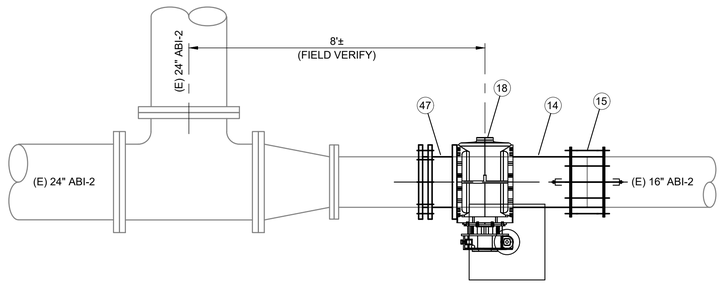
GRIT REMOVAL SYSTEM SECTIONS

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1 | SLUDGE PUMP STATION PLAN
C01 — SCALE 1/2" = 1'-0"

NOTES:
1. NOT ALL PIPE DETAILS, VALVES, AND METER DETAILS ARE SHOWN. CONTRACTOR TO FIELD VERIFY PIPE MATERIALS, ELEVATIONS, AND LOCATIONS OF CONNECTION POINTS PRIOR TO CONSTRUCTION.



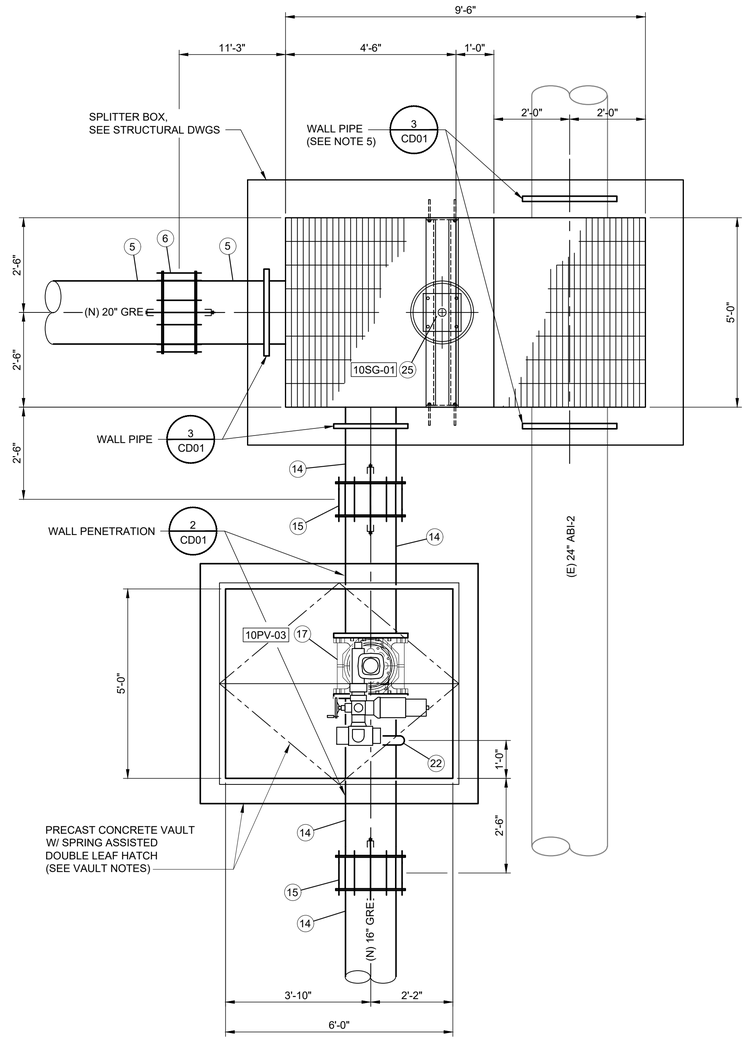
3 | 16-INCH MANUAL PLUG VALVE PLAN
C01 — SCALE 1/2" = 1'-0"

0 2' 4'
1/2" = 1'-0"

N

VAULT NOTES:

1. PROVIDE PRECAST CONCRETE VAULT PER SPECIFICATIONS 034220.
2. PROVIDE PEDESTRIAN-RATED (300 PSF) ALUMINUM DOUBLE LEAF HATCH, HYDRAULIC-ASSISTED (OR SPRING-ASSISTED), LOCKABLE, SIZED FOR FULL OPENING OF STRUCTURE.
3. VAULT SHALL BE PRECAST OR CAST-IN-PLACE. IF THE VAULT IS TO BE CAST-IN-PLACE, IT SHALL BE DESIGNED BY CONTRACTOR IN ACCORDANCE WITH ACI 350. FOR CAST-IN-PLACE OPTION, SUBMIT DESIGN CALCULATIONS AND SHOP DRAWINGS IN ACCORDANCE WITH SPECIFICATIONS. ALL CONCRETE USED FOR THE VAULT, WITHER PRECAST OR CAST IN PLACE, SHALL USE TYPE 5 OR TYPE 2 MODIFIED CEMENT FOR SULFATE RESISTANCE.
4. CONTRACTOR TO PAINT 2-INCH RED LETTERS OVER WHITE BACKGROUND ON THE ACCESS HATCH, "DANGER CONFINED SPACE AUTHORIZED PERSONNEL ONLY". PAINT SHALL INCLUDE PRIMER FOR ALUMINUM. MARKING PAINT SHALL BE USE SHERWIN-WILLIAMS SETFAST ACRYLIC TRAFFIC MARKING PAINT OR EQUAL.
5. WELD WALL PIPE (2-PIECE) TO EXISTING 20-INCH DIP AND RELINE AND RECOAT DAMAGED AREA WITH EPOXY PER SPEC. 099000



2 | SPLITTER BOX & VALVE VAULT PLAN
C04 — SCALE 1/2" = 1'-0"

NOTE:
FOR MATERIALS LIST, SEE SHEET C05.

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Rosamond Community Services District

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SLUDGE PUMP STATION PLAN AND SPLITTER BOX & VALVE VAULT PLAN

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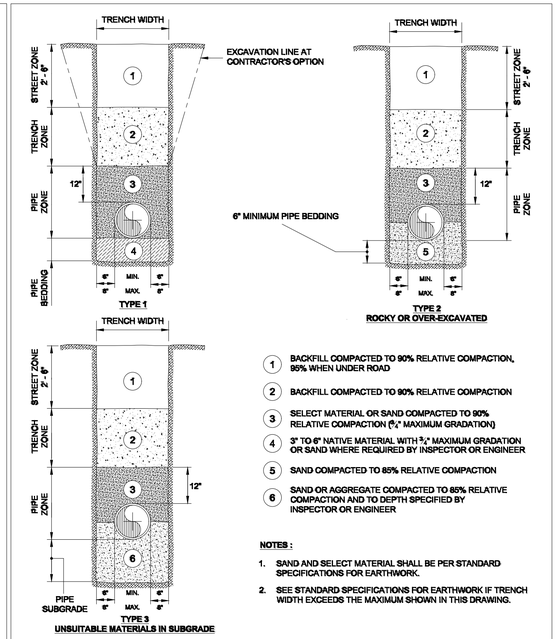
SEWER NOTES

1. THE SEWER FACILITIES TO BE DEDICATED TO THE R.C.S.D. SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS OF THE R.C.S.D.
2. THE R.C.S.D. ENGINEERING DEPARTMENT SHALL BE NOTIFIED AT LEAST TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION. TELEPHONE (661) 256-3411.
3. THE CONSTRUCTION PLANS MUST BE APPROVED BY THE R.C.S.D. PRIOR TO THE START OF ANY SEWER CONSTRUCTION. TWO (2) SETS OF APPROVED PLANS AND A COMPLETE ELECTRONIC COPY (AUTOCAD DWG FORMAT) OF SAID PLANS SHALL BE FURNISHED TO THE R.C.S.D. PRIOR TO DISTRICT APPROVAL. THE PLANS MUST BE SIGNED BY A CALIFORNIA REGISTERED ENGINEER.
4. PRIOR TO ACCEPTANCE OF THE SEWER FACILITIES, ALL NECESSARY EASEMENT DOCUMENTS SHALL BE PROPERLY EXECUTED AND RECORDED. THREE (3) COPIES EACH OF THE RECORDED DOCUMENTS SHALL BE FURNISHED TO THE R.C.S.D.
5. THE MANHOLE FRAME AND COVER AND CONCRETE SUPPORT FOR MANHOLES SHALL BE RAISED AND CONSTRUCTED TO FINISHED PAVED GRADE AFTER THE PAVING OPERATION IS COMPLETED. THE RING SECTION SHALL NOT BE MORE THAN 24" FROM THE CONE. THE COMPLETE SEWER SYSTEM SHALL BE COMPLETELY CLEAN PRIOR TO ACCEPTANCE.
6. ASPHALTIC MASTIC OR PORTLAND CEMENT MORTOR SHALL BE PLACED BETWEEN CONE RINGS (MASTIC PREFERRED). FILL ALL HORIZONTAL RING JOINTS WITH MORTOR TO MAKE JOINTS FINAL SURFACES FLUSH WITH INTERIOR RING WALLS (SURFACES).
7. ALL NEW MANHOLE COVERS SHALL BE EQUIPPED WITH DISH INSERTS, ULTRA HIGH DENSITY POLYETHYLENE COPOLYMER MATERIAL THAT MEETS ASTM SPECIFICATION D1248, CLASS A, CATEGORY 5, TYPE III. THICKNESS SHALL BE A UNIFORM $\frac{1}{8}$" OR GREATER.
8. THE SEWER SYSTEM, INCLUDING LATERALS, SHALL BE HYDROSTATIC WATER OR AIR TESTED, AND VIDEO CAMERA TESTED, AFTER ALL UNDERGROUND UTILITIES ARE CONSTRUCTED, AND PRIOR TO PLACING STREET PAVEMENT.
9. ALL SEWER LINES SHALL BE VIDEO CAMERA INSPECTED BY THE R.C.S.D. PRIOR TO ACTIVATING WATER SERVICES, REGARDLESS OF KERN COUNTY INSPECTORS' FINAL APPROVAL.
10. WORK IN THE STATE OF CALIFORNIA OR THE COUNTY OF KERN RIGHTS-OF-WAY SHALL BE DONE IN ACCORDANCE WITH THE APPROPRIATE ENCROACHMENT PERMITS.
11. EXISTING SEWER LOCATION AND FLOW LINE SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE START OF CONSTRUCTION. THE DISTRICT SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
12. ONE (1) COMPLETE SET OF DRAWINGS (CHRONOFLEXES OR MYLAR) AND ONE (1) COMPLETE ELECTRONIC SET (AUTOCAD DWG FORMAT) OF DRAWINGS SHALL BE FURNISHED TO THE DISTRICT ON COMPLETION OF CONSTRUCTION.
13. TRENCHING MATERIAL TO BE COMPACTED TO 90%. TRENCHING MATERIAL TO BE COMPACTED TO 95% UNDER SURFACE GRADE.

Rosamond Community Services District | STANDARD SPECIFICATIONS AND DRAWING DETAILS

SHEET NO.		DATE DRAWN
S-1	STANDARD SEWER NOTES	11/07

R.C.S.D. ENGINEERING DEPARTMENT | REVISION NO.:002-03069 | DRAWN BY : EVAN R. CRABTREE | APPROVED BY:



1. BACKFILL COMPACTED TO 90% RELATIVE COMPACTION, 95% WHEN UNDER ROAD
2. BACKFILL COMPACTED TO 90% RELATIVE COMPACTION
3. SELECT MATERIAL OR SAND COMPACTED TO 90% RELATIVE COMPACTION (¾" MAXIMUM GRADATION)
4. 3" TO 6" NATIVE MATERIAL WITH ¾" MAXIMUM GRADATION OR SAND WHERE REQUIRED BY INSPECTOR OR ENGINEER
5. SAND COMPACTED TO 85% RELATIVE COMPACTION
6. SAND OR AGGREGATE COMPACTED TO 85% RELATIVE COMPACTION AND TO DEPTH SPECIFIED BY INSPECTOR OR ENGINEER

NOTES :

1. SAND AND SELECT MATERIAL SHALL BE PER STANDARD SPECIFICATIONS FOR EARTHWORK.
2. SEE STANDARD SPECIFICATIONS FOR EARTHWORK IF TRENCH WIDTH EXCEEDS THE MAXIMUM SHOWN IN THIS DRAWING.

STANDARD SPECIFICATIONS AND DRAWING DETAILS | *Rosamond Community Services District*

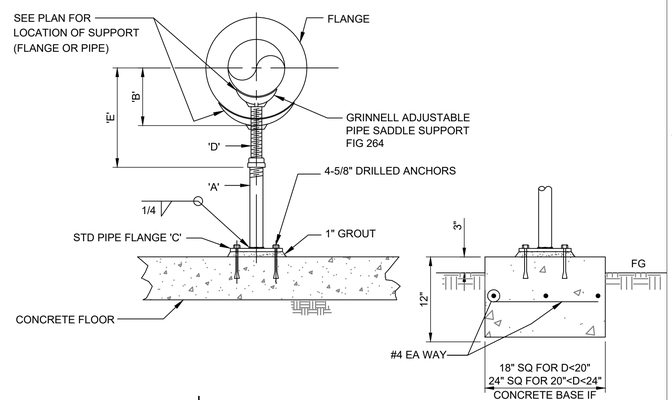
DATE DRAWN		SHEET NO.
11/07	SEWER PIPE BEDDING AND BACKFILL DETAILS	S-2

R.C.S.D. ENGINEERING DEPARTMENT | REVISION NO.:002-03069 | DRAWN BY : EVAN R. CRABTREE | APPROVED BY:

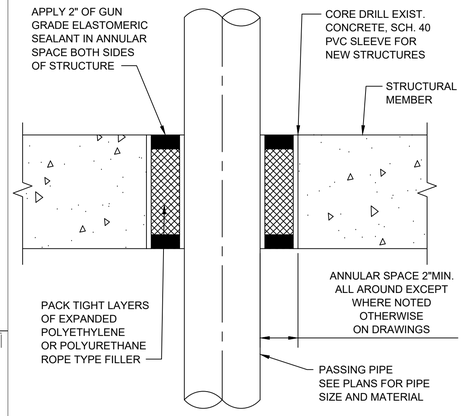
NOTES:

1. PROVIDE HALF ROUND RIGID INSULATION & INSULATION PROTECTION SHIELD, SIMILAR TO GRINNELL FIG 167 OR B-LINE B-3151, WHEN PIPING IS INSULATED
2. PROVIDE NEOPRENE WAFFLE ISOLATION PAD SIMILAR TO MASON TYPE "W" OR KORFUND KORPAD 40, UNDER SUPPORT FOOT WHEN PIPING IS ISOLATED OR SUPPORT IS ADJACENT TO MECHANICAL EQUIPMENT

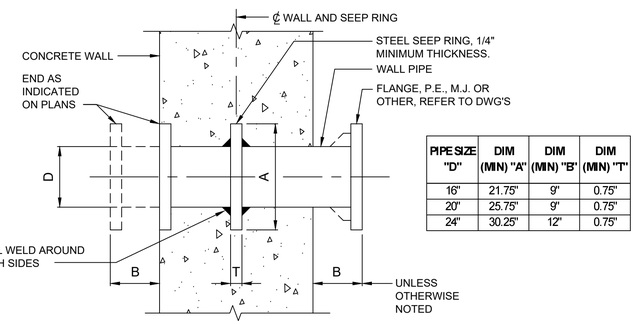
PIPE DIA (IN)	'A'	'B'	'C'	'D'	'E'	
					MIN	MAX
2 1/2	2 1/2	3 1/2	9	1 1/2	8	13
3	2 1/2	3 3/4	9	1 1/2	8 1/4	13 1/4
4	3	4 1/4	9	2 1/2	9 1/4	14
6	3	5 1/2	9	2 1/2	10 1/2	15 1/4



1 | PIPE SUPPORT — NOT TO SCALE



2 | WALL OR SLAB PENETRATION — NOT TO SCALE

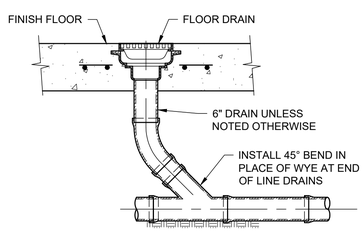


PIPE SIZE "D"	DIM (MIN) "A"	DIM (MIN) "B"	DIM (MIN) "T"
16"	21.75"	9"	0.75"
20"	25.75"	9"	0.75"
24"	30.25"	12"	0.75"

3 | CAST IN PLACE PIPE — NOT TO SCALE

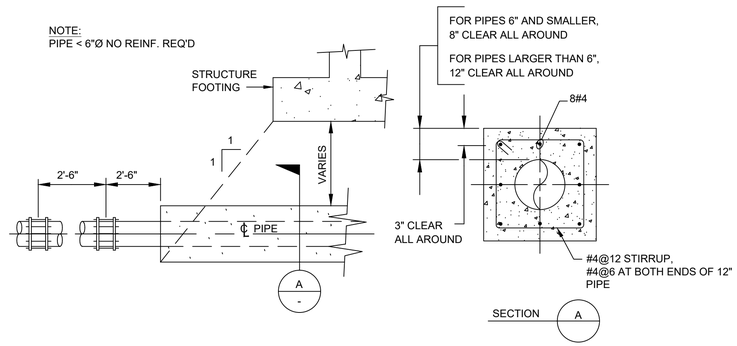
FLOOR DRAIN NOTES

1. FLOOR DRAINS USED ON GROUND FLOOR WHERE A CONCRETE SLAB IS USED OVER GRADE SHALL HAVE AN INSIDE CAULK OUTLET.
2. FLOOR DRAINS SHALL BE ROUND, 8-INCH HEAVY DUTY CAST-IRON GRATE, WITH A SOLID FREE STANDING SEDIMENT BUCKET.
3. SEE PLANS FOR DRAIN LINE SIZE AND TYPE. PROVIDE SUITABLE CONNECTION FROM FLOOR DRAIN OUTLET TO DRAIN LINE.

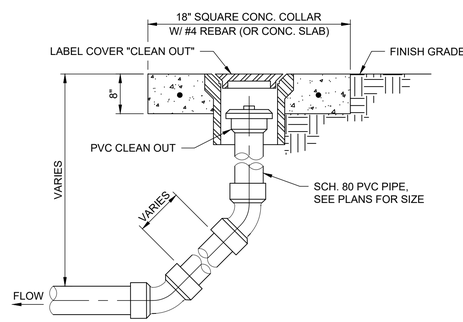


4 | FLOOR DRAIN — NOT TO SCALE

NOTE:
PIPE < 6"Ø NO REINF. REQ'D



5 | PIPE ENCASEMENT DETAIL — SCALE: NTS



6 | CLEAN OUT DETAIL — NOT TO SCALE

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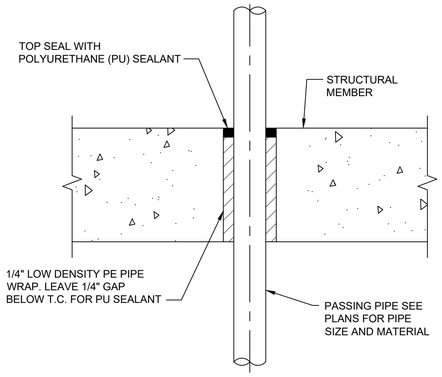
REGISTERED PROFESSIONAL ENGINEER — AMANDA C. FARRAR — No. RCE 91161 — CIVIL — STATE OF CALIFORNIA

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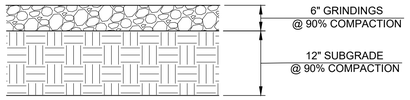
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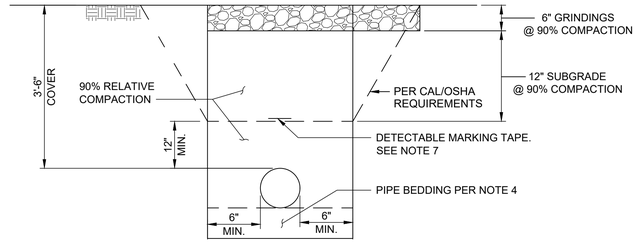
1 | 2-INCH & LESS PIPE DIA. SLAB PENETRATION

– NOT TO SCALE



2 | YARD SURFACING

– NOT TO SCALE

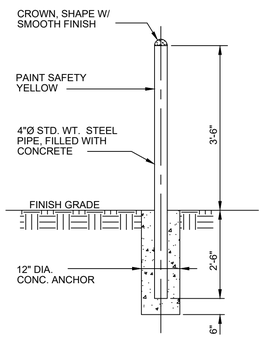


NOTES:

1. ACCOMPLISH COMPACTION IN 8" LIFTS MAXIMUM.
2. NO JETTING SHALL BE ALLOWED FOR COMPACTION.
3. SECTION SHOWS A SINGLE PIPE. IF TWO PIPES ARE IN THE TRENCH, PROVIDE ONE FOOT OF SEPARATION BETWEEN PIPES.
4. IMPORTED SAND AND BACKFILL MATERIAL. MINIMUM SAND EQUIVALENT = 30
5. MINIMUM COVER OVER PIPE SHALL BE 3'-6"
6. MAINTAIN POSITIVE UPHILL SLOPE TO AVOID HIGH POINTS.
7. DETECTABLE MARKING TAPE SHALL BE SEATON STYLE SP 367, OR EQUAL.

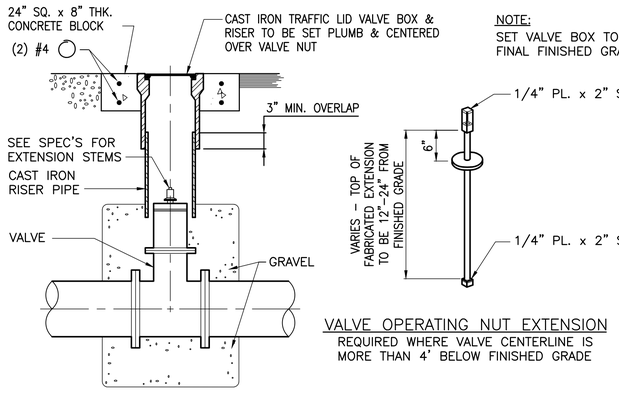
3 | TYPICAL WATER LINE TRENCH

– NOT TO SCALE



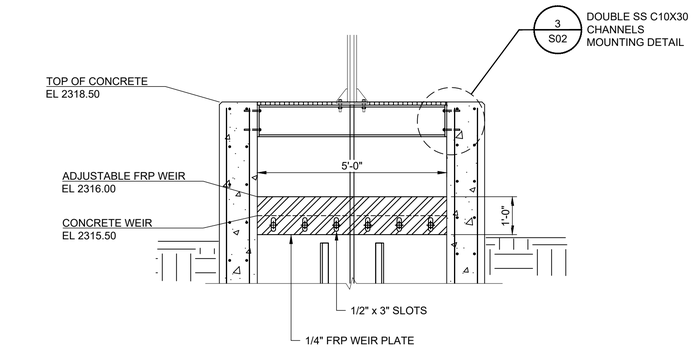
4 | BOLLARD DETAIL

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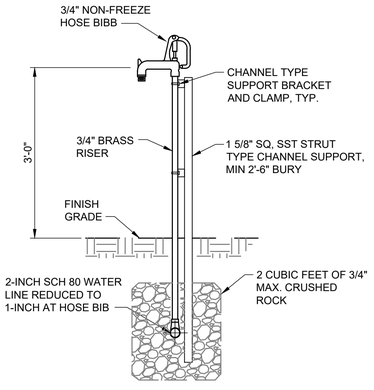
5 | VALVE BOX AND STEM EXTENSION

– NOT TO SCALE



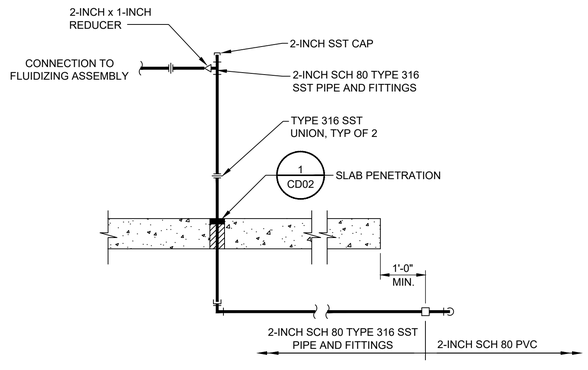
6 | WEIR PLATE DETAIL

– NOT TO SCALE



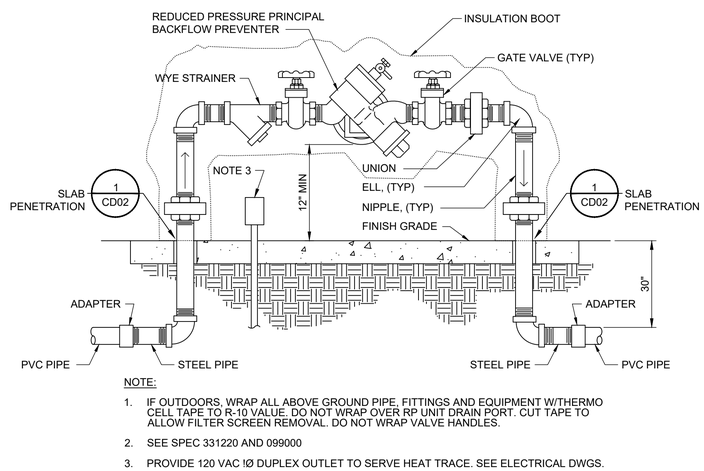
7 | HOSE BIBB DETAIL

NOT TO SCALE



8 | GRIT REMOVAL TANK FLUSH CONNECTION

- NOT TO SCALE



NOTE:

1. IF OUTDOORS, WRAP ALL ABOVE GROUND PIPE, FITTINGS AND EQUIPMENT W/THERMO CELL TAPE TO R-10 VALUE. DO NOT WRAP OVER RP UNIT DRAIN PORT. CUT TAPE TO ALLOW FILTER SCREEN REMOVAL. DO NOT WRAP VALVE HANDLES.
2. SEE SPEC 331220 AND 099000
3. PROVIDE 120 VAC 1Ø DUPLEX OUTLET TO SERVE HEAT TRACE. SEE ELECTRICAL DWGS.

9 | REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTER

- NOT TO SCALE

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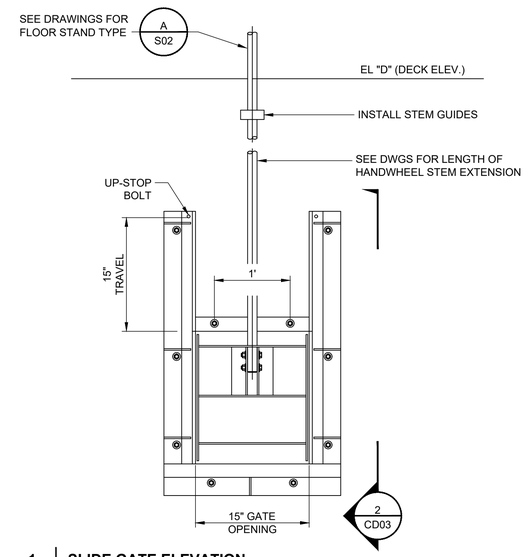
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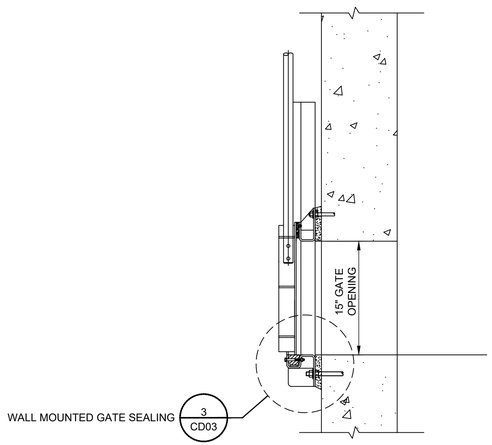
CIVIL DETAILS - 2

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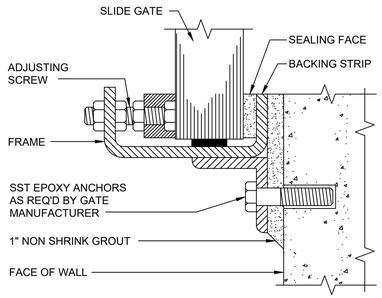
1 SLIDE GATE ELEVATION

NOT TO SCALE



2 SLIDE GATE SECTION

NOT TO SCALE



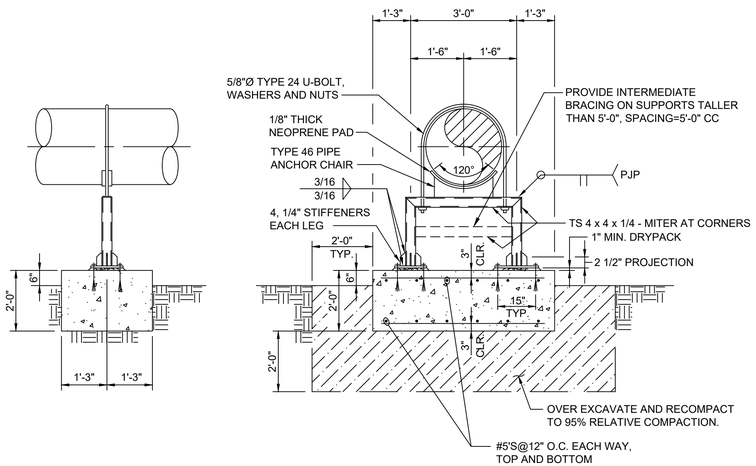
3 WALL MOUNTED GATE SEALING

NOT TO SCALE

SLIDE GATE NOTES:

1. SLIDE GATE SHALL BE THIMBLE-MOUNTED. WALL THIMBLE OPENING SIZE AND LENGTH SHALL BE AS SHOWN ON THE DRAWINGS. WALL THIMBLE SHALL BE SUPPLIED BY THE SLIDE GATE MANUFACTURER.
2. BOLT OPENINGS AND STEM GUIDE OPENINGS ARE ON HOLD AND SHALL BE UPDATED BASED ON THE APPROVED MANUFACTURER SUBMITTALS.
3. CONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS AND EXISTING CONDITIONS PRIOR TO FABRICATION AND INSTALLATION.
4. ALL ANCHOR BOLTS, FASTENERS, AND MOUNTING HARDWARE SHALL BE STAINLESS STEEL UNLESS NOTED OTHERWISE.
5. INSTALL SLIDE GATE, WALL THIMBLE, STEM GUIDES, AND OPERATING EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL COORDINATE REQUIRED OPENINGS, EMBEDMENTS, AND INSTALLATION REQUIREMENTS WITH APPROVED SHOP DRAWINGS PRIOR TO CONCRETE WORK.
7. PROVIDE NON-SHRINK GROUT AT WALL THIMBLE INSTALLATION AS REQUIRED.
8. ALL DIMENSIONS SHALL BE VERIFIED WITH APPROVED MANUFACTURER SUBMITTALS PRIOR TO INSTALLATION.

4 SLIDE GATE NOTES



PIPE SUPPORT NOTES:

1. PLACE 1/8" THICK NEOPRENE PAD UNDER PIPE AT SUPPORT (TYP.)
2. SEE PLANS FOR PIPE SIZE, TYPE, AND ELEVATION.
3. ALL PIPES TO BE SUPPORTED WITH PIPE CHAIR ANCHORS.
4. ALL PIPE SUPPORTS TO BE COMPLETELY WELDED. GRIND ALL WELDS SMOOTH PRIOR TO COATING.
5. COAT PIPE SUPPORT WITH THE SAME COATING SYSTEM AS THE PIPING. COLOR SHALL MATCH THE COLOR OF THE PIPE.

5 SADDLE PIPE SUPPORT

NOT TO SCALE

CLIENT

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

PROJECT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

APPROVED BY
RCSD BOARD OF DIRECTORS

PRESIDENT, BOARD OF DIRECTORS — DATE

RECOMMENDED FOR APPROVAL

GENERAL MANAGER — DATE

AECOM
5001 E. Commercenter Dr. Suite 100
Bakersfield, CA 93309
661.283.2323 tel
www.aecom.com

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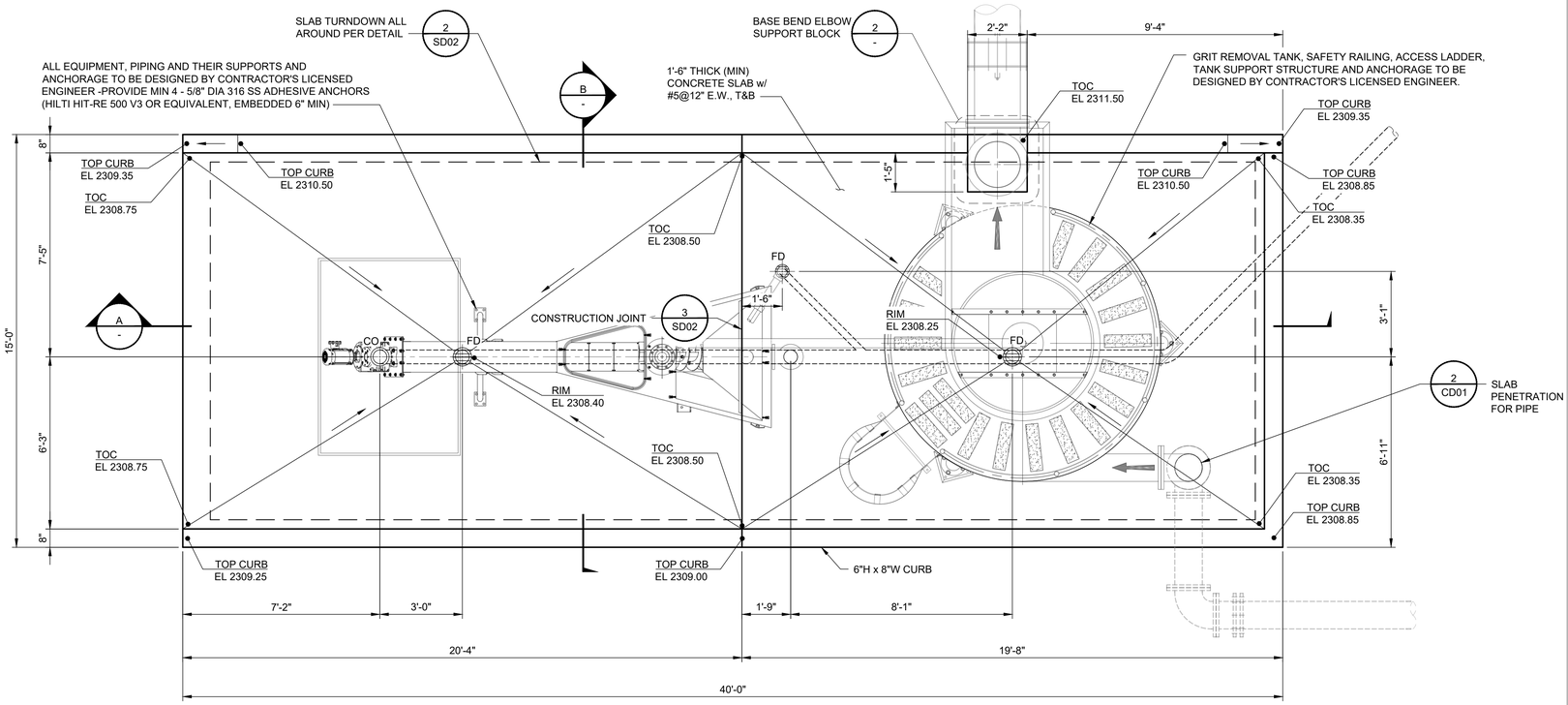
REGISTERED PROFESSIONAL ENGINEER
AMANDA C. PARAMO
No. RCE 91161
CIVIL
STATE OF CALIFORNIA

DATE	REV	DESCRIPTION
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9-1-26	B	ISSUED FOR BID

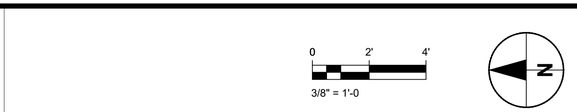
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DESIGNED BY PM
DRAWN BY DG
CHECKED BY WB
JOB NO. 60730277
SHEET NO. CD03
PAGE 14 OF 30
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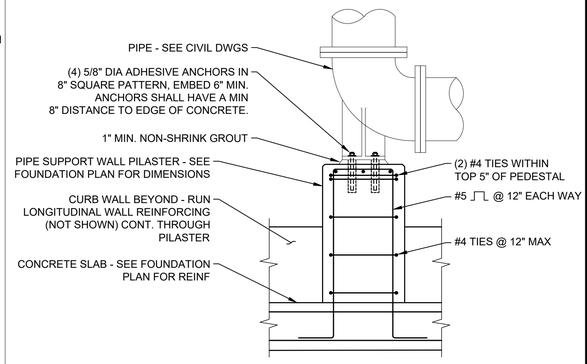
CIVIL DETAILS - 3

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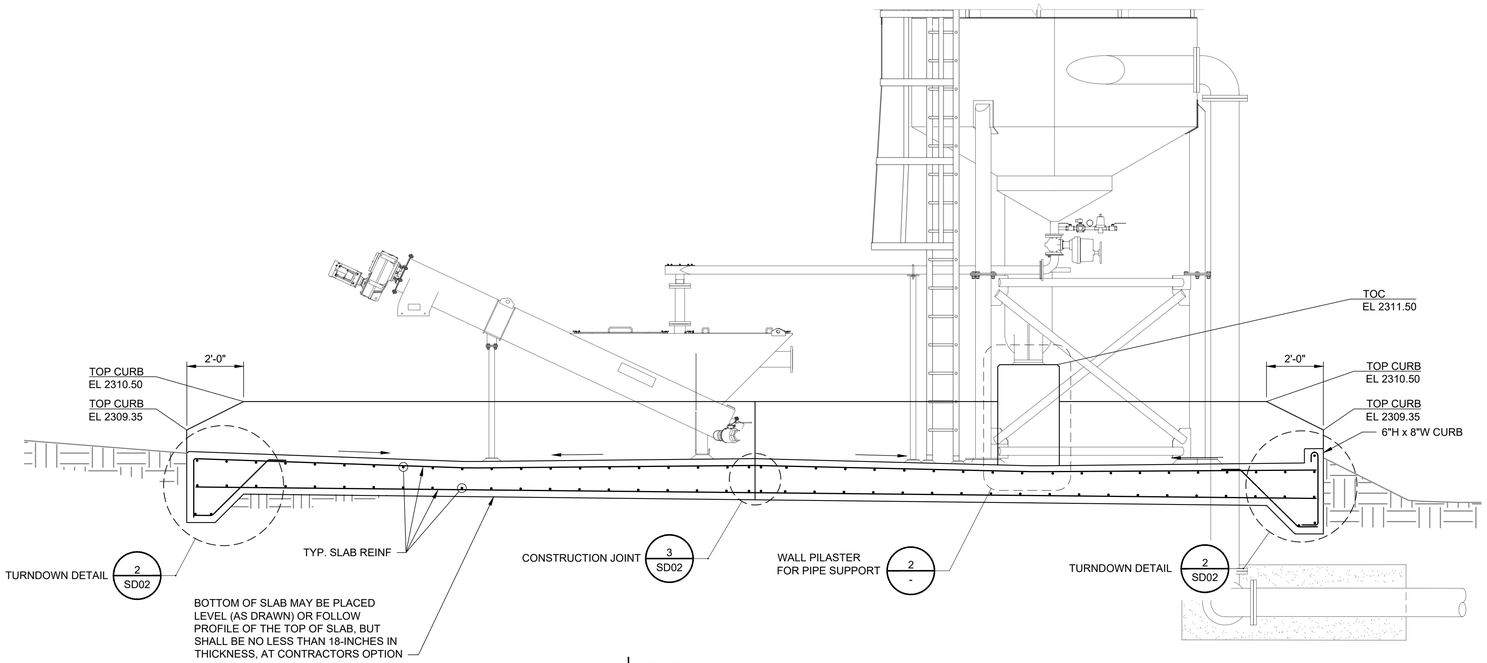


1 | STRUCTURAL PLAN
- | Scale 3/8" = 1'-0"

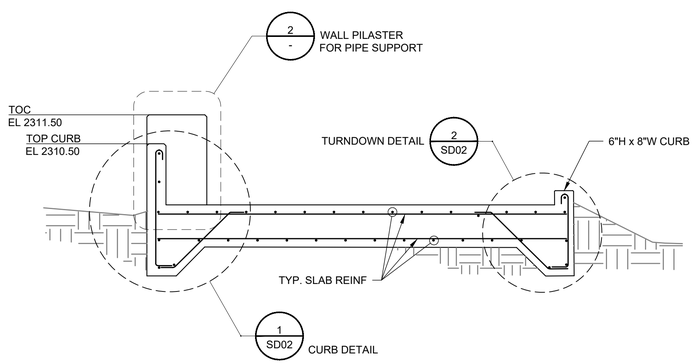




2 | PIPE SUPPORT AND WALL PILASTER
- | Scale 1/2" = 1'-0"



A | SECTION
- | Scale 3/8" = 1'-0"



B | SECTION
- | Scale 3/8" = 1'-0"

CLIENT

Rosamond Community Services District

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3179 35TH STREET WEST
ROSAMOND, CA 93560

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5001 E. Commercenter Dr. Suite 100
Bakersfield, CA 93309
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www.aecom.com

CONSULTANT STAMP

REGISTERED PROFESSIONAL ENGINEER
DAVID A. RANEY
No. 3945
STRUCTURAL
STATE OF CALIFORNIA

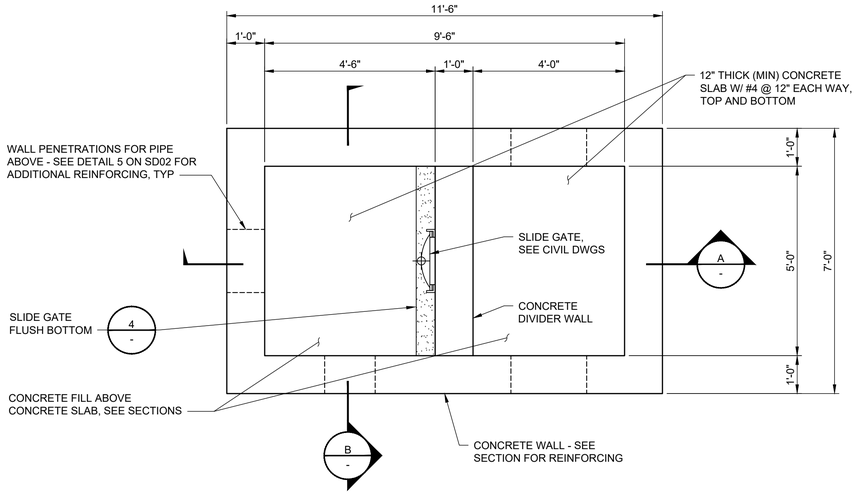
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DATE 5/18/2026
DESIGNED BY TN
DRAWN BY DG
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JOB NO. 60730277

SHEET NO. **S01**
PAGE 15 OF 30
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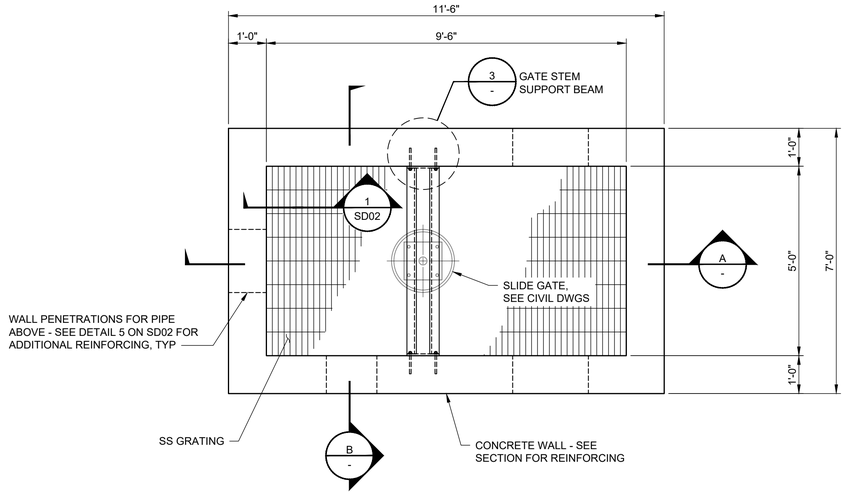
GRIT SYSTEM FOUNDATION PLAN AND SECTIONS

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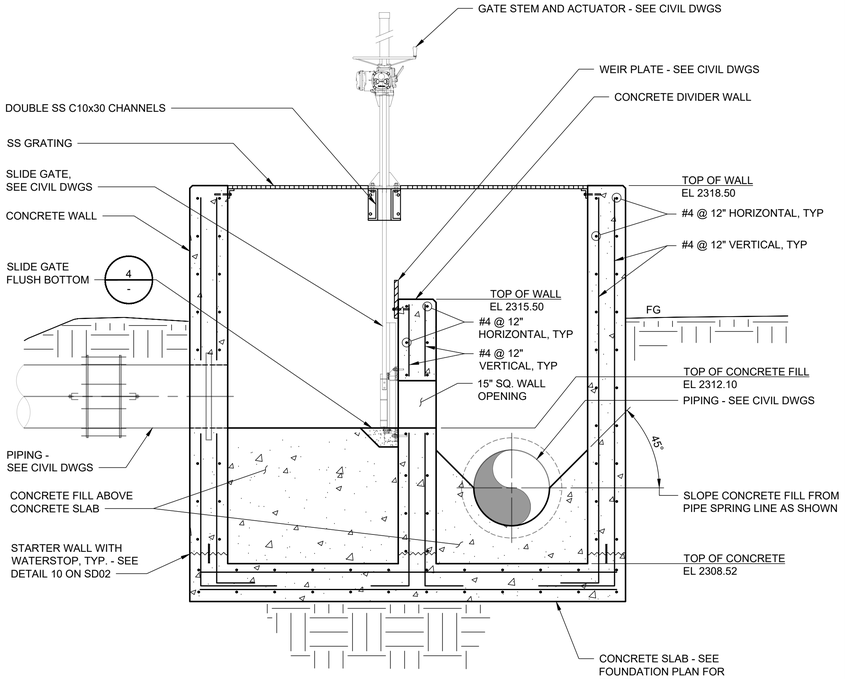
1 | SPLITTER BOX FOUNDATION PLAN

Scale 1/2" = 1'-0"



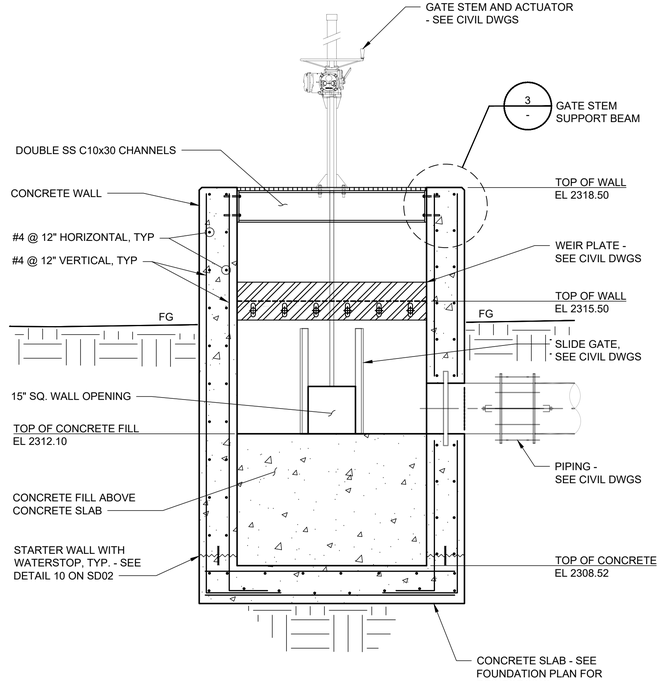
2 | SPLITTER BOX TOP PLAN

Scale 1/2" = 1'-0"



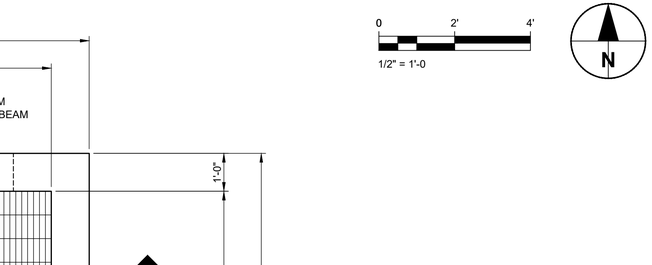
A | SECTION

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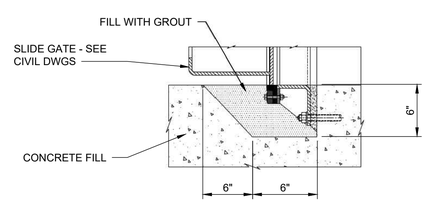
B | SECTION

Scale 1/2" = 1'-0"



3 | GATE STEM SUPPORT BEAM

Scale 1" = 1'-0"



4 | SLIDE GATE FLUSH BOTTOM

NOT TO SCALE

0 2' 4'

1/2" = 1'-0

N

CLIENT

Rosamond Community Services District

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

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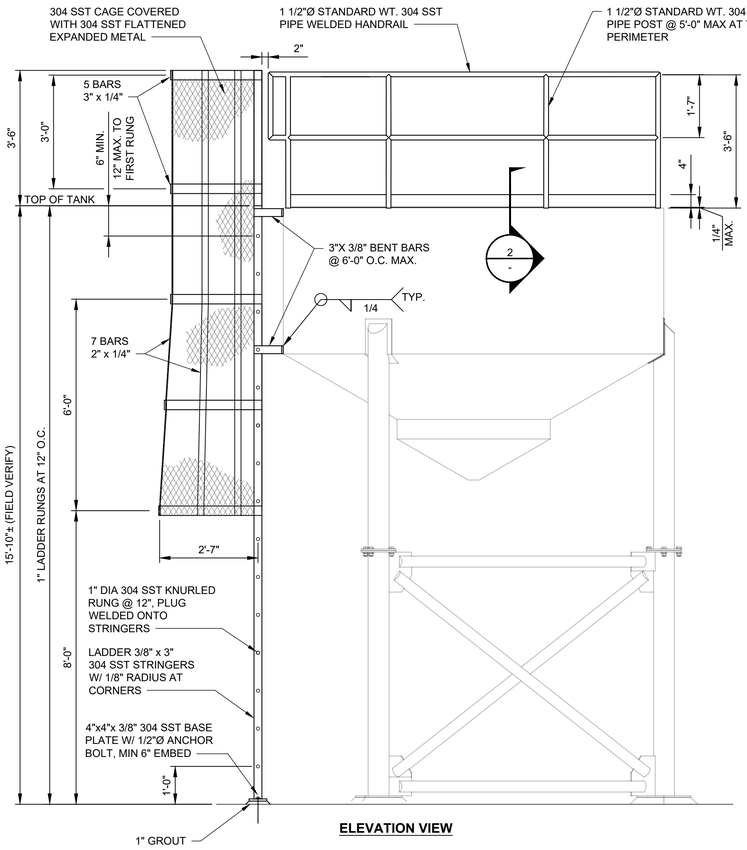
REGISTERED PROFESSIONAL ENGINEER
DAVID A. KARP
No. 3945
STRUCTURAL
STATE OF CALIFORNIA

DATE	REV	DESCRIPTION
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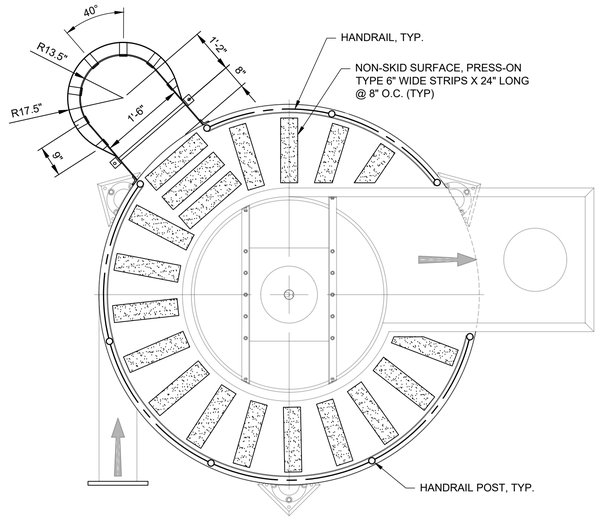
DATE 5/18/2026
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SHEET NO. S02
PAGE 16 OF 30
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SPLITTER BOX FOUNDATION PLAN, TOP PLAN, AND SECTIONS

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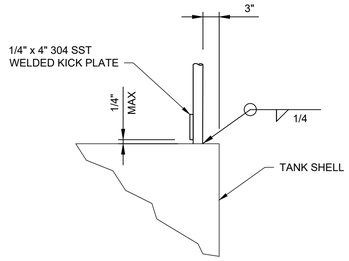


ELEVATION VIEW



PLAN VIEW

1 | TANK LADDER, HANDRAIL, AND SAFETY CAGE DETAIL
-
Scale 1/2" = 1'-0"



2 | GUARDRAIL POST CONNECTION
-
NOT TO SCALE

0 2' 4'
1/2" = 1'-0

CLIENT

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ROSAMOND, CA 93560

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GRIT REMOVAL TANK LADDER, HANDRAIL, AND SAFETY CAGE

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GENERAL STRUCTURAL NOTES

THESE NOTES SHALL APPLY UNLESS SHOWN/INDICATED OTHERWISE ELSEWHERE ON THE STRUCTURAL DRAWINGS.

GENERAL

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO ACI 301-20 AND THE AISC MANUAL OF STEEL CONSTRUCTION. ALL ASTM DESIGNATIONS REFERRED TO ON THESE DRAWINGS SHALL BE THE LATEST ADOPTED OR REVISED SPECIFICATION, AS OF THE DATE OF THESE DRAWINGS. WHERE CONFLICTS BETWEEN THESE STANDARDS AND THE PROJECT SPECIFICATIONS OCCUR, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN.
2. THE DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE DRAWINGS OF ALL OTHER DISCIPLINES AND SPECIFICATIONS THAT ARE A PART OF THIS PROJECT. NO PORTION OF WORK, INCLUDING SHOP DRAWING DEVELOPMENT, SHALL BE PERFORMED WITHOUT CONSIDERING REQUIREMENTS OF CONTRACT DOCUMENTS IN THEIR ENTIRETY.
3. NEITHER THE OWNER NOR THE STRUCTURAL ENGINEER WILL ENFORCE SAFETY MEASURES OR REGULATIONS. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, DESIGN, CONSTRUCT AND MAINTAIN ALL SAFETY DEVICES, INCLUDING FORMWORK, SHORING, AND BRACING OF ALL TEMPORARY CONSTRUCTION (CONTRACTOR MEANS AND METHODS), AND SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS AND REGULATIONS. SITE OBSERVATION VISITS BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE SAFETY ITEMS. IF A LAWSUIT IS FILED BY ONE OF THE CONTRACTOR'S OR SUBCONTRACTOR'S EMPLOYEES, OR ANY ONE ELSE, BY ACCEPTING THIS CONSTRUCTION CONTRACT, CONTRACTOR AGREES TO INDEMNIFY, DEFEND AND HOLD THE OWNER AND AECOM, THEIR PARENT AND SUBSIDIARY COMPANIES HARMLESS OF ANY AND ALL SUCH CLAIMS.
4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL CONSTRUCTION IN-PROGRESS (WALLS, ETC.) IS ADEQUATELY BRACED AND SHORED DURING CONSTRUCTION. ALL FORMWORK, SHORING, AND BRACING (CONTRACTOR'S MEANS AND METHODS) SHALL BE DESIGNED BY A REGISTERED ENGINEER HIRED BY THE CONTRACTOR. NO BACKFILL OR LOADING OF CONCRETE WALLS SHALL OCCUR UNTIL CONCRETE HAS REACHED ITS 28-DAY COMPRESSIVE STRENGTH.
5. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE STARTING WORK. SHOULD CONDITIONS EXIST WHICH ARE CONTRARY TO THOSE SHOWN ON PLANS, THE ENGINEER SHALL BE NOTIFIED IN WRITING BEFORE PROCEEDING WITH WORK.
6. UNLESS DETAILED, SPECIFIED, OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND THESE GENERAL NOTES. TYPICAL DETAILS ARE MEANT TO APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS WHERE THEY OCCUR.
7. THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE CONTRACTOR'S MEANS AND METHODS TO ACCOMPLISH THE CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE, WORKERS AND PEDESTRIANS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, TEMPORARY STRUCTURES, AND PARTIALLY COMPLETED WORK, ETC. OBSERVATION VISITS TO THE SITE BY THE ENGINEER SHALL NOT BE CONSIDERED AS INSPECTION OF SUCH ITEMS.
8. DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON DRAWINGS.
9. ALL WORK SHALL CONFORM TO THE PLANS AND SPECIFICATIONS IN ALL RESPECTS AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.
10. SOIL DESIGN DESIGN VALUES ARE BASED UPON SOIL PROFILE FOR SAND (SW/SP/SM/SC/GM/GC) FROM TABLE 1806.2 OF THE CBC ASSUMING UNDISTRUBED NATIVE SOIL. THE SOIL PROFILE TYPE SHOULD BE VERIFIED BY A GEOTECHNICAL ENGINEER AS WELL AS WHETHER THE SOIL IS UNDISTURBED NATIVE. EARTH LOADING VALUES ARE BASED UPON LOADING VALVES PROVIDED IN ASCE 7-22, TABLE 3.2-1, ASSUMING SATURATED SOILS.
11. CONTRACTOR SHALL VERIFY LOCATION OF ALL SITE UTILITIES PRIOR TO STARTING WORK, BOTH ABOVE GROUND AND BELOW GROUND, WHICH MAY BE IMPACTED BY THE WORK SHOWN ON THESE DRAWINGS. ANY CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
12. ALL ITEMS SHOWN ON THESE PLANS ARE NEW UNLESS NOTED (E), EXIST. OR EXISTING.

REINFORCING STEEL

1. REINFORCEMENT FOR CONCRETE SHALL BE DEFORMED BARS CONFORMING TO ASTM SPECIFICATION A615 (A706/A706M FOR WELDED REINFORCING). GRADE 60 STEEL SHALL BE USED EXCEPT THAT #3 BARS AND SMALLER MAY BE GRADE 40 STEEL.
2. WIRE MESH SHALL CONFORM TO ASTM A1064. LAP 12" WHERE SPLICED.
3. ALL REINFORCEMENT, ANCHOR BOLTS, AND OTHER ANCHORAGES PLACED IN CONCRETE SHALL BE ACCURATELY PLACED AND POSITIVELY SECURED AND SUPPORTED BY CONCRETE BLOCKS, METAL CHAIRS, SPACERS, OR METAL HANGERS, AND SHALL BE IN POSITION BEFORE CONCRETE PLACING OR GROUTING IS BEGUN. DETAILING AND PLACING OF BARS SHALL CONFORM TO THE ACI MANUAL OF STANDARD PRACTICES.
4. BARS SPECIFIED AS "CONTINUOUS" SHALL EXTEND THE FULL LENGTH OF THE MEMBER CONTAINING THEM AND MAY BE SPLICED (UNLESS NOTED OR SHOWN WITHOUT SPLICES ON THE PLANS). IN MASONRY, PROVIDE LAPS PER DETAIL 4 ON DRAWING SD02. STAGGER ALL SPLICES.
5. DOWELS SHALL BE PROVIDED AT ALL POUR JOINTS AND SHALL BE THE SAME SIZE AND SPACING AS REINFORCING DIRECTLY BEYOND POUR JOINTS.
6. ALL REINFORCING BAR BENDS SHALL BE MADE COLD, UNLESS OTHERWISE PERMITTED BY THE ENGINEER. REBENDING OF BARS IS NOT PERMITTED.
7. WELDING OF REINFORCING STEEL, METAL INSERTS AND CONNECTIONS IN REINFORCED CONCRETE CONSTRUCTION SHALL CONFORM TO ANSI/AWS D1.4-11. USE LOW HYDROGEN E-70 SERIES ELECTRODES FOR WELDING OF REINFORCING BARS. CONTINUOUS INSPECTION IS REQUIRED OF ALL FIELD WELDING IN ACCORDANCE WITH AWS D1.1.
8. THE SPECIFIED DIMENSIONS OF THE VERTICAL LEGS OF "L" DOWELS, WHOSE HORIZONTAL LEGS ARE CAST INTO A FOOTING OR SLAB CAST ON TOP OF EARTH, ARE BASED UPON THE SLAB THICKNESS AS SHOWN ON THE DRAWINGS. IF A SLAB IS POURED THICKER THAN SHOWN ON THE DRAWINGS, SUCH AS FOR THE SUBGRADE OCCURRING AT A LOWER ELEVATION THAN SHOWN, THE VERTICAL LEGS MUST BE FABRICATED TO A LONGER LENGTH OR THE HORIZONTAL TAILS MUST BE SUPPORTED ABOVE SUBGRADE HIGH ENOUGH TO PROVIDE THE SAME AMOUNT OF LAP LENGTH BETWEEN THE DOWEL AND THE WALL VERTICAL REINFORCING.
9. CONDUIT AND PIPING SHALL BE FABRICATED AND INSTALLED SO THAT CUTTING, BENDING, OR DISPLACEMENT OF REINFORCEMENT FROM ITS SPECIFIED LOCATION WILL NOT BE REQUIRED. (REF. ACI 318-14, SECTION 26.8.2).

CONCRETE

1. AGGREGATES FOR CONCRETE SHALL CONFORM TO ASTM C33. CONCRETE f'c AT 28 DAYS SHALL BE AS NOTED BELOW. REQUIRED AVERAGE COMPRESSIVE STRENGTH (f'cr) SHALL BE IN ACCORDANCE WITH ACI 301-16, ARTICLE 4.2.3.

CONCRETE SCHEDULE		
ITEMS	28 DAY COMPRESSIVE CYLINDER STRENGTH	
	2500 PSI	4000 PSI
ALL CONCRETE, U.N.O.		X

2. CEMENT FOR CONCRETE SHALL BE TYPE II PORTLAND CEMENT CONFORMING TO ASTM C150, WITH ASTM C150 TABLE 2 OPTIONAL REQUIREMENTS.
3. READY MIXED CONCRETE SHALL CONFORM TO ASTM C94.
4. CONCRETE COVER FOR REINFORCING BARS SHALL BE:
   CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3"
   EXPOSED TO EARTH OR WEATHER: = 2"
5. DRYPACK SHALL BE 1 PART CEMENT AND 3 PARTS SAND (BY VOLUME).
6. NO PIPES OR DUCTS SHALL BE PLACED IN STRUCTURAL CONCRETE UNLESS SPECIFICALLY DETAILED. SEE MECHANICAL AND/OR ELECTRICAL DRAWINGS FOR LOCATION OF SLEEVES THROUGH WALLS AND FLOORS.
7. REFER TO DRAWING DETAILS FOR ALL MOLDS, GROOVES, CLIPS, GROUNDS, ORNAMENTS AND OTHER INSERTS TO BE CAST IN CONCRETE.
8. THE LOCATION OF ALL CONSTRUCTION JOINTS NOT SPECIFICALLY NOTED OR SHOWN SHALL BE APPROVED BY THE STRUCTURAL ENGINEER.
9. "ROUGHENED SURFACES", WHERE SPECIFIED ON THE DRAWINGS, SHALL BE MECHANICALLY ROUGHENED SUCH THAT A 1/4"± AMPLITUDE IS ACHIEVED BETWEEN HIGH AND LOW SPOTS OF THE ROUGHENED SURFACE. THE SURFACE SHALL BE CLEAN AND FREE OF LAITANCE.
10. ALL SLABS SHALL HAVE A TROWEL FINISH EXCEPT AS NOTED ON THE DRAWINGS.
11. PROVIDE 3/4" CHAMFER AT ALL EXPOSED (I.E., NOT BURIED OR CONCEALED FROM VIEW OR ACCESS) CONCRETE EDGES AND CORNERS REGARDLESS OF WHETHER OR NOT SHOWN AS SUCH ON THE DRAWINGS.
12. FOR CONSTRUCTION BELOW GRADE AND IN AREAS IN CONTACT WITH LIQUIDS, ALL HOLES AND FORM TIE HOLES SHALL BE SEALED WITH A PLUG AND FILLED WITH AN APPROVED WATERPROOF EPOXY GROUT OR NON-SHRINK GROUT, UNO. HOLES SHALL BE ROUGHENED AND PLUGGED AFTER THE REMOVAL OF ALL FORM CLAMPS, BOLTS AND OTHER HARDWARE.

STAINLESS STEEL

1. STAINLESS STEEL BOLTS SHALL CONFORM TO ASTM F593, LATEST REVISION TYPE 316, UNO. STAINLESS STEEL NUTS SHALL CONFORM TO ASTM F594, TYPE 316. STAINLESS STEEL FOR WASHERS SHALL BE TYPE 316.
2. STAINLESS STEEL PLATES, BARS, AND STUDS SHALL CONFORM TO ASTM A666, LATEST REVISION. PROVIDE TYPE 316 STAINLESS STEEL (316L WHEN WELDING IS REQUIRED) UNLESS NOTED OTHERWISE. MINIMUM YIELD STRENGTH SHALL BE 30 KSI.
3. STAINLESS STEEL STRUCTURE SHAPES SHALL CONFORM TO ASTM A276, LATEST REVISION, TYPE 316 (304L WHEN WELDING IS REQUIRED). MINIMUM YIELD STRENGTH SHALL BE 30 KSI.
4. STAINLESS STEEL PIPES SHALL CONFORM TO ASTM A312, LATEST REVISION, TYPE 304 (304L WHEN WELDING IS REQUIRED).

DESIGN CRITERIA

DESIGN CODES AND REFERENCES (WHERE CONFLICTS OCCUR, THE MOST STRINGENT SHALL APPLY):

ASCE 7-22
ACI 350-20

LIVE LOADS:
GRATING LIVE LOAD: 100 PSF

SOIL DESIGN PARAMETERS:

MODULUS OF SUBGRADE REACTION (ASSUMED)	=	100 PCI
ALLOWABLE BEARING PRESSURE	=	1500 PSF
AT-REST LATERAL EARTH PRESSURE	=	100 PSF/FT

ADHESIVE ANCHORS AND DOWELS

1. ADHESIVE FOR ANCHORS AND DOWELS SHALL BE HILTI "HIT-RE 500 V3" AS MANUFACTURED BY HILTI, INC.
2. ADHESIVE ANCHORS AND DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH ICC EVALUATION REPORT NO. 3814 FOR CONCRETE.
3. SPECIAL INSPECTION PER MANUFACTURERS INSTRUCTIONS SHALL BE PROVIDED DURING INSTALLATION.
4. AN ALTERNATIVE ADHESIVE ANCHOR PRODUCT MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL, PROVIDED THAT IT HAS A CURRENT ICC EVALUATION REPORT APPROVAL.
5. ALL ABANDONED HOLES SHALL BE FILLED WITH A DRYPACK GROUT WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 5,000 PSI. THE FILLED HOLE(S) SHALL BE PREPARED AND CLEANED AS REQUIRED BY THE GROUT MANUFACTURER.
6. LOCATE EXISTING REINFORCING USING A NON-DESTRUCTIVE METHOD (PACHOMETER OR OTHER), PRIOR TO DRILLING HOLES FOR ANCHORS. MAINTAIN A MINIMUM CLEARANCE OF 1" BETWEEN THE REINFORCEMENT AND THE ANCHOR.
7. STAINLESS STEEL ANCHOR RODS SHALL CONFORM TO ASTM F593, TYPE 316, UNLESS NOTED OTHERWISE.

CLIENT

RCSD Rosamond Community Services District

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

PROJECT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

APPROVED BY
RCSD BOARD OF DIRECTORS

PRESIDENT, BOARD OF DIRECTORS — DATE

RECOMMENDED FOR APPROVAL

GENERAL MANAGER — DATE

AECOM
5001 E. Commercenter Dr. Suite 100
Bakersfield, CA 93309
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www.aecom.com

CONSULTANT STAMP

REGISTERED PROFESSIONAL ENGINEER
DAVID A. RANEY
No. 3945
STRUCTURAL
STATE OF CALIFORNIA

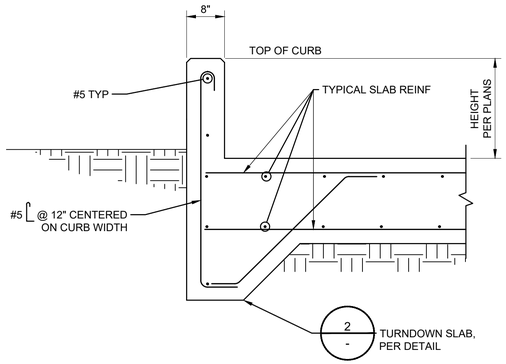
DATE	REV	DESCRIPTION
6-15-26	A	ISSUED FOR 90% REVIEW
9-1-26	B	ISSUED FOR BID

DATE 5/18/2026
DESIGNED BY TN
DRAWN BY DG
CHECKED BY DAK
JOB NO. 60730277

SHEET NO. SD01
PAGE 18 OF 30
DRAWING FILE 60730277_SD01.dwg

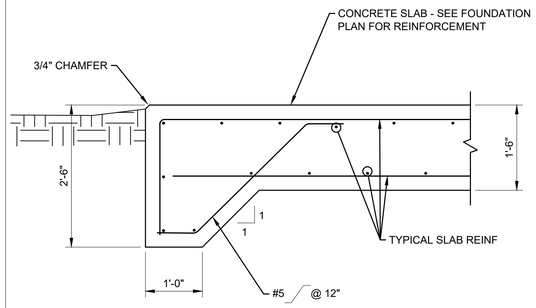
STRUCTURAL GENERAL NOTES AND DESIGN CRITERIA

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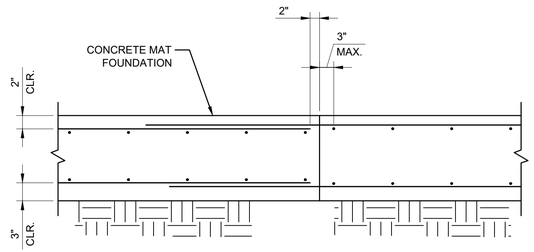
1 TYPICAL CURB DETAIL

Scale 3/4" = 1'-0"



2 TYPICAL TURNDOWN DETAIL

Scale 3/4" = 1'-0"



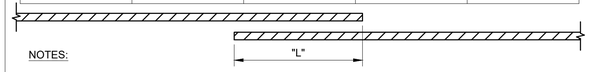
NOTE: FOR LAP SPLICE LENGTHS, SEE DETAIL 4

3 TYPICAL CONSTRUCTION JOINT

Scale 3/4" = 1'-0"

CONCRETE REINFORCING LAP SPLICE SCHEDULE

BAR	f'c = 2500	f'c = 3000	f'c = 4000	f'c = 4500
	L (inches)	L (inches)	L (inches)	L (inches)
3	24	22	19	18
4	32	29	25	24
5	39	36	31	30
6	47	43	37	35
7	69	63	54	51
8	78	72	62	59
9	88	81	70	66

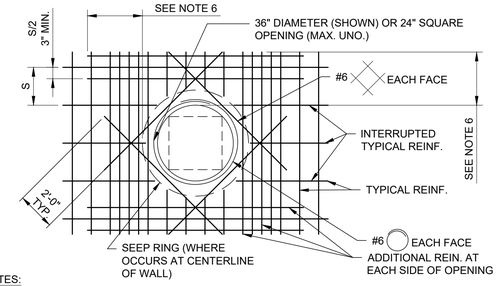


NOTES:

1. LAPS SHOWN IN THIS TABLE ARE CLASS B, CATEGORY 3 TYPE SPLICES. LAP LENGTH IS BASED UPON SMALLER OF TWO BARS BEING SPLICED WHEN NOT THE SAME SIZE.
2. INCREASE LAP LENGTHS BY A FACTOR OF 1.3 FOR HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THIS REINFORCEMENT

4 CONCRETE LAP SPLICE SCHEDULE

Scale: NOT TO SCALE

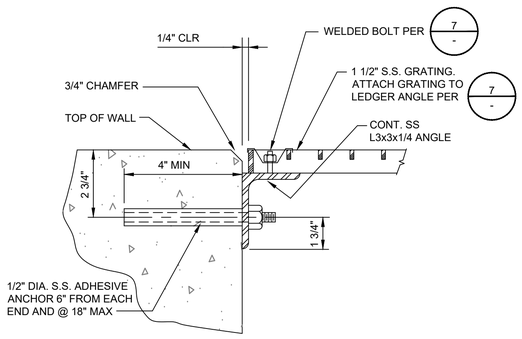


NOTES:

1. NUMBER OF ADDITIONAL REINFORCING BARS ON EACH SIDE OF OPENING SHALL BE EQUAL TO HALF OF THE NUMBER OF INTERRUPTED BARS IN EACH LAYER OF REINFORCING.
2. SIZE OF ADDITIONAL BARS SHALL MATCH THE SIZE OF INTERRUPTED REINFORCING BARS.
3. PROVIDE STANDARD HOOKS ON BARS IF LAP LENGTH EXTENSION CANNOT BE OBTAINED.
4. PLACE ADDITIONAL BARS IN SAME PLANE AS INTERRUPTED REINFORCING. PLACE #6 INSIDE OF PANE OF INTERRUPTED AND ADDITIONAL REINFORCING.
5. ALL REINFORCING SHALL CLEAR EDGE OF OPENING, PIPE OR FLANGE COLLARS BY 2".
6. EXTEND ADDED BARS PAST EDGE OF OPENING A DISTANCE EQUAL TO THE OPENING DIAMETER OR 48 BAR DIAMETERS, WHICHEVER IS GREATER.
7. WHERE SPECIFIED LENGTHS CANNOT BE ACHIEVED, BEND REINFORCING AND PROVIDE A STANDARD 90° BEND OR 180° HOOK.

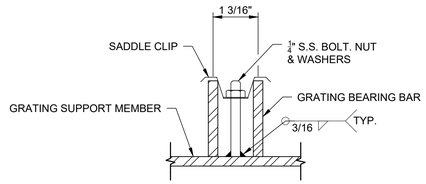
5 TYPICAL REINF AT WALL & STRUCT SLAB OPGS

Scale 6" = 1'-0"



6 TYPICAL GRATING LEDGER ANGLE

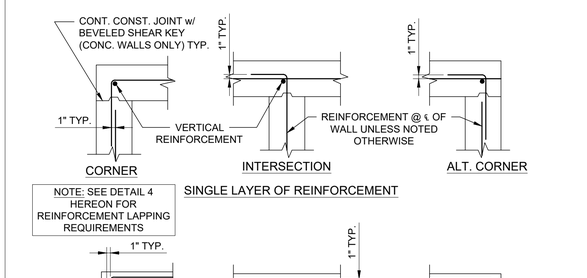
Scale 3" = 1'-0"



NOTE:
PROVIDE 4 CLIPS PER GRATING PANEL APPROXIMATELY 4" FROM PANEL CORNERS. MAXIMUM CLIP SPACING AT 36" O.C.

7 TYPICAL GRATING CLIP

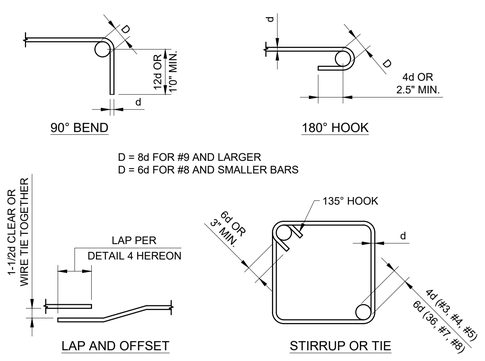
Scale 6" = 1'-0"



DOUBLE LAYER OF REINFORCEMENT

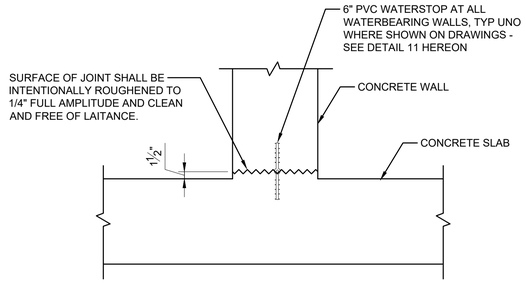
8 TYPICAL WALL & FOOTING REINF AT CORNERS AND INTERSECTIONS

Scale NOT TO SCALE



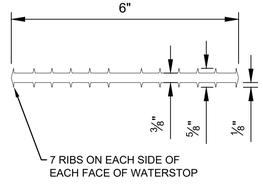
9 BAR BENDS

Scale 6" = 1'-0"



10 STARTER WALL

Scale 3/4" = 1'-0"

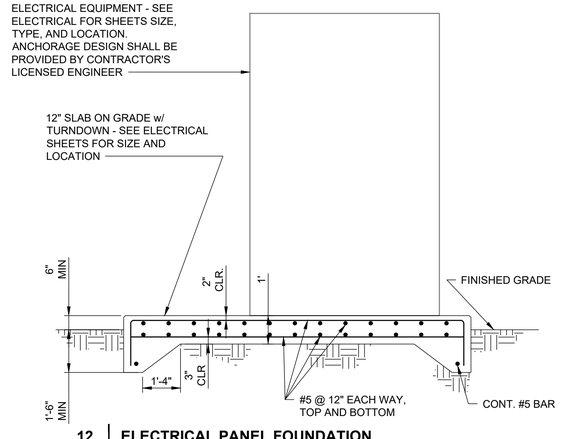


NOTES:

1. NO CENTERBULB ALLOWED IN WATERSTOP FOR VERTICAL JOINTS
2. ALL SPLICES SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. SUBMIT SHOW DRAWINGS PRIOR TO INSTALLATION OR SPLICING WATERSTOP.

11 RIBBED WATERSTOP

Scale 6" = 1'-0"



12 ELECTRICAL PANEL FOUNDATION

Scale 3/8"=1'-0"

CLIENT

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ROSAMOND, CA 93560

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CONSULTANT STAMP

REGISTERED PROFESSIONAL ENGINEER DAVID A. RANEY No. 3945 STRUCTURAL STATE OF CALIFORNIA

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PAGE 19 OF 30
DRAWING FILE 60730277_SD02.dwg

STRUCTURAL DETAILS

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ELECTRICAL SYMBOLS - PLANS

SYMBOL	DESCRIPTION
(D-XXX) (P-XXX) (M-XXX) (A-XXX) (SP-X)	CONDUIT DESIGNATION: (SEE CONDUIT SCHEDULE) XXX = CONDUIT NUMBER P = POWER SP = SPARE, 1"CO. UON D = DISCRETE M = MANUFACTURER- A = ANALOG SUPPLIED CABLE
	LED FIXTURE – CIRCLE INDICATES OUTLET, CEILING MOUNTED
	AUXILIARY LIGHT
	POLE MOUNTED LIGHTING FIXTURE & LIGHTING PULLBOX
	POLE MOUNTED LIGHTING FIXTURE (2 PER POLE) AND LIGHTING PULL BOX
	WALL MOUNTED LIGHTING FIXTURE
X XX	FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE)
	DUPLEX RECEPTACLE, +12" UON.
GFCI	DUPLEX RECEPTACLE, GFCI +12" UON.
	QUAD RECEPTACLE, +12" UON.
	CONDUIT IN SLAB OR UNDERGROUND AS APPLICABLE
	CONDUIT EXPOSED
G	GROUNDING ELECTRODE
	CONDUIT BODY WHERE ONE FLEXIBLE CONDUIT IS SHOWN OR REQUIRED. JBOX WHERE MORE THAN ONE FLEXIBLE CONDUIT IS SHOWN OR REQUIRED.
	CONDUIT BENDS TOWARD OBSERVER.
	CONDUIT BENDS AWAY FROM OBSERVER
LA-1	HOMERUN TO PANEL 'LA', CIRCUIT 1
	STUB-OUT & CAP

ELECTRICAL SYMBOLS - PLANS (CONT.)

SYMBOL	DESCRIPTION
SD	FIRE ALARM AUTOMATIC SMOKE DETECTOR
FACP	FIRE ALARM CONTROL PANEL
T	THERMOSTAT BY HVAC INSTALLER
$	SINGLE POLE SWITCH, +48" UON SEE GENERAL NOTE 4
$2	2-POLE SWITCH, +48" UON SEE GENERAL NOTE 4
$3, $4	3-WAY SWITCH, 4-WAY SWITCH, +48" UON SEE GENERAL NOTE 4
$M	MANUAL STARTER SEE GENERAL NOTE
	NON-FUSED DISCONNECT SWITCH
F	FUSED DISCONNECT SWITCH
	COMBINATION STARTER
	PANELBOARD
	LOCAL CONTROL SWITCH UON. MOUNTED ON A C-CHANNEL SUPPORT
	C-CHANNEL SUPPORT. SEE DETAIL 4/EDT-01.
	C-CHANNEL SUPPORT WITH BACKPLATE. SEE DETAIL 4/EDT-01.
1	SEE NOTE INDICATED
J	FLEXIBLE CONDUIT CONNECTION
DS	DUCT SMOKE DETECTOR

ELECTRICAL SYMBOLS - SINGLE LINE DIAGRAM

SYMBOL	DESCRIPTION
	POWER TRANSFORMER
	FUSE
	GROUND
10	MOTOR, 10 HORSEPOWER
100A/3P	CIRCUIT BREAKER, 3P – 3-POLE. 100A – 100 AMPERES.
100A/MCP	MOTOR CIRCUIT PROTECTOR 100A-100 AMPERES
	CURRENT TRANSFORMER
	CONTACTOR
1	STARTER, 1 – NEMA SIZE
	POTENTIAL TRANSFORMER
	DRY-TYPE TRANSFORMER
G	GENERATOR
PQM	POWER QUALITY MONITOR
PM	POWER MONITORING DEVICE
M	UTILITY METER
V	VOLTMETER
VS	VOLTMETER SELECTOR SWITCH
TVSS	TRANSIENT VOLT SUPPRESSION SYSTEM
	NON-FUSED DISCONNECT SWITCH, 30A, 3P, UON
	COMBINATION STARTER

ELECTRICAL SYMBOLS - SCHEMATIC DIAGRAMS

NORMALLY OPEN	NORMALLY CLOSED	DEVICE
		CONTACT
		TIMED CONTACT – CONTACT ACTION RETARDED ON ENERGIZATION
		TIMED CONTACT – CONTACT ACTION RETARDED ON DEENERGIZATION
		PUSHBUTTON, SINGLE CIRCUIT, MOMENTARY CONTACT
		PUSHBUTTON, SINGLE CIRCUIT, MAINTAINED CONTACT. LOS – LOCKOUT STOP
		LIMIT SWITCH, TORQUE SWITCH
		LIQUID LEVEL SWITCH
		PRESSURE SWITCH
		THERMOSTAT, TEMPERATURE SWITCH
		FLOW SWITCH
		SELECTOR SWITCH
		FUSE
O/L'S		MOTOR OVERLOAD HEATER CONTACTS
A		PILOT LIGHT, R=RED, W=WHITE, G=GREEN, A=AMBER
W		PILOT LIGHT, PUSH-TO-TEST, R=RED, W=WHITE, G=GREEN, A=AMBER
R		RELAY, CR-CONTROL RELAY, AR-ALARM RELAY
TD		TIME DELAY RELAY. TIME DELAY ON ENERGIZATION
TD TDOD		TIME DELAY RELAY. TIME DELAY ON DEENERGIZATION
M		STARTER COIL
S		SOLENOID OPERATED VALVE
ETM		ELAPSED TIME METER
		CONTROL POWER TRANSFORMER
		GROUND
		WIRING IN MOTOR STARTER, UON
		FIELD WIRING
		WIRE TERMINAL IN MOTOR STARTER
		MOTOR ANTICONDENSATION HEATER

ABBREVIATIONS

A	AMPERES
AFF	ABOVE FINISHED FLOOR
ATS	AUTOMATIC TRANSFER SWITCH
CKT	CIRCUIT
CO	CONDUIT ONLY
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
DB	DUCT BANK
DWG	DRAWING
ELEC	ELECTRICAL
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
G	GROUND FAULT INTERRUPTER
GFI	GROUND FAULT INERRUPTER
GND	GROUND
GOB	GATE OPEN BUTTON
GOCP	GATE OPERATOR CONTROL PANEL
HID	HIGH INTENSITY DISCHARGE
HOA	HAND OFF AUTOMATIC
ICP	INSTRUMENTATION CONTROL PANEL
INSTR	INSTRUMENTATION
JB	JUNCTION BOX
JBOX	JUNCTION BOX
kcmil	THOUSAND CIRCULAR MILS
KVA	KILO VOLT-AMPERE
LCP	LOCAL CONTROL PANEL
LOS	LOCKOUT SWITCH
LV	LOW VOLTAGE
MAX	MAXIMUM
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
O/C	OPEN/CLOSE
OL'S	OVERLOADS
PB	PULLBOX
PG&E	PACIFIC GAS & ELECTRIC
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PWR	POWER
QTY	QUANTITY
REF	REFERENCE
SCCR	SHORT CIRCUIT CURRENT RATING
SP	SPARE
TDB	TELEPHONE DATA BACKBOARD
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT
VFD	VARIABLE FREQUENCY DRIVE
VS	VARIABLE SPEED
W	WATT
WP	WEATHERPROOF
XFMR	TRANSFORMER
Z1	FIRE ALARM ZONE REFERENCE

GENERAL NOTES:

1. NOT ALL SYMBOLS AND/OR ABBREVIATIONS INCLUDED IN THIS SHEET ARE NECESSARILY USED IN THIS PROJECT.
2. INSTRUMENTS ARE SHOWN IN THEIR GENERAL VICINITY AND MAY NOT NECESSARILY MATCH LOCATIONS SHOWN ON THE PROCESS DRAWINGS MECHANICAL SHEETS. VERIFY ACTUAL LOCATIONS OF INSTRUMENTS AND RUN ASSOCIATED CONDUITS ACCORDINGLY.
3. ALL RECEPTACLE & SWITCH INSTALLATION HEIGHTS SHALL COMPLY WITH REQUIREMENTS OF SECTION 1117B.6 (2025 CALIFORNIA BUILDING CODE).

CLIENT

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
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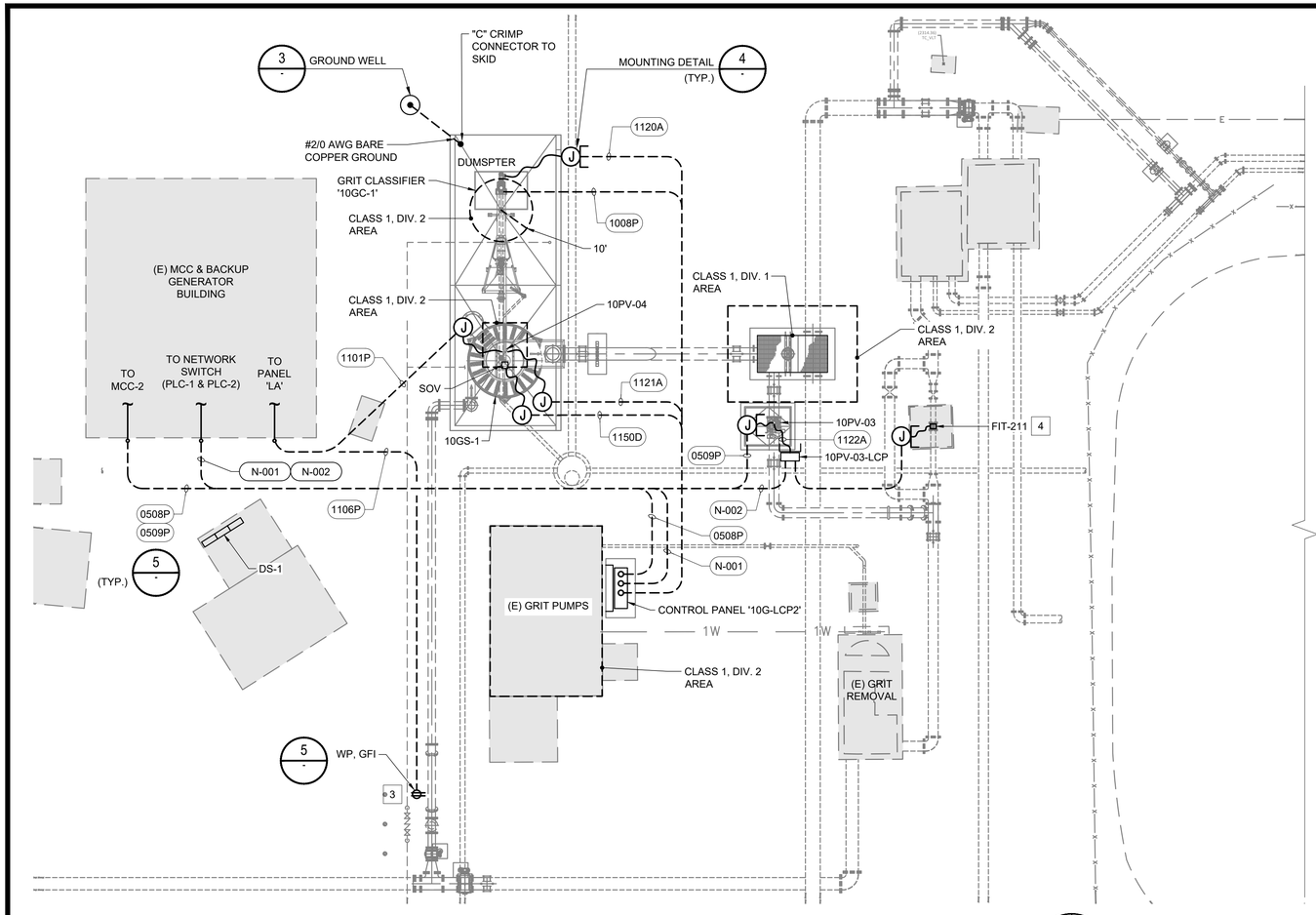
REGISTERED PROFESSIONAL ENGINEER
ANTHONY CORTEZ
6/30/28
E16161
ELECTRICAL
STATE OF CALIFORNIA

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ELECTRICAL LEGEND AND ABBREVIATIONS

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1 PARTIAL ELECTRICAL SITE PLAN

Scale: 1" = 10'

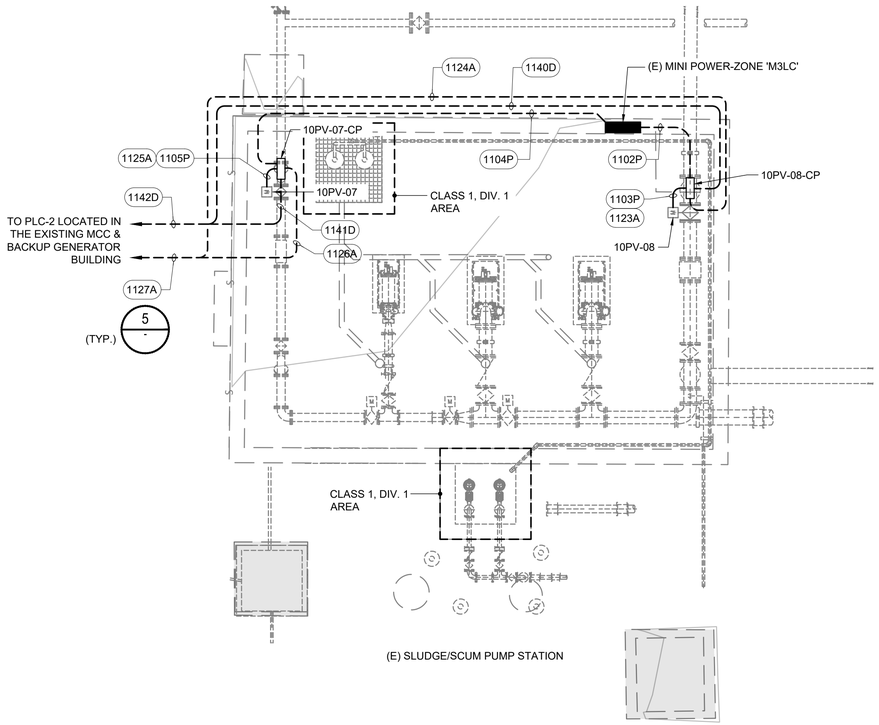
0 10' 20'

1" = 10'

N

NOTE:

1. SCAN TO IDENTIFY THE UNDERGROUND UTILITIES BEFORE INSTALLING UNDERGROUND CONDUITS.
2. PROVIDE CONDUIT SEALS FOR ALL CONDUITS BEFORE ENTERING CLASSIFIED AREAS.
3. WP, GFCI RECEPTACLE NEMA 5-20R WITH METALLIC "WHILE IN USE" COVERS, INSTALL PER DETAIL 4.
4. REPLACE EXISTING FIT-211 WITH A KIND UNIT, RECONNECT EXISTING ELECTRICAL CONNECTIONS.



2 PARTIAL ELECTRICAL SITE PLAN

Scale: 1" = 5'

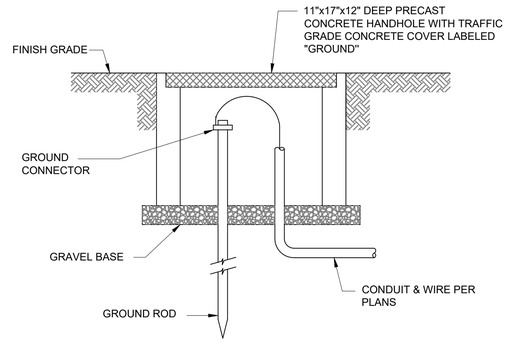
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0 5' 10'

1" = 5'

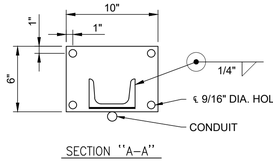
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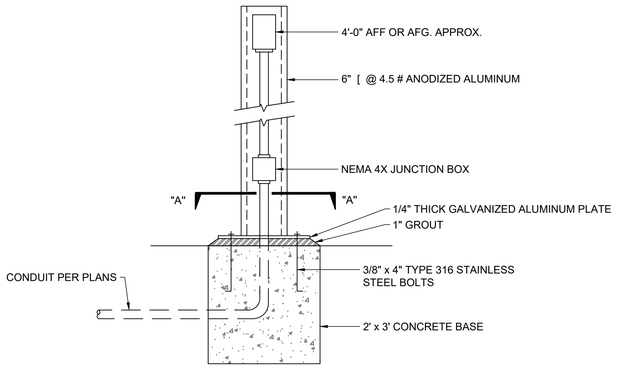
1. SCAN TO IDENTIFY THE UNDERGROUND UTILITIES BEFORE INSTALLING UNDERGROUND CONDUITS.



3 GROUND WELL DETAIL

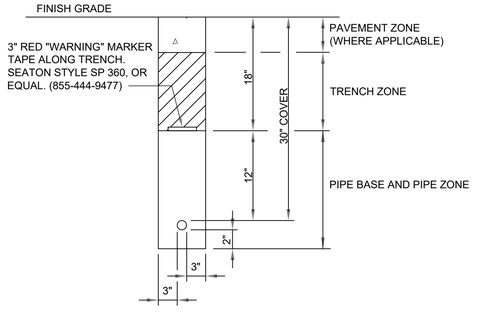
Scale: NONE





4 STANCHION DETAIL

Scale: NONE



5 CONDUIT TRENCH REQUIREMENTS

Scale: NONE

CLIENT

RCSD Rosamond Community Services District

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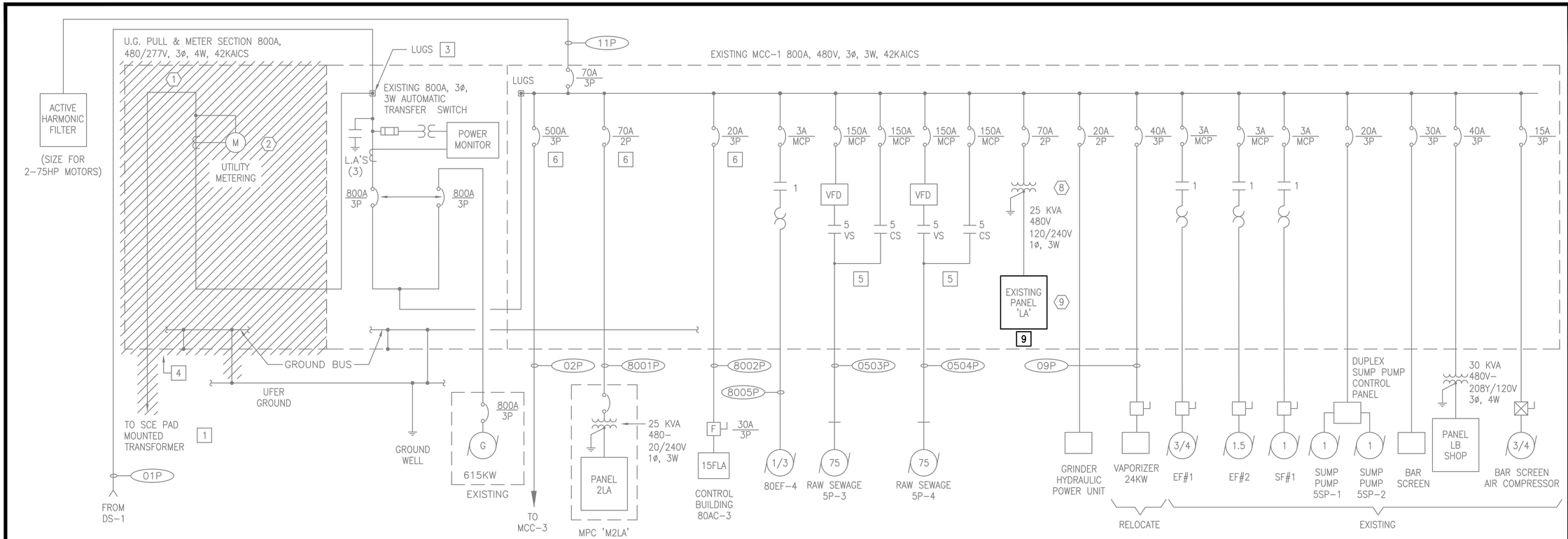
REGISTERED PROFESSIONAL ENGINEER ANTHONY CORTEZ 6/30/28 E16161 ELECTRICAL STATE OF CALIFORNIA

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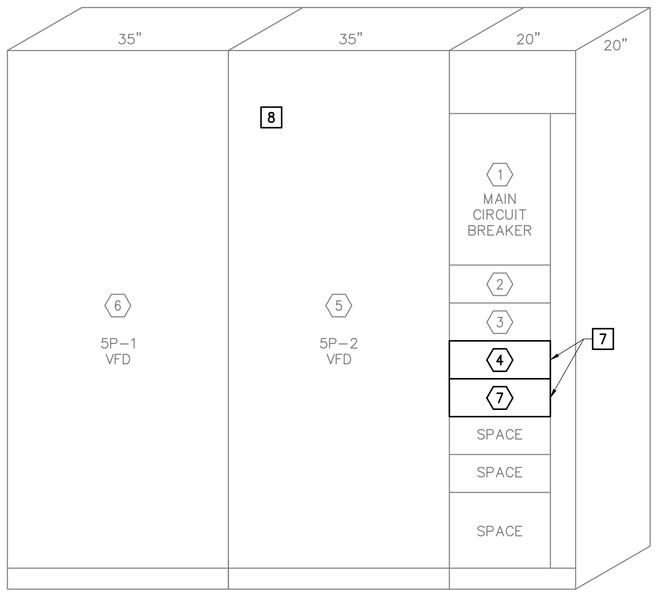
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PARTIAL ELECTRICAL SITE PLAN

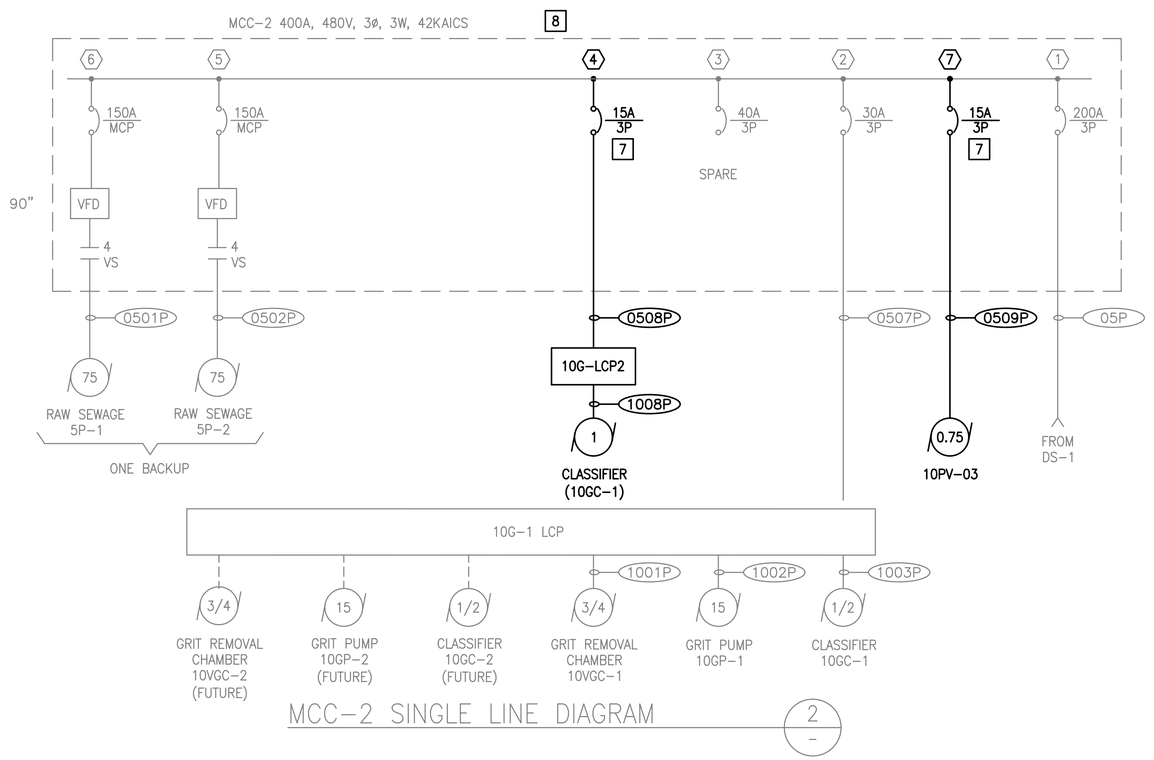
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MCC–1 SINGLE LINE DIAGRAM — 1



MCC–2 ELEVATION — 3



MCC–2 SINGLE LINE DIAGRAM — 2

NOTES:

1. EXISTING SCE TRANSFORMER TO REMAIN.
2. PROVIDE TEMPORARY POWER TO MCC–1 DURING THE CUT OVER TO DS–1.
3. TAP EXISTING BUS IN THE AUTOMATIC TRANSFER SWITCH SECTION FOR TERMINATION OF CABLE LUGS. CONNECT ON THE LINE SIDE OF THE EXISTING POWER MONITOR. PROVIDE COVER OVER OPENING BETWEEN THE EXISTING SERVICE METER SECTION AND THE AUTOMATIC TRANSFER SWITCH. PAINT TO MATCH EXISTING.
4. DEMOLISH EXISTING SERVICE METER SECTION AFTER MCC–1 HAS BEEN FED FROM DS–1. CUT SERVICE ENTRANCE CONDUITS FLUSH WITH THE TOP OF THE PAD. EXTEND EXISTING GROUND TO AUTOMATIC TRANSFER SWITCH.
5. CHANGE NAMEPLATES FOR 5P–1 AND 5P–2 MCC SECTIONS TO READ 5P–3 AND 5P–4 RESPECTIVELY.
6. LOCATE CIRCUIT BREAKERS IN MOTOR CONTROL CENTER SECTION ADJACENT TO THE AUTOMATIC TRANSFER SWITCH, BELOW THE MAIN LUG COMPARTMENT. IF SPACE IS NOT ADEQUATE, SOME OF THESE NEW ITEMS MAY BE LOCATED IN OTHER SPARE SPACE AVAILABLE IN THE MOTOR CONTROL CENTER.
7. **PROVIDE NEW MCC BUCKET, CIRCUIT BREAKER TO MATCH EXISTING MANUFACTURER, KAIC RATING AND MODEL. PROVIDE NEW EQUPMENT LABEL.**
8. **COORDINATE MCC AND PANELS OUTAGE WITH RCSD PROJECT MANAGER. PROVIDE OUTAGE SCHEDULE FOR RCSD PROJECT MANAGER REVIEW AND APPROVAL.**
9. **REFER TO DRAWINGS E05 FOR PANELBOARD SCHEDULE.**

CLIENT

Rosamond Community Services District

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

PROJECT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

APPROVED BY
RCSD BOARD OF DIRECTORS

PRESIDENT, BOARD OF DIRECTORS — DATE

RECOMMENDED FOR APPROVAL

GENERAL MANAGER — DATE

AECOM
5001 E. Commercenter Dr. Suite 100
Bakersfield, CA 93309
661.283.2323 tel
www.aecom.com

CONSULTANT STAMP

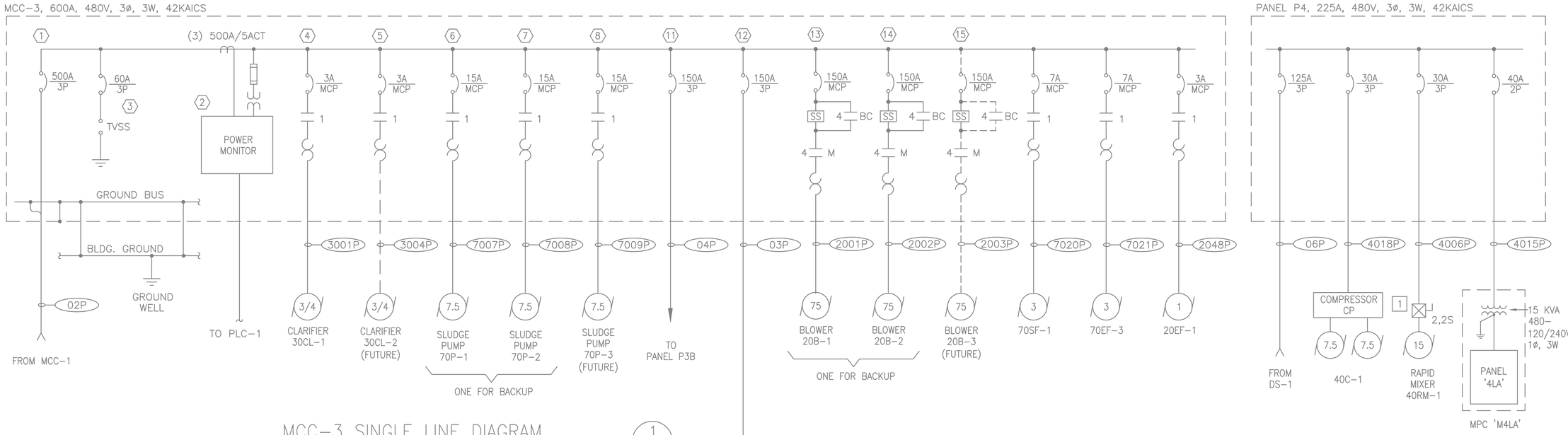
REGISTERED PROFESSIONAL ENGINEER ANTHONY CORTEZ 6/30/28 E16161 ELECTRICAL STATE OF CALIFORNIA

DATE	REV	DESCRIPTION
6-15-26	A	ISSUED FOR 90% REVIEW
9-1-26	B	ISSUED FOR BID

DATE 5/18/2026
DESIGNED BY NG
DRAWN BY DG
CHECKED BY AC
JOB NO. 60730277
SHEET NO. E03
PAGE 22 OF 30
DRAWING FILE 60730277-E03.dwg

SINGLE LINE DIAGRAM (1 OF 2)

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MCC–3 SINGLE LINE DIAGRAM 1

PANEL P4 SINGLE LINE DIAGRAM 3

PANEL P3A SINGLE LINE DIAGRAM 2

NOTES:

1. WITH CURRENT TRANSDUCER
2. COORDINATE MCC AND PANELS OUTAGE WITH RCSD PROJECT MANAGER. PROVIDE OUTAGE SCHEDULE FOR RCSD PROJECT MANAGER REVIEW AND APPROVAL.
3. REFER TO DRAWINGS E05 FOR PANELBOARD SCHEDULE.

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DRAWING FILE 60730277-E04.dwg

SINGLE LINE DIAGRAM (2 OF 2)

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CONDUIT & WIRE SCHEDULE

CONDUIT		POWER				CONTROL				FROM	TO	REMARKS
				GROUND				GROUND				
NO.	SIZE	NO.	SIZE	NO.	SIZE	NO.	SIZE	NO.	SIZE			
0508P	1"	3	#12	1	#12	-	-	-	-	MCC-2	10G-LCP2	NEW GRIT REMOVAL SYSTEM
0509P	1"	3	#12	1	#12	-	-	-	-	MCC-2	10PV-03	
1008P	1"	3	#12	1	#12	-	-	-	-	10G-LCP2	GRIT CLASSIFIER '10GC-1'	
1101P	1"	2	#12	1	#12	-	-	-	-	PANEL 'LA'	10PV-04	
1102P	1"	2	#12	1	#12	-	-	-	-	MINI POWER-ZONE 'M3LC'	10PV-08-CP	
1103P	1"	2	#12	1	#12	-	-	-	-	10PV-08	10PV-08-CP	CONTROL PANEL FOR 10PV-08
1104P	1"	2	#12	1	#12	-	-	-	-	MINI POWER-ZONE 'M3LC'	10PV-07-CP	
1105P	1"	2	#12	1	#12	-	-	-	-	10PV-07	10PV-07-CP	
1106P	1"	2	#12	1	#12	-	-	-	-	PANEL 'LA'	HEAT TRACE RECEPTACLE	
1120A	1"	-	-	-	-	1	#18 TSP	-	-	GRIT CLASSIFIER '10GC-1'	10G-LCP2	
1121A	1"	-	-	-	-	1	#18 TSP	-	-	10PV-04	10G-LCP2	
1122A	1"	-	-	-	-	1	#18 TSP	-	-	10PV-03	10PV-03-LCP	
1123A	1"	-	-	-	-	1	#18 TSP	-	-	10PV-08-CP	10PV-08	
1124A	1"	-	-	-	-	2	#18 TSP	-	-	10PV-08-CP	PLC-2	VIA ANALOG JBOX AT 10PV-07
1125A	1"	-	-	-	-	1	#18 TSP	-	-	10PV-07-CP	10PV-07	VIA ANALOG JBOX AT 10PV-07
1126A	1"	-	-	-	-	2	#18 TSP	-	-	10PV-07-CP	PLC-2	VIA ANALOG JBOX AT 10PV-07
1127A	1"	-	-	-	-	4	#18 TSP	-	-	10PV-08-CP AND 10PV-07-CP	PLC-2	VIA ANALOG JBOX AT 10PV-07
1130A	1"	-	-	-	-	1	#18 TSP	-	-	FIT-211	10PV-03-LCP	
1140D	1"	-	-	-	-	4	#14	1	#14	10PV-08-CP	PLC-2	VIA DISCRETE JBOX AT 10PV-07
1141D	1"	-	-	-	-	4	#14	1	#14	10PV-07-CP	PLC-2	VIA DISCRETE JBOX AT 10PV-07
1142D	1"	-	-	-	-	8			#14	10PV-08-CP AND 10PV-07-CP	PLC-2	VIA DISCRETE JBOX AT 10PV-07
1150D	1"	-	-	-	-	2	#14	1	#14	SOV (10PV-04)	10G-LCP2	
N-001	2"	-	-	-	-	CAT6A ETHERNET CABLE				10G-LCP2	PLC-1	
N-002	1"	-	-	-	-	CAT6A ETHERNET CABLE				10PV-03-CP	PLC-1	

MOTOR CONTROL CENTER 'MCC-2' LOAD SCHEDULE

DESCRIPTION	VOLTAGE	PHASE	CONNECTED		
			HP	KVA	AMPS
(E) RAW SEWAGE 5P-1	480	3	75	76.5	
(E) RAW SEWAGE 5P-2 *	480	3	75		
GRIT REMOVAL SYSTEM 10GC-1	480	3	1.0	1.0	
GRIT REMOVAL SYSTEM 10GP-1	480	3	15	16.8	
(E) GRIT REMOVAL SYSTEM 10VGC-1	480	3	0.75	1.1	
GRIT REMOVAL SYSTEM CONTROL PANEL 10G-LCP2	480	3	1.0	1.4	
10PV-03	480	3	0.75	1.1	
LCL 25% LARGEST MOTOR (75 HP)	480	3		19.1	
TOTAL LOAD				117.0	140.9

NOTE:

* STANDBY ONLY, NOT INCLUDED IN THE LOAD CALCULATION.

NAMEPLATE LA — 2 MTG: SURFACE — MAIN: 125A/2P

BUS: AMPS 150 — VOLTS: 120/240V, 1Ø, 3W — AIC RATING: 10K

	WATTAGE A	WATTAGE B	OUTLETS LTG	OUTLETS REC	OUTLETS MISC	10,000 AICS 20A-1P U.O.N.	OUTLETS LTG	OUTLETS REC	OUTLETS MISC	WATTAGE A	WATTAGE B	
BUILDING EXTERIOR LIGHTING	500		5			1, 2		2		360		RECEPTACLE ELECTRICAL ROOM
BATTERY CHARGER		300			1	3, 4		3			540	RECEPTACLE GENERATOR ROOM
ELECTRICAL ROOM LIGHTS	600		4			5, 6	4			720		DRY WELL LIGHTS
ALARM LIGHT DRYWELL		200	1			7, 8			1			SAMPLER
A/C DRIVE NO. 1	300				1	9, 10	2			100		EMERGENCY LIGHTS
A/C DRIVE NO. 2		300			1	11, 12			1		500	EF 3
GAS DETECTOR	500				1	13, 14		1		180		RECEPTACLE WET WELL
A/C 1 EVAPORATOR		3000			1	15, 15, 16			1		300	HEAT TRACE
A/C 2 EVAPORATOR	3000				1	17, 18		2		360		RECEPTACLE TELEPHONE
GENERATOR ROOM LIGHT		800	8			19, 20		3			540	DRY WELL RECEPTACLE
SPARE						21, 22	1	1		500		WET WELL RECEPTACLE AND LIGHT
A/C					1	23, 30, 24			3		800	METER VAULT
						25, 26			1	500		ISR CONTROL CABINET
A/C					1	27, 30, 15, 28			1		1500	JACKET WATER HEATER LEFT
						29, 30						
GRIT REMOVAL LIGHTING		300	1			31, 15, 32			1		1500	JACKET WATER HEATER RIGHT
10MV-1	100				1	33, 34						
1 10PV-4		200			1	35, 36						SPARE
HEAT TRACE RECEPTACLE	600				1	37, 38						SPARE
SPARE						39, 40						SPARE
TOTAL LOAD	5600	5100								2720	5680	TOTAL LOAD

18.5 KW + LCL — KW= — 18.5 KW AT — 240 VOLTS — 1PH= 82 AMPS

NAMEPLATE 3LC — 2 MTG: SURFACE — MAIN: 70A/2P

BUS: AMPS 100 — VOLTS: 120/240V, 1Ø, 3W — AIC RATING: 10K

	WATTAGE A	WATTAGE B	OUTLETS LTG	OUTLETS REC	OUTLETS MISC	10,000 AICS 20A-1P U.O.N.	OUTLETS LTG	OUTLETS REC	OUTLETS MISC	WATTAGE A	WATTAGE B	
SLUDGE PS RECEPTACLES	720			4		1, 2	2			300		SLUDGE PS LIGHTING
SLUDGE PS RECEPTACLES		720		4		3, 4			1		1600	70EF-1
70FIT-141	100				1	5, 15, 6			1	1600		70SF-1
70FIT-143		100			1	7, 15, 8			1		100	70MV-21
70MV-31	100				1	9, 10			1	100		70MV-23
70MV-33		100			1	11, 12			1		100	70MV-25
70MV-35	100				1	13, 14			1	100		70MV-27
70LIT-125		100			1	15, 15, 16			1		100	VENTILATION CP
HEAT TRACE	100				1	17, 15, 18						SPARE
1 10PV-07		100			1	19, 20						SPARE
10PV-08	100				1	21, 22						SPARE
SPARE						23, 24						SPARE
TOTAL LOAD	1220	1120								2100	1900	TOTAL LOAD

6.3 KW + LCL — KW= — 6.3 KW AT — 240 VOLTS — 1PH= 26.5 AMPS

KEYNOTES:

1. NEW 20A SINGLE POLE CIRCUIT BREAKERS TO MATCH EXISTING MANUFACTURER, KAIC RATING.
2. UPDATE PANEL SCHEDULE.

CLIENT

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PANEL SCHEDULES

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INSTRUMENT SYMBOL IDENTIFIERS

	FIRST LETTER (1)		SUCCEEDING LETTERS (15)		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (2)(3)(4)		ALARM		
B	BURNER, COMBUSTION (2)		USER'S CHOICE (5)	USER'S CHOICE (5)	USER'S CHOICE (5)
C	USER'S CHOICE (3a)(5)			CONTROL (23a)(23e)	CLOSED (27b)
D	DENSITY	DIFFERENTIAL	DAMPER		
E	VOLTAGE (2)		SENSOR (PRIMARY ELEMENT)		
F	FLOW, FLOW RATE (2)	RATIO (FRACTION) (2b)			
G	USER'S CHOICE		GLASS, VIEWING DEVICE (16)		
H	HAND (2)				HIGH (27A)(28A)(29)
I	CURRENT (ELECTRICAL)(2)		INDICATE (17)		
J	POWER (2)		SCAN (18)		
K	TIME, TIME SCHEDULE (2)	TIME RATE OF CHANGE (12c)(13)		CONTROL STATION (24)	
L	LEVEL (2)		LIGHT (19)		LOW (27b)(28)(29)
M	MOISTURE	MOMENTARY			MIDDLE, INTERMEDIATE
N	USER'S CHOICE (5)		USER'S CHOICE (5)	USER'S CHOICE (5)	USER'S CHOICE (5)
O	USER'S CHOICE (5)		ORIFICE, RESTRICTION		OPEN (27a)
P	PRESSURE, VACUUM (2)		POINT (TEST) CONNECTION		
Q	QUANTITY (2)	INTEGRATE, TOTALIZE	INTEGRATE, TOTALIZE		
R	RADIATION (2)		RECORD (20)		RUN
S	SPEED, FREQUENCY (2)	SAFETY (14)		SWITCH (23b)	STOP
T	TEMPERATURE (2)			TRANSMIT	
U	MULTI VARIABLE (2)(6)		MULTIFUNCTION (21)	MULTIFUNCTION (21)	MULTIFUNCTION (21)
V	VIBRATION, MECHANICAL ANALYSIS (2)(4)(7)			VALVE, DAMPER, OR LOUVER (23c)(23e)	
W	WEIGHT, FORCE (2)		WELL, PROBE		
X	UNCLASSIFIED (8)	X AXIS (11c)	ACCESSORY DEVICES (22) UNCLASSIFIED (8)	UNCLASSIFIED (8)	UNCLASSIFIED (8)
Y	EVENT, STATE, PRESENCE (2)(9)	Y AXIS (11c)		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION (2)	Z AXIS (11c), SAFETY INSTRUMENTED SYSTEM (30)		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

NOTE: NUMBERS IN PARANTHESES REFER TO EXPLANATORY NOTES IN ANSI/ISA-5.1-2009, SECTION 4.2



A: ISA IDENTIFICATION LETTERS (SEE TABLE OR REFER TO ANSI/ISA-5.1-2009; TABLE 4.1)

B: LOOP NUMBER, MINIMUM OF FOUR CHARACTERS (####)

C: USER DESCRIPTOR

D: MEASUREMENT (REFER TO ANSI/ISA-5.1-2009; TABLE 5.2.2)

E & F: PROCESS CONTROL DESCRIPTORS

J-4 FUNCTION BLOCK DESIGNATORS

Σ	SUMMING	$\sqrt[n]{}$	ROOT EXTRACTION
△	DIFFERENCE	$\sqrt{}$	SQUARE ROOT
∫	INTEGRAL	x^n	EXPONENTIAL
d/dt	DERIVATIVE	>	HIGH SELECTING
×	MULTIPLYING	<	LOW SELECTING
÷	DIVIDING	±	BIAS
/	CONVERT:	F(X)	NONLINEAR OR UNSPECIFIED FUNCTION

★ E - VOLTAGE
I - CURRENT
P - PNEUMATIC
A - ANALOG
B - BINARY
H - HYDRAULIC
O - ELECTROMAGNETIC, SONIC
R - RESISTANCE (ELECT)
D - DIGITAL

J-6 HANDSWITCH DESIGNATORS

HOA	HAND-OFF-AUTO	LR	LOCAL-REMOTE
HOR	HAND-OFF-REMOTE	OC	OPEN-CLOSE
F-R	FORWARD-REVERSE	OCA	OPEN-CLOSE-AUTO
1-0	ON-OFF	A/M	AUTO-MANUAL

INSTRUMENT SERVICES

AS — INSTRUMENT AIR SUPPLY (NOTE 4)

ES — 120 VAC ELECTRICAL SERVICE (DIFFERENT VOLTAGES ARE SPECIFICALLY NOTED)

PLC INPUT/OUTPUT

DISCRETE INPUT

ANALOG INPUT

DISCRETE OUTPUT

ANALOG OUTPUT

MISCELLANEOUS

EQUIP ID — EQUIPMENT TO/FROM IDENTIFIER

SH (#) — REFERENCE SHEET/GRID NUMBER

SYSTEM — SYSTEM DESCRIPTOR

INTERLOCK. NUMBER IS THE CROSS REFERENCE TO A SPECIFIC ELEMENTARY DIAGRAM OR TO A SPECIFIC CONTROL STRATEGY DESCRIBED IN THE SPECS



PILOT LIGHT

INSTRUMENT LINE SYMBOLS

INSTRUMENT OR CONNECTION TO PROCESS

PNEUMATIC SIGNAL

ELECTRIC ANALOG SIGNAL

ELECTRIC DISCRETE SIGNAL

HYDRAULIC SIGNAL

CAPILLARY TUBE

ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)

ELECTROMAGNETIC OR SONIC SIGNAL (UN-GUIDED)

INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK)

RADIO SIGNAL (DATA)

RADIO SIGNAL (WIO)

HARDWIRE

ELECTRIC SIGNAL LINE ARROW

HARDWIRED INTERLOCK

LINE BREAK OR GAP

ELECTRICAL — CONNECTED / NOT CONNECTED

FIBER DEVICE LEVEL RING — F10

COPPER DEVICE LEVEL RING — C10

HART — H — H

MODBUS — MB — MB

SERIAL — S — S

CONTROL NET — CN — CN

ETHERNET — E — E

FIBER OPTIC ETHERNET — FO — FO

WIRELESS ETHERNET — W — W

DEVICENET — DN — DN

PROFIBUS DP — PBD — PBD

PROFIBUS PA — PBA — PBA

NOTES:

1. THIS IS A GENERALIZED LEGEND SHEET.
2. SEE ALSO ISA S5.1, S5.3 AND S7.3.
3. INSTRUMENTS MARKED WITH AN ASTERISK ARE FURNISHED WITH THE EQUIPMENT.
4. REFER TO ISA RP7.7 FOR INSTRUMENT AIR QUALITY STANDARDS.
5. REFER TO DIVISION 17, ABBREVIATION APPENDIX FOR SPECIFIC NOMENCLATURE.

INSTRUMENTATION DEVICE & FUNCTION SYMBOLS

	1 LOCATED IN FIELD VISIBLE AT LOCATION OPERATOR ACCESSIBLE	2 LOCATED ON MAIN PANEL VISIBLE ON PANEL FRONT OPERATOR ACCESSIBLE	3 LOCATED IN MAIN PANEL CABINET NOT VISIBLE ON PANEL FRONT NOT OPERATOR ACCESSIBLE	4 LOCATED ON SECONDARY PANEL VISIBLE ON PANEL FRONT OPERATOR ACCESSIBLE	5 LOCATED IN SECONDARY PANEL CABINET NOT VISIBLE ON PANEL FRONT NOT OPERATOR ACCESSIBLE
A SHARED DISPLAY PRIMARY CHOICE					
B SHARED DISPLAY ALTERNATE CHOICE					
C COMPUTER SYSTEMS					
D DISCRETE					

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PROCESS LEGEND

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VALVES

- GATE VALVE
- GLOBE VALVE
- PLUG VALVE
- PLUG VALVE CLOSED
- CHECK VALVE
- DUCKBILL CHECK VALVE
- BALL CHECK VALVE
- PINCH VALVE
- DIAPHRAGM VALVE
- BUTTERFLY VALVE
- BALL VALVE
- BALL VALVE CLOSED
- NEEDLE VALVE
- PLUG (COCK)
- PRESSURE REDUCING REGULATING VALVE, SELF-CONTAINED
- BACK PRESSURE REGULATING VALVE, SELF-CONTAINED
- PRESSURE REDUCING REGULATOR WITH EXTERNAL PRESSURE TAP
- 3-WAY VALVE
- 4-WAY VALVE
- ANGLE VALVE
- PRESSURE RELIEF VALVE
- FOOT VALVE
- * FC = FAIL CLOSED, FO = FAIL OPEN; LC = LOCKED CLOSED, LO = LOCKED OPEN
- CLOSED DURING NORMAL OPERATION
- SHADING INDICATES PORT TO BE CLOSED DURING NORMAL OPERATION. DOT INDICATES PORT TO BE CLOSED DURING ALTERNATE OPERATION.
- KNIFE GATE VALVE

VALVE OPERATORS

- DIAPHRAGM
- DIAPHRAGM PRESSURE BALANCED
- DIAPHRAGM
- MOTOR (M)
- CYLINDER OPERATOR
- SOLENOID (S)
- SOLENOID VALVE (SV)

FLOW PRIMARY ELEMENTS

- ORIFICE PLATE
- SINGLE PORT PITOT TUBE OR PITOT-VENTURI TUBE
- VENTURI TUBE
- AVERAGING PITOT TUBE
- FLUME
- WEIR
- TURBINE OR PROPELLER-TYPE PRIMARY ELEMENT
- THERMAL MASS FLOWMETER
- POSITIVE DISPLACEMENT TYPE FLOW TOTALIZING INDICATOR
- VORTEX SENSOR
- TARGET TYPE SENSOR
- FLOW NOZZLE
- MAGNETIC FLOWMETER (M)
- SONIC FLOWMETER
- ROTAMETER (X X)
- ROTAMETER WITH INTEGRAL VALVE (X X)

NEW LINES EXISTING

- MAIN PROCESS
- SECONDARY PROCESS
- INSTRUMENT CONNECTION
- EQUIPMENT ENCLOSURE

EQUIP ID — EQUIPMENT TO/FROM IDENTIFIER

SH (#) — REFERENCE SHEET/GRID NUMBER

SYSTEM — SYSTEM DESCRIPTOR

24" BW — PIPE SYSTEM, PIPE SIZE IN INCHES

TOP / MIDDLE / BOTTOM

AAABBBCCCDDD — EQUIPMENT TAG (SEE EQUIPMENT ASSET TAGGING STANDARD)
- THREE DIGIT ITEM NUMBER
- THREE DIGIT EQUIPMENT CODE
- THREE DIGIT SYSTEM SERVICE CODE
- THREE DIGIT PLANT ZONE NUMBER

MECHANICAL

OR

CONNECTED

NOT CONNECTED

MISCELLANEOUS

- FLANGE
- UNION
- Y STRAINER
- INLET FILTER
- FLOW STRAIGHTENING VANE
- TEE
- SCREWED CAP
- WELDED CAP
- BLIND FLANGE
- REDUCER
- HB — HOSE BIBB CONNECTION
- CHEMICAL PIPING FLEXIBLE CONNECTION/ FLEXIBLE HOSE
- FLEXIBLE TANK CONNECTION
- BRAIDED METAL HOSE
- METAL BELLOWS
- EXPANSION JOINT
- FLEXIBLE COUPLING
- FLANGED COUPLING ADAPTER
- SLIDE GATE
- DRAIN
- SPRAY NOZZLE
- DIAPHRAGM SEAL
- ANNULAR SEAL
- RUPTURE DISK, PRESSURE
- RUPTURE DISK, VACUUM
- PURGE (P)
- THERMOMETER WELL
- CALIBRATION CYLINDER
- PULSATION DAMPER
- AIR RELIEF VALVE
- AIR RELEASE
- LEVEL PROBE
- CHEMICAL DIFFUSER
- INJECTION MIXER
- STATIC MIXER
- EDUCTOR/INJECTOR
- * AV - AIR VALVE, F - FILTER, T - TRAP, FH - FIRE HYDRANT
- WATER LINE
- GRAVITY FLOW
- DIFFUSER

MISCELLANEOUS

- VENT
- FLAME ARRESTOR
- BUBBLER
- HEAT TRACE
- SILENCER (SILENCER)
- SNUBBER
- SONIC SENSOR
- DISCONNECT'
- 55 GAL DRUM
- * DENOTES SUPPLIED BY MFR
- STEEL TANK
- PLASTIC TANK
- FLAT TOP TANK
- OPEN TOP TANK
- PRESSURE VESSLES (VERTICAL AND HORIZONTAL)
- HORIZONTAL HEAT EXCHANGER
- VERTICAL HEAT EXCHANGER
- SPLITTER

EQUIPMENT

- MIXER (M)
- VERTICAL TURBINE PUMP (M)
- SUBMERSIBLE PUMP (M)
- PUMP BLOWER
- PUMP
- METERING PUMP
- ROTARY PUMP
- PERISTALTIC PUMP
- TURBINE PUMP
- HORIZONTAL SCREW CONVEYOR
- INCLIINED SCREW CONVEYOR
- BELT CONVEYOR
- VERTICAL TURBINE PUMP HEAD
- VERTICAL TURBINE PUMP T-HEAD
- VERTICAL TURBINE PUMP CAN
- VERTICAL TURBINE PUMP INTAKE

NOTES:

1. THIS IS A GENERALIZED LEGEND SHEET.
2. SEE ALSO ISA S5.1, S5.3 AND S7.3.
3. INSTRUMENTS MARKED WITH AN ASTERISK ARE FURNISHED WITH THE EQUIPMENT.
4. REFER TO ISA RP7.7 FOR INSTRUMENT AIR QUALITY STANDARDS.

TYPICAL CONNECTION

- IN-LINE DEVICE (X X)
- DIRECT CONNECTION TO PROCESS (X X)
- FILLED SYSTEM, DIAPHRAGM SEAL CONNECTION (X X)

EQUIPMENT CONTINUED

- SUBMERSIBLE PUMP (M)
- DU — DRIVE UNIT
- GATE - NORMALLY CLOSED
- GATE - NORMALLY OPEN
- DUMPSTER
- MANHOLE
- ULTRA - SONIC LEVEL SENSOR

CLIENT

ROSAMOND COMMUNITY SERVICES DISTRICT (RCSD)
3179 35TH STREET WEST
ROSAMOND, CA 93560

PROJECT

WWTP GRIT REMOVAL SYSTEM IMPROVEMENTS

APPROVED BY
RCSD BOARD OF DIRECTORS

PRESIDENT, BOARD OF DIRECTORS — DATE

RECOMMENDED FOR APPROVAL

GENERAL MANAGER — DATE

AECOM
5001 E. Commercenter Dr. Suite 100
Bakersfield, CA 93309
661.283.2323 tel
www.aecom.com

CONSULTANT STAMP

REGISTERED PROFESSIONAL ENGINEER — ANTHONY CORTEZ — 6/30/28 — E16161 — ELECTRICAL — STATE OF CALIFORNIA

DATE	REV	DESCRIPTION
6-15-26	A	ISSUED FOR 90% REVIEW
9-1-26	B	ISSUED FOR BID

DATE 5/18/2026
DESIGNED BY IA
DRAWN BY DG
CHECKED BY AC
JOB NO. 60730277

SHEET NO. N02
PAGE 26 OF 30
DRAWING FILE 60730277-N02.dwg

INSTRUMENTATION LEGEND

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SCS

PLC-1 (AT ICP-1)

SOLENOID VALVE OPENED YI 02C
SOLENOID VALVE CLOSED YA 02D
GRIT CLASSIFER RUNNING YI 01A
GRIT CLASSIFER FAULT YA 01
GRIT CLASSIFER CALL TO RUN HS 01
GRIT CLASSIFER TEMP HIGH YA 01
GRIT CLASSIFER CALL TO RUN YI 01B
GRIT CLASSIFER CALL TO RUN YI 01B
10PV-04 VALVE OPENED YI 02A
10PV-04 VALVE CLOSED YI 02B
10PV-04 VALVE FAULT YA 02
FLOW CONTROL SETPOINT FIC 01

10PV-03 VALVE OPENED YI 03A
10PV-03 VALVE CLOSED YI 03B
10PV-03 VALVE FAULT YA 03
10PV-03 IN HAND YI 03C

FLOW ALARM FAHL 211
FLOW FN 211
TOTALIZE FQI 211

IO
DI
E
AI

NOTES

1. VENDOR SUPPLIED PLC WILL BE AB MICRO850, OR EQUAL THAT IS TO CONNECT TO RCSD'S PLC-1 VIA ONE ETHERNET CABLE.

VENDOR SUPPLIED CONTROL PANEL (10G-LCP2)
CONTROL POWER ON YL 01
SYSTEM IN AUTO YL 02A
SYSTEM IN HAND YL 02B
SYSTEM ALARM YL 02C
SOLENOID VALVE OPEN YL 03A
10PV-04 OPEN YL 03B
CLASSIFIER RUNNING YL 04A
CLASSIFIER FAIL YL 04B

VALVE 10PV-03 LOCAL CONTROL PANEL
HS 03 HOA

FROM HEADWORKS
20" RS
14" RS
14" RS

GRIT CHAMBER 10GS-1
12" RS
20" GRE
FROM DISTRIBUTION BOX NO. 1
24" ABI-2
SLIDE GATE 10SG-01
24" ABI-2
TO AERATION BASIN NO. 2
16" GRE
10PV-03
16" GRE

10VGC-1
10WG-1
TO EXISTING GRIT CLASSIFIER
4" GRIT
VORTEX GRIT CHAMBER 10VGC-1
AUTO SAMPLER 5I-1 3
FIT 211 120VAC
TO EXISTING DISTRIBUTION CHAMBER NO. 1
16" GRE
8" GRE
8" GRE
10PV-1 (10PV-1)
10PV-2
FE 211
16" GRE
16" GRE
10PV-3 (10PV-3)

FROM POTABLE WATER
4" GRIT
PI
10PV-05
10PV-04
GRIT CLASSIFIER 10GC-01
3" DRAIN
10BV-01
6" GDRL
TO EXISTING MANHOLE MH-3

CLIENT

RCSD Rosamond Community Services District

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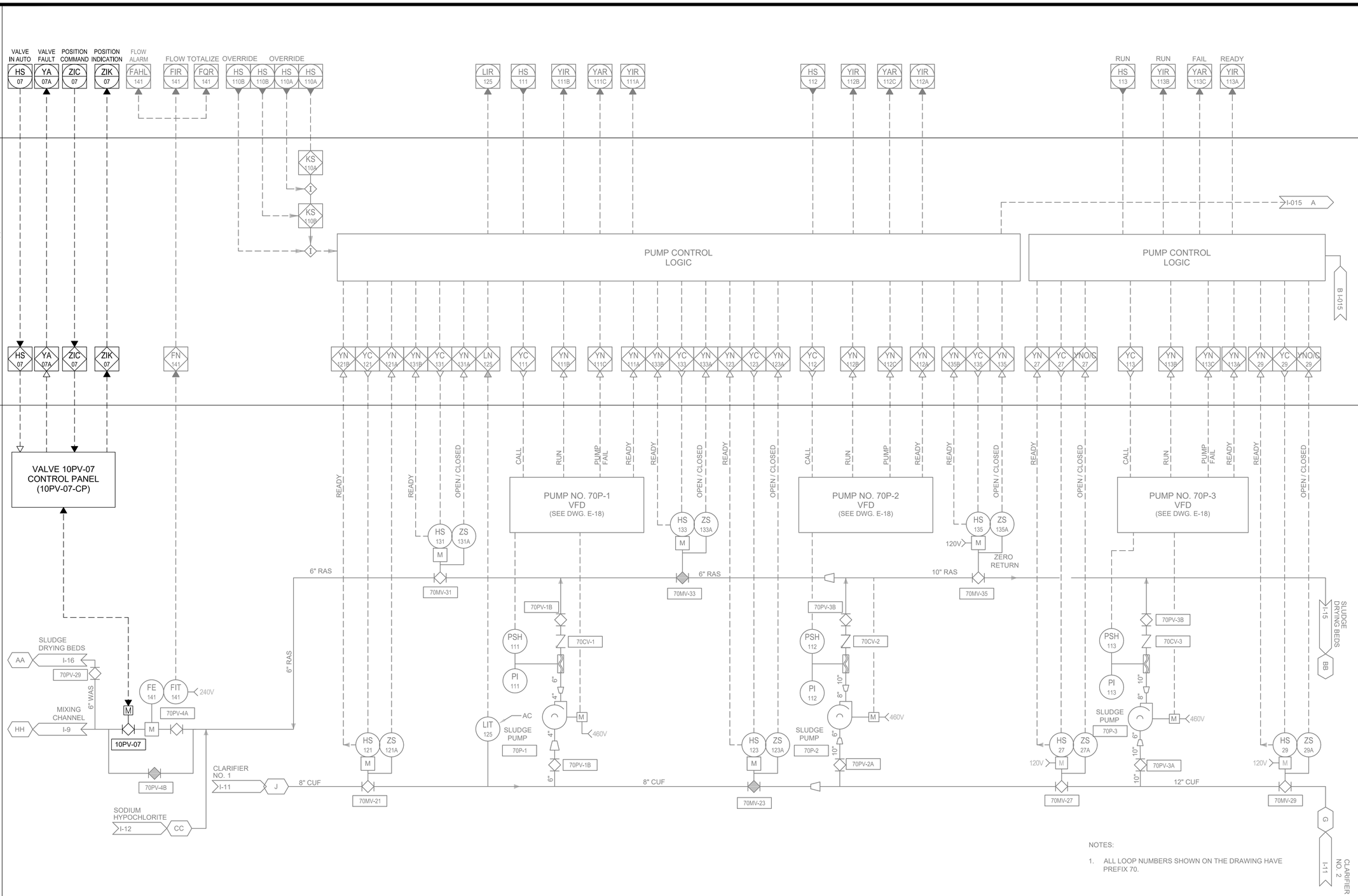
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JOB NO. 60730277
SHEET NO. N03
PAGE 27 OF 30
DRAWING FILE 60730277-N03.dwg

GRIT CHAMBER P&ID

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NOTES:

1. ALL LOOP NUMBERS SHOWN ON THE DRAWING HAVE PREFIX 70.

CLIENT

RCSD Rosamond Community Services District

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SHEET NO. N04
PAGE 28 OF 30
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SLUDGE PUMP STATION - 1

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SCS

(E) PLC-2
AT ICP-2

FIELD

LIR 125 — CALL HS 111 — RUN YIR 111B — FAIL YAR 111C — READY YIR 111A — CALL HS 112 — RUN YIR 112B — FAIL YAR 112C — READY YIR 112A

FLOW ALARM FIR 143 — FLOW FIR 143 — TOTALIZE FIR 143 — VALVE IN AUTO HS 08 — VALVE FAULT YA 08A — POSITION COMMAND ZIC 08 — POSITION INDICATION ZIK 08

LAHH 140

YAR 110B — YIR 110A — YAR 151 — YAR 153 — YAR 155

PUMP CONTROL LOGIC

PUMP CONTROL LOGIC

LN 125 — YC 111 — YN 111B — YN 111C — YN 112A — YC 112 — YN 112B — YN 112C — YN 112A

FN 143 — HS 08 — YA 08A — ZIC 08 — ZIK 08 — YN 140 — YN 110B — YN 110A — YN 151 — YN 153 — YN 155

CALL — RUN — PUMP FAIL — READY — CALL — RUN — PUMP FAIL — READY

PUMP NO. 70SC-1 MCC — PUMP NO. 70SC-2 MCC

(SEE DWG E-18)

VALVE 10PV-08 CONTROL PANEL (10PV-08-CP)

LSHH 140

FLOOD SWITCH

HI LEVEL — RUN

SUMP PUMPS LCP

70SP-LCP

SCUM WET WELL

2" SUMP

70BV-8 — 70BV-9

70CV-6 — 70CV-7

70SP-8 — 70SP-9

SUMP

AIR FLOW LOW ALARM — H2S ALARM — HAZ ALARM

SLUDGE DRYING BEDS

6" WAS — I-16 — BB

70PV-31

6" WAS

FE 143 — FIT 143 — 120V

I-14 — BB — 10" RAS — 70PV-6A — 70FIT-143 — 10" RAS — 10PV-08 — MIXING CHANNEL — I-9 — II

20GLB-2

70PV-6B

SODIUM HYPOCHLORITE — DD — I-12

VENTILATION CONTROL PANEL

70-VCP

(SEE DWG. E-17)

(2) — H2S ALARM — HAZ ALARM — HAZ ALARM

24VDC

FS 151 — AIT 155 (2) — AIT 155A (2) — AIT 155B (2)

FAN AIR FLOW SWITCHES

AE 155 — AE 155A — AE 155B

LIT 125 — TSH 114 — MS 114 — TSH 115 — MS 115

LE 125

70PV-8 — 70CV-4 — 70PV-9 — 70CV-5

PSH 114 — PSH 115

PI 114 — PI 115

M — 460V — M — 460V

70SC-1 — 70SC-2

70PV-10

CLARIFIER NO.1 — I-11 — E — 6" SCUM

3" SCUM — SLUDGE DRYING BED NO. 11 AND 12 — I-16 — CC

6" SCUM — F — I-11 — CLARIFIER NO. 2

SCUM WET WELL

NOTES:

1. ALL LOOP NUMBERS SHOWN ON THE DRAWING HAVE PREFIX 70.

REMOVE AND RELOCATE EXISTING LEVEL SENSOR IN

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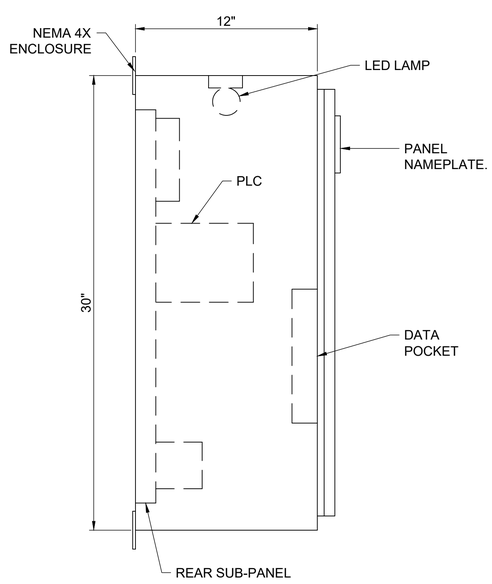
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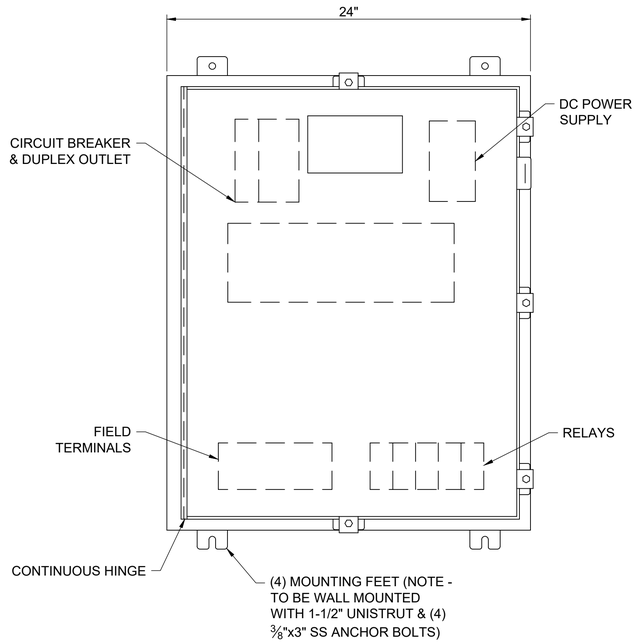
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SHEET NO. N05
PAGE 29 OF 30
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SLUDGE PUMP STATION - 2





1 | VALVE 10PV-03 LOCAL CONTROL PANEL LAYOUT

\- | SCALE: NTS

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CLIENT

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INSTRUMENTATION DETAILS