Specifications for:

Sweetwater Dam 36-inch Raw Water Pipeline Replacement

B.P. 20104024

May 24, 2011

REGISTERED PROFESSIONAL ENGINEER
MARC J. ROZMAN
C 042862
Exp. 3-31-12
CIVIL
STATE OF CALIFORNIA

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT

TABLE OF CONTENTS

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
TABLE OF CONTENTS

Part 1 - General Conditions

Part 2 - Special Conditions

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT

TABLE OF CONTENTS

SWEETWATER AUTHORITY

505 GARRETT AVENUE
POST OFFICE BOX 2328
CHULA VISTA, CALIFORNIA 91912-2328
(619) 420-1413
FAX (619) 425-7469
http://www.sweetwater.org

May 24, 2011

Subject: INVITATION TO BID
SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
SWA FILE: B.P. 20104024

Sweetwater Authority (Authority) is inviting bids for the Sweetwater Dam 36-inch Raw Water Pipeline Replacement, and the Authority is pleased to invite your firm to submit a bid for this project.

Enclosed for your review are copies of the following documents:

1. Notice to Bidders,
2. Instruction to Bidders,
3. Proposal (including Subcontractor's Form, Certificate of Contractor, and Non-Collusion Affidavit),
4. Contract,
5. Faithful Performance Bond, or equal, as approved by the Authority,
6. Laborer's and Materialmen's Payment Bond,
7. General Conditions and Special Conditions,
8. Attachments B and C (Attachments A not used)
9. Technical Specifications
10. Construction Drawings

A **MANDATORY PRE-BID CONFERENCE** and inspections will be held beginning at **9:00 A.M., JUNE 1, 2011** at the Authority's Robert A. Perdue Water Treatment Plant, located at 100 Lakeview Avenue, Spring Valley, California 91977. During this conference, you will have the opportunity to ask questions and discuss the work before

submitting your bid. Please call if you plan on attending the conference or need direction to this location.

Sealed bids shall be received no later than **JUNE 17, 2011 AT 10:00 A.M. BY THE AUTHORITY'S ENGINEERING DEPARTMENT LOCATED AT 505 GARRETT AVENUE, CHULA VISTA, CA 91910. THE BID OPENING WILL TAKE PLACE ON JUNE 17, 2011, AT 10:30 A.M. AT THE AUTHORITY'S RICHARD A. REYNOLDS GROUNDWATER DESALINATION FACILITY, LOCATED AT 3066 NORTH SECOND AVENUE, CHULA VISTA, CA 91950.**

If you have any questions on this invitation, please contact Mr. Michael Garrod at (619) 409-6752, or mgarrod@sweetwater.org.

Sincerely,

Marguerite S. Strand
Assistant General Manager

MSS:MG:vls

enclosures: as cited

cc: Sweetwater Authority Inspection Section

I:\engr\B P\BP 10\Engineering\20104024 - 36-inch Raw Water Pipe Repair - SW Dam\Spec Book\A - Invitation to Bid.doc

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT

NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN that SWEETWATER AUTHORITY (Authority) will receive no later than June 17, 2011, bids for SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT. Each bid shall be on a form attached to the Contract Documents, which can be obtained at the office of the Authority, 505 Garrett Avenue, Chula Vista, CA, and shall be sealed and filed with the Engineering Department of the Authority, located at 505 Garrett Avenue, Chula Vista, CA, no later than June 17, 2011, at 10:00 am, and read aloud on or after June 17, 2011, that day at 10:30 am the Richard A. Reynolds Desalination Facility, 3066 North Second Avenue, Chula Vista, CA 91910. Bids received after this 10:00 am will be returned unopened. The Authority will not permit prime contractor bidders to submit subcontractor information after the deadline for submission of bids. Bids shall be valid for 60 (sixty) calendar days after the bid opening date.

Bid Items:

All items of work shall be as more particularly enumerated and described in the Proposal and other Contract documents forming a part of and in strict conformity with the "Contract Documents" for SWEETWATER DAM 36—INCH RAW WATER PIPELINE REPLACEMENT available at the office of the Authority, 505 Garrett Avenue, Chula Vista, CA, and shall include the following:

1. Mobilization;
2. Providing sheeting, shoring, and bracing for all excavations;
3. Clearing and grubbing the project areas;
4. Performing minor earthwork and dewatering to facilitate project construction;
5. Demolishing, removing and disposing of approximately 426 linear feet of existing 36-inch steel pipe, including fittings, appurtenances, and concrete encasement;
6. Demolishing existing flowmeter, sensor lines, portions of old foundation and walls, and a portion of stilling pool structure to facilitate pipe line construction;
7. Abandoning approximately 203 linear feet of the existing 36-inch steel pipe and a blowoff structure in-place;
8. Furnishing and installing approximately 426 linear feet of new buried 36-inch welded steel pipe, including fittings, appurtenances, electrical conduits and concrete encasement;
9. Furnishing and installing 203 linear feet of new above-grade 36-inch welded steel pipe, including fittings, appurtenances, electrical conduits, concrete encasement, and anchoring it to the top of the concrete encasement of the existing 36-inch steel pipe;
10. Furnishing and installing manways;
11. Furnishing and Installing combination air and vacuum valves;
12. Furnishing and installing blowoffs;
13. Furnishing and installing approximately 32 linear feet of 30-inch steel pipe liner, including all connections;
14. Re-constructing portion of stilling pool dam structure;
15. Constructing a concrete access ramp and concrete drainage ditch;
16. Furnishing and installing corrosion monitoring.

The work shall include the furnishing of any and all required labor, transportation, services, and material for the hauling, distributing, excavating, laying, caulking, tapping, assembling, testing, and backfilling, where necessary for the construction of SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT complete as shown in the Plans and Specifications.

Time for Completion:

It is especially called to the attention of the Bidder that the work placed under Contract shall be commenced by the Contractor within **TEN (10) DAYS** after the date of the letter giving notice to the Contractor to proceed, which will be dated on or before August 1, 2011. The official starting date shall be said **TENTH (10TH)** day. **The existing 36-inch steel raw water pipeline will be placed out of service between October 1, 2011 and December 31, 2011. All pipeline demolition and construction work shall occur within this timeframe. The new pipeline shall be fully operational no later than December 31, 2011. The contractor has until January 31, 2012 to be 100% complete with non-operational aspects of the project and remove equipment and material from the site.**

Prevailing Rates of Pay:

The Director of Industrial Relations has determined the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract which will be awarded to the successful bidder. A compact disc (CD) copy of these prevailing rates are on file at the office of the Authority and may be secured upon request by any interested party or online at http://www.dir.ca.gov/dlsr. A copy of these rates shall be posted by the successful bidder at the job site. The successful bidder and all subcontractor(s) under him, shall comply with all applicable Labor Code provisions, which include, but are not limited to the payment of not less than the required prevailing rates to all workers employed by them in the execution of the Contract, the employment of apprentices, the hours of labor and the debarment of contractors and subcontractors.

If a job classification needed to execute a contract cannot be found in the general prevailing wage determinations, the Division of Labor Statistics & Research, Prevailing Wage Unit, P.O. Box 420603, San Francisco, CA 94142-0603, (415) 703-4774, should be contacted.

Bid Security:

Each bid shall be accompanied by cash, a certified or cashier's check, or bond secured from a surety company satisfactory to the Governing Board (Board) of the Authority, the amount of which cash, check, or bond shall not be less than ten percent (10%) of said bid, made payable to the order of the Sweetwater Authority. Said cash, check, or bond shall be given as a guarantee that the successful Bidder within ten (10) days after being notified to do so, will enter into a Contract and provide the necessary bonds and

certificate of insurance. The cash, check, or bond will be declared forfeited if the successful Bidder fails to comply within said time.

The bid bond shall be provided on the form included in these Documents by a surety company that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure section 995.120, and is authorized by the State of California. Failure to provide an appropriate bid bond shall cause the bid to be rejected.

Bonding and Insurance:

The successful Bidder will be required to furnish a Laborer's and Materialmen's Payment Bond in an amount equal to one hundred percent (100%) of the Contract price and a Faithful Performance Bond in an amount equal to one hundred percent (100%) of the Contract price. The bonds shall be furnished by a surety company satisfactory to the Authority, in its sole discretion, on forms furnished by the Authority. All bonds are to be secured from a surety company that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure section 995.120, and is authorized by the State of California. The successful Bidder shall also be required to meet the insurance requirements of the Authority as set forth in the General Conditions. All of said bond and insurance requirements shall be completed and submitted to the Authority within ten (10) calendar days from the date the Authority gives written intentions to award the Contract. Failure to meet these requirements within the allotted time shall be sufficient cause for rejection of bid.

Obtaining Contract Documents:

Contract Documents, including the Plans and Specifications may be picked up at the office of the Sweetwater Authority, 505 Garrett Avenue, Chula Vista, CA 91910-2328 at no cost. Documents will be mailed after receipt of a $25 mailing and handling fee. All payments are non-refundable and documents do not have to be returned. Cash or check only. Make checks payable to Sweetwater Authority.

Brand or Trade Name:

Pursuant to Public Contract Code section 3400(b), the Authority may make a finding that designates certain product(s), thing(s), or service(s) by specific brand or trade name for the statutorily enumerated purposes. As required by section 3400(b), the Authority has made such findings as further described in the Special Conditions. These findings as well as the products, and their specific brand or trade name that must be used for the Project may be found in the Special Conditions section.

Mandatory Pre-Bid Meeting:

A mandatory pre-bid meeting has been scheduled for June 1, 2011 at 9:00 am to review the Project's existing conditions. The pre-bid meeting will take place at the Authority's Perdue Water Treatment Plant, located at 100 Lakeview Avenue, Spring

Valley, California 91977. Representatives of the Authority, the Construction Manager, and the Engineer will be present to address any questions Bidders may have regarding this Project. Bids will not be accepted from any Bidder who did not attend the mandatory pre-bid meeting. Attendees will sign a certificate of attendance at the mandatory pre-bid meeting, which shall be submitted with their bid. Only Bidders attending the pre-bid meeting will receive any addenda that is issued.

Licensing:

The Authority requires that: (a) the Bidder be licensed in the State of California, (b) the Bidder's license appear clearly on the bid, (c) the license expiration date appear on the bid, and (d) any bid not containing this information, or a bid containing information which is subsequently proven false, shall be considered non-responsive and shall be rejected by the Authority.

Contractor License Classification:

In accordance with the provisions of California Public Contract Code section 3300 and California Business and Professions Code section 7059, the Authority (a) requires that the Bidder possess the following classification of the contractor's license at the time that the Contract is awarded: Class "A"; and (b) has determined that if the license classification specified defined in "(a)" is that of a "specialty contractor" (as defined in California Business and Professions Code section 7058), the specialty contractor's license so specified will, at a minimum, constitute a majority of the Project.

Substitution of Securities:

At the request and expense of the successful Bidder, the Authority will pay the amounts retained pursuant to the Contract documents as security for the completion of the Project in compliance with the requirements of Public Contract Code section 22300.

Storm Water:

Storm, surface, nuisance, or other waters may be encountered at various times during construction of the Project. Federal and State laws require the Authority and its contractors to appropriately manage such waters pursuant to the requirements of California State Water Resources Control Board Order Number 2009-0009-DWQ, the Federal Clean Water Act, and the California Porter Cologne Water Quality Control Act. By submitting a Bid, each bidder acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom. Additional information regarding Storm Water requirements is included in the General Conditions.

Ineligible Contractors:

In accordance with the provisions of the Labor Code, contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to

perform work on a public project pursuant to Section 1777.1 or Section 1777.7 of the Labor Code. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid to a debarred subcontractor by the Contractor for the Project shall be returned to the Authority. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

Bidder Qualifications

The bidder must have completed three projects within the last five years that included the installation of more than 600 feet of 36-inch steel main for each project.

Award of Contract:

The Authority shall award the Contract for the Project to the Bidder submitting the lowest bid for the Total Bid Price for Bid Items 1 through 16 for the Work, and is deemed responsive and responsible by the Authority. For purposes of this Project, Bidder's failure to provide a complete Proposal with bid prices for all bid items shall result in a determination that the bid is non-responsive. The Authority reserves the right to reject any or all bids and/or waive any irregularity in a bid.

Dated: 5-23-2011

SWEETWATER AUTHORITY

By: _____
MARGUERITE S. STRAND
ASSISTANT GENERAL MANAGER

I:\engr\B P\BP 10\Engineering\20104024 - 36-inch Raw Water Pipe Repair - SW Dam\Spec Book\C - Notice to Bidders.doc

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
INSTRUCTIONS TO BIDDERS

1. Securing Documents: Contract documents may be secured at the office of Sweetwater Authority, 505 Garrett Avenue, Chula Vista, CA 91910. A CD copy of the contract documents is free of charge, and a hard copy will cost $100.

2. Proposals: Bids, also sometimes referred to herein as Proposals, to receive consideration shall be made in accordance with the following instructions:

   A. Bidders shall provide prices for all of the bid items and the total bid price for bid categories. Failure to provide prices for all bid items, and a total bid price will render a Proposal non-responsive, and will disqualify the Proposal. Bidder and its subcontractors performing Work under these Contract Documents will be required to pay California sales tax and other applicable taxes, and to pay for permits, licenses and fees required by the agencies with authority in the jurisdiction in which the work will be located, unless otherwise expressly provided by the Contract Documents.

   B. Bids shall be made upon the forms found in the Proposal and shall not be detached from these Contract Documents; the bid shall be properly filled out; numbers shall be stated in figures and writing. The completed form should be without interlineations, alterations, or erasures.

      Bids submitted shall be executed by the Bidder or its authorized representative. Bidders may be asked to provide evidence in the form of an authenticated resolution of its Board of Directors or a Power of Attorney evidencing the capacity of the person signing the bid to bind the Bidder to each bid and to any Contract arising therefrom. If a Bidder is a joint venture or partnership, it may be asked to submit an authenticated Power of Attorney executed by each joint venturer or partner appointing and designating one of the joint venturers or partners as a management sponsor to execute the bid on behalf of Bidder. Only that joint venturer or partner shall execute the bid. The Power of Attorney shall also: (1) authorize that particular joint venturer or partner to act for and bind Bidder in all matters relating to the bid; and (2) provide that each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of Bidder assumed under the Bid and under any Contract arising therefrom. The bid shall be executed by the designated joint venturer or partner on behalf of the joint venture or partnership in its legal.

      In case words and figures do not agree, the words shall govern and the figures shall be disregarded. If the unit price and the total amount named by a Bidder for any item are not in agreement, the unit price alone shall be considered as representing the Bidder's intention, and the totals shall be corrected by the Authority's Engineer to conform thereto.

      In addition to the Proposal, the Bidder shall also complete as a part of the bid the following documents:

1. Bidder's organizational, experience, insurance, financial, and work performance statement, if requested after opening bids.
2. Subcontractors form.
3. Certificate of Contractor/ Worker's Compensation.
4. Non-Collusion Affidavit.

C. Each bid shall be accompanied by cash, a certified or cashier's check, or bond secured from a surety company satisfactory to the Board of the Authority; the cash, check, or bond shall not be less than ten percent (10%) of Bid Price with the check or bond made payable to the order of Sweetwater Authority. The cash, check, or bond shall be given as a guarantee that the Bidder, within ten (10) days after being notified to do so, will enter into a contract and provide the necessary bonds and certificate of insurance if awarded the work. The cash, check, or bond will be declared forfeited if successful Bidder fails to comply within this time.

The bid bond shall be provided on the form included in these Documents by a surety company that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure section 995.120, and is authorized by the State of California. Failure to provide an appropriate bid bond may cause the bid to be rejected.

D. Before submitting a bid, Bidders shall carefully read the Notice and Instructions to Bidders, Specifications, and the form of agreement, shall visit the site of the work, shall fully inform themselves as to all existing conditions and limitations, and shall include a bid for all items on the Proposal. The Bidder shall be responsible for determining the quantities of materials to be furnished by Bidder under this Contract.

E. No Bidder shall be allowed to make, submit, or be interested in more than one bid. However, a person, firm, corporation, or other entity that has submitted a subproposal to a Bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a subproposal or quoting prices to other bidders submitting a bid to the Authority. No person, firm, corporation, or other entity may submit subproposal to a bidder, or quote prices of materials to a Bidder, when also submitting a prime bid on the same Project.

F. Bids shall be delivered, enclosed in a sealed envelope, and bearing the title of the work and the name of the Bidder to the Engineering Department of Sweetwater Authority, 505 Garrett Avenue, Chula Vista, CA 91910, but **PLEASE NOTE THAT THE BID OPENING WILL TAKE PLACE AT THE RICHARD A. REYNOLDS DESALINATION FACILITY, 3066 NORTH SECOND AVENUE, CHULA VISTA, CA 91910**. Any bids received after the

scheduled closing time for receipt of bids shall be returned to the Bidder unopened.

G. After opening bids, the Authority may require that the Bidder submit letters of recommendation from five (5) water agencies for whom he/she has performed work within the past five (5) years. If the letters are required, the Authority reserves the right to review the letters with the agencies involved.

3. Withdrawal of Bid: Any Bidder may withdraw his/her bid, either personally, by telegraphic or written request, at any time prior to the scheduled closing time for receipt of bids.

4. Agreement and Bonds: The form of agreement for the Contract, which the successful Bidder, as Contractor, will be required to execute; and the bonds which Bidder will be required to furnish, are included in and form a part of this section and the Contract documents.

5. Interpretation of Drawings and Documents: If any person contemplating submitting a bid for the proposed Contract is in doubt as to the true meaning of any part of the documents, he/she may submit to the Engineer of the Authority a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made by addendum duly issued and a copy of such interpretation in the form of addendum will be mailed or delivered to each person receiving a set of such documents. The Authority will not be responsible for any other explanation or interpretations of the proposed documents.

6. Addenda or Bulletins: The Authority reserves the right to revise the Contract Documents prior to the bid opening date. Revisions, if any, shall be made by written addenda. All addenda issued by the Authority shall be included in the bid and made part of the Contract Documents. Pursuant to Public Contract Code Section 4104.5, if the Authority issues an Addendum which includes material changes to the Project less than seventy-two (72) hours prior to the deadline for submission of bids, the Authority will extend the deadline for submission of bids. The Authority may determine, in its sole discretion, whether an Addendum warrants postponement of the bid submission date. Each prospective Bidder shall provide the Authority a name, address, and facsimile number to which Addenda may be sent, as well as a telephone number by which the Authority can contact the Bidder. Copies of Addenda will be furnished by facsimile, first class mail, express mail, or other proper means of delivery without charge to all parties who have obtained a copy of the Contract Documents and provided such current information. Please Note: Bidders are responsible for ensuring that they have received any and all Addenda. To this end, each Bidder should contact the Engineering Department to verify that it has received all Addenda issued, if any, prior to the bid opening. Failure to include all addenda with the bid documents may be sufficient cause for rejecting the bid. The Bidder shall indicate the

addenda received prior to bidding in the space provided on Page C-4 of the Proposal.

7. Opening of Bids: The public reading of each bid will include at least the following:

   A. Name and address of Bidder.
   B. The nature and the amount of the security furnished with the bid.
   C. Acknowledgement of any addenda.
   D. Amount of bid.

   Bidders, or their representatives, and other interested persons, may be present at the opening of bids.

8. Award or Rejection of Bids: The Contract will be awarded to the lowest responsible and responsive Bidder as determined from the Total Bid Price for Bid Items 1 through 16. For purposes of the Project, Bidder's failure to provide a complete Proposal with bid prices for all bid items shall result in a determination that the bid is non-responsive. The Authority reserves the right to reject any or all bids and/or waive any irregularity in a bid. The Authority may reject any bid which, in its opinion when compared to other bids received or to the Authority's internal estimates, does not accurately reflect the cost to perform the Work. The Authority may reject as non-responsive any bid which unevenly weights or allocates costs, including but not limited to overhead and profit to one or more particular bid items.

9. Bonds: The successful Bidder shall be required to furnish a Laborer's and Materialmen's Payment Bond in an amount equal to one hundred percent (100%) of the Notice to Proceed price, and a Faithful Performance Bond in an amount equal to one hundred percent (100%) of the Notice to Proceed price; said bonds shall be secured from a surety company satisfactory to the Authority and shall be in the form provided in the Contract documents. **All bonds shall be provided by a surety company that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure section 995.120, and is authorized by the State of California.** Failure to submit acceptable bonds will be cause for rejection of bid. Said bonds shall be furnished within ten (10) days after award of the Contract and before commencement of construction.

10. Special Notice: Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the work will be performed.

11. Ownership of Drawings and Specifications: Except the Contractor's executed set, all of the drawings, and the Contract documents are the property of the Authority. The Authority will furnish the Contractor without charge, three (3) sets of the drawings and specifications. Additional sets will be furnished upon request. Said drawings and specifications are not to be used on any other work and all sets

shall be returned to the Authority, upon request, at the completion or cessation of the work, or termination of the Contract.

12. Statement of Bidder's Qualifications: Each Bidder shall be prepared to furnish a statement, on the form furnished for that purpose, a copy of which is included in this document, of the Bidder's financial resources, construction experience, and organization available for the work contemplated. The statement shall be submitted at the request of the Engineer of the Authority. The right is reserved to reject any bid where an investigation of the evidence or information submitted by such Bidder does not satisfy the Engineer of the Authority that the Bidder is qualified to carry out properly the terms of the Contract.

13. Request for Substitutions:

A. For purposes of this provision, the term "substitution" shall mean the substitution of any material, process, or article that is substantially equal or better in every respect to that so indicated or specified in the Specifications.

B. Pursuant to Public Contract Code section 3400(b), the Authority may make a finding designating certain products, things, or services by specific brand or trade name for the statutorily enumerated purposes. As required by section 3400(b), the Authority may have made such findings if made, as well as the products and their specific brand or trade name that must be used for the Project may be found in Section 2.20 of the Special Conditions, if applicable.

C. Unless specifically designated in the Special Conditions, whenever in Specifications, any material, process, or article is indicated or specified by grade, patent, proprietary name, or by name of manufacturer, such specifications shall be deemed to be used for the purpose of facilitating the description of the material, process, or article desired and shall be deemed to be followed by words "or equal." Bidders may, unless otherwise stated, offer for substitution any material, process, or article which shall be substantially equal or better in every respect to that so indicated or specified. However, the Authority has adopted certain uniform standards for certain materials, processes, and articles. If any material, process, or article offered for substitution by Bidders is not, in the opinion of the Engineer and the Authority, substantially equal or better in every respect to that specified. Bidders shall furnish the material, process, or article specified. The burden of proof as to the equality of any material, process or article shall rest with the Bidders.

D. Bidders shall submit requests together with substantiating data for substitution of any "or equal" material, process, or article no later than (ten) 10 calendar days after the award of Contract. Provisions authorizing

submission of an "or equal" substitution justification data shall not in any way authorize an extension of time for performance of this Contract. Furthermore, if a proposed "or equal" substitution request is rejected, a Bidder shall be responsible for including the specified material, process, or article in its bid. The Authority shall not be responsible for any costs of Bidders associated with "or equal" substitution requests. The Authority has the complete and sole discretion to determine if a material, process, or article is an "or equal" material, process, or article that may be substituted.

E. For purposes of subdivision (D) above, data required to substantiate requests for substitutions of an "or equal" material, process, or article data shall include a signed affidavit from the Bidder stating that the substituted "or equal" material, process, or article is equivalent to that specified in the specification in every way except as listed on the affidavit. Substantiating data shall also include any and all illustrations, specifications, and other relevant data including catalogue information which describes the requested substituted "or equal" material, process, or article, and substantiates that it is an "or equal" to the material process, or article specified. In addition, the submittal documentation must also include a statement of the cost implications of the substitution being requested stating whether and why the substitution of the "or equal" material, process, or article will reduce or increase the Contract price. The substantiating data must also include information regarding the durability and lifecycle cost of the requested substituted "or equal" material, process, or article. Failure to submit all the needed substantiating data, including the signed affidavit, to the Engineer in a timely fashion so that the substitution can be adequately reviewed may result in the rejection of the proposed substitution. The Engineer is not obligated to review multiple substitution submittals for the same product or item due to the Bidder's failure to submit a complete package initially.

F. Time limitations in this Section must be complied with strictly and in no case will an extension of time for completion be granted because of Bidder's failure to request the substitution of an alternate item at the times and manner set forth herein in subdivision (D) above. Further, the Bidder shall bear the costs of all engineering work associated with the review of submittals for substitution of equals.

G. In the event the Bidder furnished material, process, or article more expensive than that specified, the difference in cost of such material, process, or article so furnished shall be borne by Bidder.

14. Contractor's License: No bid will be accepted from a Contractor who is not licensed in accordance with the law under the provisions of Division III, Chapter 9, of the Business and Professions Code of the State of California, and possessing a current Class "A" Engineering Contractor's License. Provided,

however, if federal funds will be used to pay for the Project, bidder shall be properly licensed at the time of award and no bid submitted shall be invalidated by the failure of the bidder to be licensed at the time of bid submission.

15. Subcontractors: Bidder shall set forth the name and address of the place of business of each subcontractor who will perform work, labor, furnish materials, or render service to the Bidder on said contract, and each subcontractor licensed by the State of California who, under subcontract to Bidder, specially fabricates and installs a portion of the work contained in the Plans and Specifications, in an amount in excess of one-half (1/2) of one percent (1%) of the Prime Contractor's total bid, and the portion of the work to be done by such subcontractor in accordance with Public Contract Code section 4104. Circumvention by the Contractor of the requirement to list subcontractors by the device of listing one subcontractor who will in turn sublet portions constituting the majority of the work covered by this Contract shall be considered a violation of Chapter 4 of the California Public Contract Code and shall subject the Contractor to the penalties set forth in sections 4110 and 4111 of said code.

16. Prevailing Wages: The Director of Industrial Relations has determined the general prevailing rate of per diem wages in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract which will be awarded to the successful bidder. A compact disc (CD) copy of these prevailing rates are on file at the office of the Authority and may be secured upon request by any interested party or online at http://www.dir.ca.gov/dlsr. A copy of these rates shall be posted by the successful bidder at the job site. The successful bidder and all subcontractor(s) under him, shall comply with all applicable Labor Code provisions, which include, but are not limited to the payment of not less than the required prevailing rates to all workers employed by them in the execution of the Contract, the employment of apprentices, the hours of labor and the debarment of contractors and subcontractors.

Bidders are further advised that any Contractor who is awarded a public works project and intends to use a craft or classification not shown on the general prevailing wage determinations, may be required to pay the wage rate of the craft or classification most closely related to it as shown in the general determinations effective at the time of the call for bids.

If a job classification needed to execute a contract cannot be found in the general prevailing wage determinations, the Division of Labor Statistics & Research, Prevailing Wage Unit, P.O. Box 420603, San Francisco, CA 94142-0603, (415) 703-4281, should be contacted.

Because this determination may necessitate a wage survey, thirty (30) to forty-five (45) days should be allowed for a determination. Requests should include

the project name or bid number, the classification needed, job description, if available, the bid advertisement date, and the location of the project.

17. Debarment of Contractors and Subcontractors: In accordance with the provisions of the Labor Code, contractors or subcontractors may not perform work on a public works project with a subcontractor who is ineligible to perform work on a public project pursuant to Section 1777.1 or Section 1777.7 of the Labor Code. Any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. A debarred subcontractor may not receive any public money for performing work as a subcontractor on a public works contract. Any public money that is paid to a debarred subcontractor by the Contractor for the Project shall be returned to the Authority. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the Project.

18. State and Authority Labor and Material Requirements: Attention is called to the state and the Authority's labor and material requirements, which are deemed to be a part of the Contract, including the provisions in sections 1777.5 and 1777.6 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under Contractor.

19. Storm Water Permit for Construction Activity: Each prospective bidder is responsible for fully acquainting itself with the conditions of the Project Site (which may include more than one site), as well as those relating to the construction and labor of the Project, to fully understand the facilities, difficulties and restrictions which may impact the cost or effort required to complete the Project. To this end, a Pre-Bid Conference and Site Walk will be held on the date(s) and time(s) indicated in the Notice Inviting Bids. Storm, surface, nuisance, or other waters may be encountered at various times during construction of the Project. Federal and state laws require the Authority and its contractors to appropriately manage such waters pursuant to the requirements of California State Water Resources Control Board Order Number 2009-0009-DWQ, the Federal Clean Water Act, and the California Porter Cologne Water Quality Control Act. By submitting a bid, each bidder acknowledges that it has investigated the risk arising from such waters, has prepared its bid accordingly, and assumes any and all risks and liabilities arising therefrom. Additional information regarding Storm Water requirements is included in the General Conditions.

20. Bid Protest: Bidders may file a "protest" of a Bid with the Authority's Assistant General Manager. In order for a Bidder's protest to be considered valid, the protest must:

    A. Be filed in writing within five (5) calendar days after the bid opening date;

    B. Clearly identify the specific irregularity or accusation;

C. Clearly identify the specific Authority staff determination or recommendation being protested;

D. Specify, in detail, the grounds of the protest and the facts supporting the protest; and

E. Include all relevant, supporting documentation with the protest at time of filing.

If the protest does not comply with each of these requirements, it will be rejected as invalid.

If the protest is valid, the Authority's Assistant General Manager, or other designated Authority staff member, shall review the basis of the protest and all relevant information. The Assistant General Manager will provide a written decision to the protestor. The protestor may then appeal the decision to the Board of Directors within ten (10) calendar days following issuance of the Assistant General Manager's written decision.

21. California Environmental Quality Act and Environmental Permits: A copy of the draft Mitigated Negative Declaration and Environmental Permits from three government agencies are attached as Appendix A. These documents are attached for the Contractor's information and reference in the bidding process. Contractor should take special note of any environmental restriction that may be placed on him/her during the construction process.

STATEMENT OF BIDDER'S QUALIFICATIONS

Following is a specimen form of Statement of Bidder's Qualifications, References, and Responsibility Information. The form NEED NOT be filled out and submitted with Bidder's Bid, but any Bidder may be required by the Engineer to prepare and submit the data requested in the following schedule of information after the bids are opened and before award of the Contract. If the Bidder is a joint venture, each member of the joint venture must fill out and submit this form with its bid.

Bidder References and Responsibility Information

a. The Authority expressly reserves the right to reject the bid of any Bidder who, upon investigation, has been determined to fail to complete similar contracts in a timely fashion or in a satisfactory manner. Such rejection would, if applicable, be based upon the principle that the Bidder is "non-responsible."

b. In performing the above-described responsibility determination, the Authority reserves the right to utilize all possible sources of information in making its determination, including but not limited to: inquiries to regulatory state boards and agencies; Dun and Bradstreet credit reports, or similarly accredited credit reporting service, inquiries to companies and public entities for which the Contractor has previously performed work, reference checks, and examination of all public records.

c. The Bidder must provide the following information:

1) Firm name and address:

_____

_____

_____

2) Telephone number: _____

3) Type of firm (check one): Individual ☐ Partnership ☐ Corporation ☐

4) Contractor's License: Primary Class:_____
License Number: _____
License Expiration Date: _____

5) Names and titles of all officers of the firm:

_____ _____

_____ _____

6) Number of years as a contractor in construction of this type: _____.

d. The Bidder must also demonstrate knowledge of public works construction involving pavement and surfaces restoration and should possess a working ability to perform similarly sized construction work for a public agency. This knowledge and ability shall be shown by furnishing the names, current phone numbers, address, points of contact, and scope of work of at least five (5) customers served within the past three (3) years with requirements similar to the needs of the Authority.

- FAILURE TO FURNISH THE REFERENCES (*IN THE COMPLETE FORMAT REQUIRED*) MAY CAUSE YOUR BID TO BE REJECTED AS NON-RESPONSIVE.

EXAMPLE - Your references should be listed in the following format (facts are example only):

(a) Work for XYZ Water District
(b) Phone number (222) 123-4567
(c) 999 Holly Drive, L.A., CA 92000
(d) Contact: J.Q. Jones III at above phone number
(e) Pipeline replacement in 1990 for $1.3 million

Bidder's Name:_____

Reference #1
District or Entity: _____
Phone No.: _____
Address: _____
Name of Contact: _____
Scope of Work and $ Amount: _____

Reference #2
District or Entity: _____
Phone No.: _____
Address: _____
Name of Contact: _____
Scope of Work and $ Amount: _____

Reference #3
District or Entity: _____
Phone No.: _____
Address: _____
Name of Contact: _____
Scope of Work and $ Amount: _____

Reference #4
District or Entity: _____
Phone No.: _____
Address: _____
Name of Contact: _____
Scope of Work and $ Amount: _____

Reference #5
District or Entity: _____
Phone No.: _____
Address: _____
Name of Contact: _____
Scope of Work and $ Amount: _____

e. At any time during the last five (5) years, has your firm, or any of its owners or officers been convicted of a crime involving the awarding of a contract of a government construction project, or the bidding or performance of a government contract?
Yes ☐ or No ☐

f. At the time of submitting this bid, is your firm eligible to bid on or be awarded a public works contract or perform as a subcontractor on a public works contract pursuant to either Labor Code section 1777.1 or Labor Code section 1777.7?
Yes ☐ or No ☐. If the answer is "No," state the beginning and ending dates of the period or debarment.

g. Has your contractor's license been revoked at any time in the past five (5) years?
Yes ☐ or No ☐

h. Has a surety firm completed a contract on your behalf or paid for completion because your firm was default terminated by the project owner within the last five (5) years?
Yes ☐ or No ☐

i. At any time in the past five (5) years, has your firm been assessed and paid liquidated damages after completion of a project under a construction contract with either a public or private owner? Yes ☐ or No ☐. If the answer is "Yes," explain on a separate signed page, identifying all such projects by owner, owner's address, date of project completion, amount of liquidated damages assessed, and all other information necessary to fully explain the assessment of liquidated damages.

j. In the past five (5) years has any claim against your firm concerning your firm's work on a construction project been filed in court or arbitration? Yes ☐ or No ☐. If the answer is "Yes," on separate signed sheet of paper, identify the claim(s) by providing the project name, date of the claim, name of the claimant, a brief description of the nature of the claim, the court in which the case was filed and a brief description of the status of the claim (pending, or if resolved, a brief description of the resolution).

k. In the past five (5) years, has your firm made any claim against a project owner concerning work on a project or payment for a contract and filed that claim in court or arbitration? Yes ☐ or No ☐. If the answer is "Yes," on separate sign sheets of paper identify the claim by providing the project name, date of the claim, name of the entity(ies) against whom the claim was filed, a brief description of the nature of the claim, the court in which the case was filed and a brief description of the status of the claim (pending, or if resolved, a brief description of the resolution).

l. In the past five (5) years, has any insurance carrier, for any form of insurance, refused to renew the insurance policy for your firm? Yes ☐ or No ☐. If the answer is "Yes," explain on a separate signed page, the name of the insurance carrier, the form of insurance and the year of the refusal.

m. Has the CAL OSHA cited and assessed penalties against your firm for any "serious," "willful," or "repeat" violations of its safety or health regulations in the past five (5) years? Yes ☐ or No ☐. *Note: If you have filed an appeal of a citation, and the CAL OSHA Board has not yet ruled on your appeal, you need not include information about it. If the answer is "Yes," attach a separate signed page describing the citations, including information about the dates of the citations, the nature of the violation, the project on which the citation(s) was/were issued, the amount of penalty paid, if any. If the citation was appealed to the CAL OSHA Board and its decision has been issued, state the case number and the date of the decision.*

n. Has the federal OSHA cited and assessed penalties against your firm in the past five (5) years? Yes ☐ or No ☐. *Note: If you have filed an appeal of a citation and the appeals board has not yet ruled on your appeal, or if there is a court appeal pending, you need not include information about the citation. If the answer is "Yes," attach a separate signed page describing each citation.*

o. Has the Director of Industrial Relations or any governmental labor relations department cited and assessed penalties against your firm in the past five (5) years? Yes ☐ or No ☐. *Note: If you have filed an appeal of a citation and the appeals board has not yet ruled on your appeal, or if there is a court appeal pending, you need not include information about the citation. If the answer is "Yes," attach a separate signed page describing each citation.*

p. Has the EPA or any air quality management district or any regional water quality control board cited and assessed penalties against either your firm or the owner of a project on which your firm was the contractor in the past five (5) years? Yes ☐ or No ☐. *Note: If you have filed an appeal of a citation and the appeals board has not yet ruled on your appeal, or if there is a court appeal pending, you need not include information about the citation. If the answer is "Yes," attach a separate signed page describing each citation.*

q. How often do you require documented safety meetings to be held for construction employees and field supervisors during the course of a project?

r. List your firm's Experience Modification Rate (EMR) (California Workers' Compensation Insurance) for each of the past three (3) premium years. *Note: An EMR is issued to your firm annually by your Workers' Compensation Insurance carrier.* Current Year:_____ Previous Year:_____ Year Prior to Previous Year:_____.

If your EMR for any of these three (3) years is or was 1.00 or higher, you may, if you wish, attach a letter of explanation.

s. Within the last five (5) years, has there ever been a period when your firm had employees but was without workers' compensation insurance or a state-approved self-insurance? Yes ☐ or No ☐. If the answer is "Yes," please explain the reason for the absence of workers' compensation insurance on a separate signed page. If the answer is "No," please provide a statement by your current workers' compensation insurance carrier that verifies periods of workers' compensation insurance coverage for the past five (5) years. (If your firm has been in the construction business for less than five (5) years, provide a statement by your workers' compensation insurance carrier verifying continuous workers' compensation insurance coverage for the period that your firm has been in the construction business.

1. Name of Bidder.

2. Business address.

3. When organized.

4. Where incorporated.

5. How many years have you been engaged in the contracting business under the present firm name?

6.* Contracts in progress with current completion schedule (percent work remaining) and gross amount of each contract.

7.* General character of work performed by your company.

8. Have you ever failed to complete any work awarded to you? If so, where, and why?

9.* Have you ever defaulted on a Contract? If so, where, and why?

10.* List of more important facilities constructed by your company, including approximate cost.

11.* List your major equipment.

12.* Experience in construction work similar in importance to this project.

13.* Background and experience of the principal members of your personnel, including the officers.

14.* Credit available. Furnish written evidence.

15.* Financial statement on accompanying form (notarized).

16.* Bank and other references.

**Attach additional sheets giving the information as necessary.*

CONDENSED CURRENT FINANCIAL REPORT

Condition at close of business:_____ 20_____

ASSETS — DOLLARS AND CENTS

1. Cash: (a) On hand $_____ (b) In bank $_____ (c) Elsewhere $_____

2. Notes receivable: (a) Due within ninety (90) days_____
   (b) Due after ninety (90) days _____
   (c) Past due_____

3. Accounts receivable from completed contracts, exclusive of claims not approved for payment: _____

4. Sums earned on uncompleted contracts as shown by Engineer's or Architect's estimate.

   (a) Amount receivable after deducting retainage _____
   (b) Retainage to date, due upon completion of contracts_____

5. Accounts receivable from sources other than construction contracts:_____
   _____

6. Deposit for bids or other guarantees:
   (a) Recoverable within ninety (90) days_____
   (b) Recoverable after ninety (90) days _____

7. Interest accrued on loans, securities, etc.: _____

8. Real Estate: (a) Used for business purposes_____
   (b) Not used for business purposes_____

9. Stocks and Bonds: (a) Listed - Present market value_____
   (b) Unlisted - Present value_____

10. Materials in stock not included in Item 4:
    (a) For uncompleted contracts (present value)_____
    (b) Other materials (present value)_____

11. Equipment, book value:_____

12. Furniture and fixtures, book value:_____

13. Other assets:_____

TOTAL ASSETS:_____

LIABILITIES

1. Notes Payable: (a) To banks regular _____
   (b) To banks for certified checks _____
   (c) To others for equipment obligations _____
   (d) To others exclusive of equipment obligations _____

2. Accts. Payable*: (a) Net past due _____
   (b) Past due _____

3. Real estate encumbrances _____

4. Other liabilities* _____
   **Includes all amounts owing subcontractors for all work in place and accepted or completed and uncompleted contracts, including retainage.*

5. Reserves: _____

6. Capital stock paid up: (a) Common _____
   (b) Common _____
   (c) Preferred _____

7. Surplus (net worth) Earned $_____
   Unearned $_____

   TOTAL LIABILITIES $_____

CONTINGENT LIABILITIES

	DOLLARS	CENTS

1. Liability on notes receivable, discounted, or sold _____
   _____

2. Liability on accounts receivable, pledged, assigned, or sold _____
   _____

3. Liability as bondsmen _____

4. Liability as guarantor on contracts or on accounts of others _____
   _____

5. Other contingent liabilities _____

   TOTAL CONTINGENT LIABILITIES _____

*Attach additional sheets giving the information.

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT PROPOSAL

TO THE HONORABLE GOVERNING BOARD OF SWEETWATER AUTHORITY:

The undersigned declares that he/she has carefully examined the Plans and Specifications and has physically inspected the site of the Work, and that he/she has read the accompanying Invitation to Bidders, and hereby proposes to furnish all tools, equipment, materials, supplies, temporary facilities, manufactured articles, and for all labor, operations and incidentals and appurtenances to as necessary to complete the various items of the Work, in accordance with the Drawings, Special Provisions, and Specifications, as set forth in the following schedule:

ITEM NO.	DESCRIPTION, ESTIMATED QUANTITY, AND PRICE	AMOUNT
1.	Mobilization Seventy Five Thousand Dollars Dollars ($ 75,000) per lump sum	$ 75,000
2.	Furnish and install sheeting/shoring _____ Dollars ($_____) per lump sum	$_____
3.	Clear and grub approximately 0.3 acres _____ Dollars ($_____) per lump sum.	$_____
4.	Demolition; remove, and dispose of approximately 426 linear feet of 36" steel pipe, including fittings, appurtenances, concrete encasement, flowmeter, sensor lines, and portion of stilling pool structure _____ Dollars ($_____) per lump sum	$_____
5.	Abandon approximately 203 linear feet of existing 36-inch steel pipeline in-place and existing blowoff at sta. 11+40 _____ Dollars ($_____) per lump sum.	$_____
6.	Furnish and Install approximately 426 linear feet of new buried 36-inch welded steel pipe, including fittings, appurtenances, electrical conduits, concrete encasement, dewatering and earthwork _____ Dollars ($_____) per linear foot.	$_____

7.	Furnish and Install approximately 203 linear feet of new above-grade 36-inch welded steel pipe , including fittings, appurtenances, electrical conduits, concrete encasement, and anchoring it to the top of the concrete encasement of the existing 36-inch steel pipe _____ Dollars ($_____) per linear foot.	$_____
8.	Furnish and Install two (2) manways at sta. 10+50, and sta. 15+10 _____ Dollars ($_____) per each.	$_____
9.	Furnish and Install one (1) combination air and vacuum valve at sta. 11+95 _____ Dollars ($_____) per each.	$_____
10.	Furnish and Install one (1) new 12-inch blowoff at sta. 11+40 _____ Dollars ($_____) per lump sum.	$_____
11.	Furnish and Install one (1) new 8-inch blowoff at sta. 14+20 _____ Dollars ($_____) per lump sum.	$_____
12.	Furnish and install approximately 32 linear feet of 30-inch pipe lining inside of dam, one (1) combination air and vacuum valve at sta. 16+ 42+/-, connect liner pipe to existing 36-inch steel pipe, connect one (1) new 2.5" fire hose connection at Sta. 16+52+/-, and rehabilitate combination air and vacuum valve drain line _____ Dollars ($_____) per lump sum.	$_____
13.	Connect new steel pipe to existing steel pipe at sta. 10+00 _____ Dollars ($_____) per lump sum.	$_____
14.	Re-construct portion of the stilling pool structure _____ Dollars ($_____) per lump sum.	$_____

15.	Construct concrete access ramp and concrete drainage ditch _____ Dollars ($_____) per lump sum.	$_____
16.	Furnish and install corrosion monitoring _____ Dollars ($_____) per lump sum.	$_____
	Total Bid Price for Bid Items 1 through 16	**$_____**

Total Bid Price for Bid Items 1 through 16 (write out in words) _____

_____

_____

The intention of this bid is to furnish a complete and finished piece of work, including all labor, materials, equipment, utilities, and transportation necessary for the proper execution of the work. Anything not listed as a bid item, but required to complete the work per plans and specifications and law and regulations, shall be considered as included in the unit cost paid for the various items of work.

The Bidder agrees that this Proposal Bid shall be valid for sixty (60) calendar days after the bid opening date.

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT PROPOSAL

The following addenda were received prior to bid opening:_____

_____

_____

Enclosed find cash or Bidder's bond, or cashier's or certified check number_____ of the _____ Bank for _____, which is not less than ten percent (10%) of the total bid price, payable to the Sweetwater Authority, 505 Garrett Avenue, Chula Vista, California, and which is given as a guarantee that the undersigned will enter into contract and provide the necessary bonds and certificate of insurance, if awarded the work.

The Bidder furthermore agrees that, in case of his default in executing said Contract and furnishing required bonds and certificate of insurance, the cash, bid bond, cashier's or certified check accompanying this Proposal and the money payable thereon shall become and remain the property of the Authority.

The undersigned agrees, if awarded the Contract, that there shall be paid by the undersigned, and all subcontractors under him, to all laborers, workmen and mechanics employed in the execution of such contract or any subcontract thereunder, no less than the general prevailing rate of per hourly wages in the locality in which the work is to be performed, as established by the Director of the Department of Industrial Relations, State of California.

Contractor confirms license(s) required by California State Contractor's License Law for the performance of the subject project are in full effect and proper order. The following are the Contractor's applicable license number(s) with their expiration date(s):

_____

_____

_____

Note: I state under penalty of perjury that all information submitted in this Proposal is true and correct.

Signature of Bidder:_____

If an individual, so state. If a firm or co-partnership, state the firm name and give the name of all individuals, co-partners, composing the firm. If a corporation, also names of President, Secretary, Treasurer, and Manager thereof, and affix Corporate Seal thereto).

_____

_____

Date: _____, 2011

Legal address of firm:

_____

_____

Federal Tax I.D. Number:

_____

Telephone Number:

_____

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT PROPOSAL

SUBCONTRACTORS AND SUPPLIERS

Bidder shall set forth the name and address of the place of business of each subcontractor and supplier who will perform work, or labor, or render service to the Bidder on said contract, and each subcontractor licensed by the State of California, who under subcontract to the Bidder, specially fabricates and installs a portion of the work according to the plan and specifications, in an amount of excess of one-half (1/2) of one percent (1%) of the total bid, and that portion of the work to be done by such subcontractor in accordance with Public Contract Code section 4104. The Authority will not permit prime contractors to submit required subcontractor information after the deadline for submission of bids.

Name of Subcontractor, License Number, and Classification	Address of Place of Business	Work to be done by Subcontractor
		Steel Pipe Fabrication

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT PROPOSAL

CERTIFICATE OF CONTRACTOR

PURSUANT TO SECTION 1861 OF THE LABOR CODE TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

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

Dated this_____, 2011.

_____

_____

License No./Expiration Date

_____

License Classification

_____

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT PROPOSAL

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

State of California)

ss.

(County of _____)

_____, being first duly sworn, deposes and says that he or she is _____ of _____ the party making the foregoing bid, that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

_____ _____

Business Address Signature of Bidder

_____

(Attach Proper Notarization)

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT PROPOSAL

BID BOND

The makers of this bond are, _____, as Principal, and _____, as Surety and are held and firmly bound unto the Sweetwater Authority, hereinafter called the Authority, in the penal sum of TEN PERCENT (10%) OF THE TOTAL BID PRICE of the Principal submitted to Authority 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, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted the accompanying bid dated _____, 20 ____, for SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT.

If the Principal does not withdraw its bid within the time specified in the Contract Documents; and if the Principal is awarded the Contract and provides all documents to the Authority as required by the Contract Documents; then this obligation shall be null and void. Otherwise, this bond will remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents shall in affect its obligation under this bond, and Surety does hereby waive notice of any such changes.

In the event a lawsuit is brought upon this bond by the Authority and judgment is recovered, the Surety shall pay all litigation expenses incurred by the Authority in such suit, including reasonable attorneys' fees, court costs, expert witness fees and expenses.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals this _____ day of _____, 2011, the name and corporate seal of each corporation.

(Corporate Seal)

Contractor/ Principal

By _____

Title _____

(Corporate Seal)

Surety

By _____

Attorney-in-Fact

(Attach Attorney-in-Fact Certificate)

Title _____

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT CONTRACT

This CONTRACT NO. _____ made and entered into this _____ day of_____, 2011, by and between SWEETWATER AUTHORITY, sometimes hereinafter called the "Authority," and _____, hereinafter called the "Contractor."

WITNESSETH: That the parties hereto have mutually covenanted and agreed, and by these presents do covenant and agree with each other, as follows:

FIRST: CONTRACT DOCUMENTS: The complete Contract includes all of the Contract documents, to wit: the Notice to Bidders, Instructions to Bidders, Proposal (including Bid Form, Subcontractor's Form, Certificate of Contractor and Non-Collusion Affidavit), General Conditions, Special Conditions, Technical Specifications, the wage schedule, the Contract, the bonds executed in connection herewith, Certificate of Contractor, Certificates of Insurance, and all official papers and documents relating to the work to be performed hereunder, the Sweetwater Authority Standard Specifications, Drawings, Standard Specifications for Public Works Construction (Green Book) current edition with the exception of Sections 1-9 which are inapplicable to the work under this Contract, and all modifications incorporated in these documents before their execution. These documents shall be deemed and considered as forming a part of this Contract as fully set forth herein and whether or not attached hereto. Any and all obligations of the Authority and the Contractor are fully set forth and described herein.

SECOND: MATERIALS AND EQUIPMENT: Contractor agrees to perform the work of the **SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT** and to furnish all tools, equipment, apparatus, facilities, labor, and material necessary to perform and complete in a good workmanlike manner, all parts of the work as called for in a manner designated in and in strict conformance with the Plans and Specifications. It is understood and agreed that said tools, equipment, apparatus, facilities, labor, and material shall be furnished and said work performed and completed as required in said plan and specifications under the direction and supervision of, and subject to the approval of the Authority or its representatives.

THIRD: PAYMENT: The Authority agrees to pay and the Contractor agrees to accept, in full payment for the work agreed to be done, the prices named in the Proposal, in the manner and with such additions, or deductions as are provided for in this Contract.

FOURTH: DISPUTES: Should any dispute arise respecting the true value of any work done, of any work omitted, or of any extra work which Contractor performed during the completion of this Contract, said dispute shall be decided by the Director of Engineering ("Engineer") or his/her designee and the decision of the latter shall be final and conclusive, subject to the approval of the Governing Board of said Authority, and pursuant to the terms of the Contract.

FIFTH: NOTICE OF THIRD PARTY CLAIMS: Pursuant to Public Contract Code section 9201, the Authority shall provide Contractor with timely notification of the receipt of any third party claim, relating to the Contract. The Authority is entitled to recover its reasonable costs incurred in providing such notification.

SIXTH: COMPLETION: It is agreed time is of the essence in completing this work and the time limit for the completion of the Contract work shall be as defined in Section 2.02, of the Special Conditions.

A. Delayed Completion – Damages; In the event that the Contractor fails to complete all or any portion of the work to the satisfaction of the Engineer within the specified time, Contractor shall pay as liquidated damages and not as a penalty, the sum of THREE THOUSAND DOLLARS ($3,000) per day. This sum represents a reasonable endeavor to estimate a fair compensation for the foreseeable losses that might result from such a delay.

B. Incentive To Contractor; As an incentive to the Contractor, in the event that the pipeline is fully operational before December 31, 2011, the Contractor shall be paid a sum of FOUR THOUSAND DOLLARS ($4,000) per day for every day prior to December 31, 2011.

SEVENTH: PUBLIC SAFETY: During the performance of the work, Contractor shall erect and maintain temporary fences, bridges, railing, and barriers and shall take over all the necessary precautions and place proper guards for the prevention of accidents; shall indemnify and save harmless the Authority and the Board, its officers and agents, and employees from all damages and costs to which they may be put by reason of injury to person or property resulting from the Contractor's negligence or carelessness in the performance of the work, or in guarding the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the Contractor or his agents.

EIGHTH: COMPLIANCE WITH PROVISION OF LAW RELATIVE TO PUBLIC CONTRACTS: The Authority is a Public Agency of the State of California subject to the provisions of the Government Code, Labor Code, Public Contract Code, and all applicable laws of the state. It is stipulated and agreed that all provisions of the law applicable to the public contracts are a part of this Contract to the same extent as though set forth herein and will be complied with. These include, but are not limited to, the payment of not less than the prevailing rate of wages, the stipulation that eight (8) hours labor shall constitute a legal day's work and that no worker shall be permitted to work in excess of eight (8) hours during any one (1) calendar day except as permitted by law. Contractor may be subject to penalties for noncompliance.

NINTH: SUBSTITUTE OF SECURITY: It is agreed that pursuant to section 22300 of the Public Contract Code of the State of California, the Contractor may substitute securities for any money withheld by the Authority to ensure the performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the Authority, with the state or federally chartered bank as the escrow agent, who shall return such securities to the Contractor upon satisfactory completion of the Contract. Deposit of securities with an escrow agent shall be subject to a written agreement between the escrow agent and the Authority, which provides that no portion of the securities shall be paid to the Contractor until the Authority has certified to the escrow agent, in writing, that the Contract has been satisfactorily completed. Securities eligible for investment under this section shall be limited to those listed in section 16430 of the Government Code, bank, or savings and loan certificates of deposit, interest-bearing demand deposit accounts, stand-by letters of credit, or any other security mutually agreed to by the Contractor.

IN WITNESS WHEREOF: The Contract is executed by the Manager or Assistant General Manager of the Authority.

SWEETWATER AUTHORITY: CONTRACTOR:

By:_____ By:_____
Manager or Assistant General Manager

Date:_____ Date:_____

(ALL SIGNATURES MUST BE NOTARIZED AND CORPORATE SEALS AFFIXED, IF APPLICABLE)

Approved as to form this _____day of _____ 2011.

_____
(Attorney for Sweetwater Authority)

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
BOND FOR FAITHFUL PERFORMANCE

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, Sweetwater Authority (hereinafter referred to as "Authority") has awarded to _____, (hereinafter referred to as the "Principal") an agreement for the installation and completion of SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT (hereinafter referred to as the "Project").

WHEREAS, the work to be performed by the Principal is more particularly set forth in the Contract Documents for the Project dated _____, (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, the Principal is required by said Contract Documents to perform the terms thereof and to furnish a bond for the faithful performance of said Contract Documents.

NOW, THEREFORE, we, the undersigned Principal and _____ as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the Authority in the sum of_____, ($_____), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Principal, his or its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless the Authority, its officers and agents, as stipulated in said Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees including reasonable attorney's fees, incurred by Authority in enforcing such obligation.

As a condition precedent to the satisfactory completion of the Contract Documents, unless otherwise provided for in the Contract Documents, the above obligation shall hold good for a period of one (1) year after the acceptance of the work by Authority, during which time if Principal shall fail to make full, complete, and satisfactory repair and replacements and totally protect the Authority from loss or damage resulting from or caused by defective materials or faulty workmanship. The

obligations of Surety hereunder shall continue so long as any obligation of Principal remains. Nothing herein shall limit the Authority's rights or the Principal or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Principal shall be, and is declared by the Authority to be, in default under the Contract Documents, the Surety shall remedy the default pursuant to the Contract Documents, or shall promptly, at the Authority's option:

(1) Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or

(2) Obtain a bid or bids for completing the Project in accordance with all terms and conditions in the Contract Documents and upon determination by Surety of the lowest responsive and responsible bidder, arrange for a Contract between such bidder, the Surety and the Authority, and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Principal by the Authority under the Contract and any modification thereto, less any amount previously paid by the Authority to the Principal and any other set offs pursuant to the Contract Documents.

(3) Permit the Authority to complete the Project in any manner consistent with California law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Principal by the Authority under the Contract and any modification thereto, less any amount previously paid by the Authority to the Principal and any other set offs pursuant to the Contract Documents.

Surety expressly agrees that the Authority may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal.

Surety shall not utilize Principal in completing the Project nor shall Surety accept a bid from Principal for completion of the Project if the Authority, when declaring the Principal in default, notifies Surety of the Authority's objection to Principal's further participation in the completion of the Project.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project to be performed thereunder shall in any way affect its obligations on this

bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 2011.

(Corporate Seal)

_____
Contractor/ Principal

By _____

Title _____

_____
Surety

(Corporate Seal)

By _____
Attorney-in-Fact

(Attach Attorney-in-Fact Certificate)

Title _____

The rate of premium on this bond is _____ per thousand. The total amount of premium charges, $_____.
(The above must be filled in by corporate attorney.)

THIS IS A REQUIRED FORM

Any claims under this bond may be addressed to:
(Name and Address of Surety)

_____

_____

_____

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
BOND FOR FAITHFUL PERFORMANCE

(Name and Address of Agent or Representative for service of process in California, if different from above) _____

_____

_____

(Telephone number of Surety and Agent or Representative for service of process in California _____

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
LABORER'S AND MATERIALMEN'S PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that:

WHEREAS, Sweetwater Authority (hereinafter designated as "Authority"), by action taken or a resolution passed _____ has awarded to _____, hereinafter designated as the "Principal," a contract for the work described as follows: the installation and completion of SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT (the "Project"); and

WHEREAS, said Principal is required to furnish a bond in connection with said contract; providing that if said Principal or any of its Subcontractors shall fail to pay for any materials, provisions, provender, equipment, or other supplies used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, or for amounts due under the Unemployment Insurance Code or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Principal and its Subcontractors with respect to such work or labor the Surety on this bond will pay for the same to the extent hereinafter set forth.

NOW THEREFORE, we, the Principal and _____ as Surety, are held and firmly bound unto the Authority in the penal sum of _____ ($_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his or its subcontractors, heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 3181 of the Civil Code, fail to pay for any materials, provisions or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or amounts due under the 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 Employment Development Department or Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Section 18663 of the Revenue and Taxation Code, with respect to such work and labor the Surety or Sureties will pay for the same, in an amount not exceeding the sum herein above specified, and also, in case suit is brought upon this bond, all litigation expenses incurred by the Authority in such suit, including reasonable attorneys' fees, court costs, expert witness fees and investigation expenses.

This bond shall inure to the benefit of any of the persons named in Section 3181 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the Surety on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement

herein above described, or pertaining or relating to the furnishing of labor, materials, or equipment therefore, nor by any change or modification of any terms of payment or extension of the time for any payment pertaining or relating to any scheme or work of improvement herein above described, nor by any rescission or attempted rescission or attempted rescission of the contract, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the owner or Authority and original contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 3110 or 3112 of the Civil Code, and has not been paid the full amount of his claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned.

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

(Corporate Seal)

_____
Contractor/ Principal

By _____

Title _____

_____
Surety

(Corporate Seal)

By _____
Attorney-in-Fact

(Attach Attorney-in-Fact Certificate)

Title _____

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
PART 1 - GENERAL CONDITIONS

1.01 Contract Documents: The complete Contract includes all the Contract documents to wit: the Notice to Bidders, Instructions to Bidders, Proposal (including Bid Form, Subcontractors Form, Certificate of Contractor and Non-Collusion Affidavit), General Conditions, Special Conditions, Technical Specifications, the wage schedule, the Contract, the Bonds executed in connection herewith, Certificate of Contractor, Certificates of Insurance, and all official papers and documents relating to The Work to be performed hereunder, the Sweetwater Authority Standard Specifications, Drawings, Standard Specifications for Public Works Construction (Greenbook) current edition with the exception of Sections 1 through 9 which are inapplicable to the work under this Contract, and all modifications incorporated in these documents before their execution.

These Contract documents are complementary and what is called for in any one shall be as binding as if called for in all. The intention of the Contract document is to require a complete and finished piece of work, including all labor, materials, equipment, utilities, and transportation necessary for the proper execution of the work. Anything shown in the drawings and not in the Specifications, or in the Specifications and not in the drawings, or neither in the drawings nor in the Specifications, but necessary to properly complete the work in accordance with law and governmental regulations, shall be performed by the Contractor.

1.02 Insurance: The Contractor shall submit two (2) copies of insurance evidence (Accord Form 25-5, or equivalent) commonly known as "Certificate of Insurance." The certificates are to be completed by the Contractor's Insurance carrier(s) and signed by an authorized agent(s) of the insurance company(ies). The Contractor shall not commence any work under this Contract until such "Certificate of Insurance" is in the hands of and approved by the Authority. The current insurance requirements and limits are shown below and may be modified from time to time. The Authority, its Board, Employees, and Officers shall be named as an additional insured.

A. Commercial General Liability Insurance:

The Contractor shall take out and maintain, during the performance of all work under this Contract and for twenty-four (24) months following the date of recording the Notice of Completion, in amounts not less than specified in the Contract documents, Commercial General Liability (CGL) Insurance, in a form and with insurance companies acceptable to the Authority.

Coverage for Commercial General Liability Insurance shall be at least as broad as the following:

- Insurance Services Office Commercial General Liability coverage

(Occurrence Form CG 0001).

Commercial General Liability Insurance must include coverage for the following:

1. Bodily Injury and Property Damage
2. Personal Injury/Advertising Injury
3. Premises/Operations Liability
4. Products/Completed Operations Liability
5. Aggregate Limits that Apply per Project
6. Explosion, Collapse, and Underground (UCX) Exclusion deleted
7. Contractual Liability with respect to this Contract
8. Broad Form Property Damage
9. Independent Contractors Coverage

All such policies shall name the Authority, the Board, and each member of the Board, its officers, employees, agents, and volunteers as Additional Insureds under the policy. The general liability program may utilize either deductibles or provide coverage excess of a self-insured retention, subject to written approval by the Authority.

B. Automobile Liability:

At all times during the performance of the work under this Contract, and for twenty-four (24) months following the date or recording of the Notice of Completion, the Contractor shall maintain Automobile Liability Insurance for bodily injury and property damage including coverage for owner, non-owned and hired vehicles in a form and with insurance companies acceptable to the Authority.

Coverage for automobile liability insurance shall be at least as broad as Insurance Services Office Form Number CA 0001 (ed. 6/92) covering automobile liability, Code 1 (any auto).

The automobile liability program may utilize deductibles, but not a self-insured retention, subject to written approval by the Authority.

All such policies shall name the Authority, the Board and each member of the Board, its officers, employees, agents, and volunteers as Additional Insureds under the policies.

C. Workers' Compensation / Employer's Liability Insurance:

At all times during the performance of the work under this Contract and for twenty-four (24) months following the date or recording of the Notice of Completion, the Contractor shall maintain workers' compensation in compliance with applicable statutory requirements and Employer's Liability Coverage in amounts not less than the limits specified in the Contract documents.

Such insurance shall include an insurer's Waiver of Subrogation in favor of the Authority and will be in a form and with insurance companies acceptable to the Authority.

If insurance is maintained, the workers' compensation and employer's liability program may utilize either deductibles or provide coverage excess of a self-insured retention, subject to written approval by the Authority. Before beginning the work, the Contractor shall furnish to the Authority satisfactory proof that he/she has taken out for the period covered by the work under this Contract, full compensation insurance for all persons employed directly by him/her or through subcontractors in carrying out the work contemplated under this Contract, all in accordance with the "Workers' Compensation and Insurance Act," Division IV of the Labor Code of the State of California and any acts amendatory thereof.

D. Builder's "All Risk" Insurance:

At all times during the performance of the work, the Contractor shall maintain builder's risk insurance on "all risk" completed value basis (including flood) upon the entire project which is the subject of the Contract. Coverage shall include completed work as well as work in progress. The Contractor is responsible for damage due to earthquakes, but insurance for damages from this peril is optional with the Contractor. Earthquake and tidal wave insurance to be provided by Contractor requires separate bid item. Such insurance shall include the Authority as Loss Payee.

Such insurance may have a deductible clause but not to exceed the smaller of: five percent (5%) of the total amount of the Contract; or ten thousand dollars ($10,000) for all risks, except flood. The deductible for flood shall not exceed five percent (5%) of the total amount of the Contract.

Such policies shall name the Authority as Additional Insured. The making of progress payments to the Contractor shall not be construed as creating an insurable risk interest by or for the Authority or be construed as relieving the Contractor or his subcontractors of responsibility for loss from any direct physical loss, damage, or destruction occurring prior to final acceptance of

the work by the Authority.

The insurer shall waive all rights of subrogation against the Authority and shall provide the Authority with a Certificate of Insurance for Builder's Risk insurance coverage and evidence of waiver of rights of subrogation against the Authority.

E. Contractor's Equipment Insurance:

At all times during the performance of the work, the Contractor shall maintain contractor's equipment insurance on an "all risk" basis covering equipment owned, leased, or used by Contractor. Such insurance shall include an insurer's Waiver of Subrogation in favor of the Authority, and will be in a form and with insurance companies acceptable to the Authority. Contractor hereby releases and holds harmless the Authority for any loss or damage to equipment.

F. Minimum Policy Limits Required:

The following insurance limits are required for the Contract:

	Combined Single Limit
Commercial General Liability	$2,000,000 per occurrence / $5,000,000 aggregate for bodily injury, personal injury and property damage
Automobile Liability	$1,000,000 per occurrence for bodily injury and property damage
Employer's Liability	$1,000,000 per occurrence
Contractor's Equipment	Completed value or replacement cost

G. Evidence Required:

Prior to execution of the Contract, the Contractor shall file with the Authority evidence of insurance from an insurer or insurers certifying to the coverage of all insurance required herein. Such evidence shall include original copies of the ISO CG 2010 (or insurer's equivalent) signed by the insurer's representative, and Certificate of Insurance (Accord Form 25-S or equivalent). All evidence of insurance shall be certified by a properly authorized officer, agent, or qualified representative of the insurer and shall certify the names of the insured, any additional primary insureds, where appropriate, the type and amount of the insurance, the location and

operations to which the insurance applies, and the expiration date of such insurance.

H. Policy Provisions Required:

All policies shall contain a provision for thirty (30) days advance written notice by the insurers to the Authority of any cancellation. Statements that the carrier "will endeavor" and "that failure to mail such notice shall impose no obligation and liability upon the company, its agents, or representatives," will not be acceptable on certificates.

All policies shall contain a provision stating that the Contractor's policies are primary insurance and that the insurance of the Authority or any named insureds shall not be called upon to contribute to any loss.

I. Qualifying Insurers:

All policies required shall be issued by acceptable insurance companies, as determined by the Authority, which satisfy the following minimum requirements:

- Insurance carriers shall be qualified to do business in California and maintain an agent for process within the state. Such insurance carrier shall have not less than an "A" policyholder's rating and a financial rating of not less than "Class IV" according to the latest **Best** Key Rating Guide.

J. Additional Insurance Provisions:

The foregoing requirements as to the types and limits of insurance coverage to be maintained by Contractor, and any approval of said insurance by the Authority, is not intended to and shall not in any manner limit or qualify the liabilities and obligations otherwise assumed by the Contractor pursuant to this Contract, including but not limited to, the provisions concerning indemnification.

If at any time during the life of the Contract, the Contractor fails to maintain in full force any insurance required by the Contract documents, the Authority may acquire the necessary insurance for the Contractor and deduct the cost hereof from the appropriate progress payments due the Contractor.

The Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein.

The Authority may require the Contractor to provide complete copies of all insurance policies in effect for the duration of the Project.

Neither the Authority, nor the Board, nor any member of the Board, nor any of the directors, officers, employees, agents, or volunteers shall be personally responsible for any liability arising under or by virtue of the Contract.

1.03 Unemployment Insurance: Contractor hereby agrees to accept exclusive liability for contributions for unemployment insurance, old age pensions, or annuities, measured by wages, salaries, or other remuneration paid to employees of said Contractor.

1.04 Assignment of Contract: Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of this Contract, or of his/her right, title of interest in, or to the same or any part thereof without previous consent in writing from the Authority. Any assignment of money due or to become due under this Contract shall be subject to a prior lien for services rendered or material supplied for performance of Work called for under the Contract in favor of all persons, firms, or corporations rendering such services or supplying such Materials to the extent that the claims are filed pursuant to the Civil Code, the Code of Civil Procedure or the Government Code.

1.05 Authority's Right to Terminate Contract:

A. Termination for Cause: The Authority may, without prejudice to any other right or remedy, serve written notice upon Contractor of its intention to terminate this Contract if the Contractor: (i) refuses or fails to prosecute the Work or any part thereof with such diligence as will ensure its completion within the time required; (ii) fails to complete the Work within the required time; (iii) should file a bankruptcy petition or be adjudged a bankrupt; (iv) should make a general assignment for the benefit of its creditors; (v) should have a receiver appointed; (vi) should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials to complete the work; (vii) should fail to make prompt payment to subcontractors or for material or labor; (viii) persistently disregard laws, ordinances, other requirements or instructions of the Authority; or (ix) should violate any of the provisions of the Contract documents.

The notice of intent to terminate shall contain the reasons for such intention to terminate. Unless within ten (10) days after the service of such notice, such condition shall cease or satisfactory arrangements (acceptable to the Authority) for the required correction are made, this Contract shall be terminated. In such case, Contractor shall not be entitled to receive any further payment until the Project has been finished. The Authority may take over and complete the Work by any method it may deem appropriate. Contractor and its surety shall be liable to the Authority for any excess costs or other damages incurred by the Authority to complete the Project. If the Authority takes over the Work, the Authority may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plant, and other property belonging to the Contractor as may be on the Project site.

B. Termination For Convenience: The Authority may terminate performance of the Work in whole or, in part, if the Authority determines that a termination is in the Authority's interest. **THE CONTRACTOR SHALL TAKE SPECIAL NOTE THAT THE AUTHORITY IS REQUIRED TO SECURE THE PERMITS ATTACHED IN APPENDIX A. IF THE AUTHORITY DOES NOT RECEIVE THESE PERMITS BY OCTOBER 1, 2011, THE CONTRACT WILL BE TERMINATED AND THE CONTRACTOR PAID FOR COST(S) INCURRED TO DATE OF TERMINATION.**

The Contractor shall terminate all or any part of the Work upon delivery to the Contractor of a "Notice of Termination" specifying that the termination is for the convenience of the Authority, the extent of termination, and the effective date of such termination.

After receipt of Notice of Termination, and except as directed by the Authority, the Contractor shall, regardless of any delay in determining or

adjusting any amounts due under this Termination for Convenience clause, immediately proceed with the following obligations:

1) Stop Work as specified in the Notice.

2) Complete any Work specified in the Notice of Termination in a least cost/shortest time manner while still maintaining the quality called for under the Contract documents.

3) Leave the property upon which the Contractor was working and upon which the facility (or facilities) forming the basis of the Contract documents is situated in a safe and sanitary manner such that it does not pose any threat to the public health or safety.

4) Terminate all subcontracts to the extent that they relate to the portions of the Work terminated.

5) Place no further subcontracts or orders, except as necessary to complete the remaining portion of the Work.

6) Submit to the Authority, within ten (10) days from the effective date of the Notice of Termination, all of the documentation called for by the Contract documents to substantiate all costs incurred by the Contractor for labor, materials and equipment through the Effective Date of the Notice of Termination. Any documentation substantiating costs incurred by the Contractor solely as a result of the Authority's exercise of its right to terminate this Contract pursuant to this clause, which costs the Contractor is authorized under the Contract documents to incur, shall: (i) be submitted to and received by the Authority no later than thirty (30) days after the effective date of the Notice of Termination; (ii) describe the costs incurred with particularity; and (iii) be conspicuously identified as "Termination Costs Occasioned by the Authority's Termination for Convenience."

7) These provisions are in addition to and not in limitation of any other rights or remedies available to the Authority.

C. Notwithstanding any other provision of this Article, when immediate action is necessary to protect life and safety or to reduce significant exposure or liability, the Authority may immediately order Contractor to cease Work on the Project until such safety or liability issues are addressed to the satisfaction of the Authority or the Contract is terminated.

1.06 Subcontracts:

A. At the discretion of the Authority, subcontracts may be permitted, and only to such extent as shall be shown necessary or definitely advantageous to the

principal Contractor in the prosecution of the work and without injury to the interests of the Authority. No subcontract will be permitted which has the effect of avoiding any requirements or provisions of the main Contract. Each subcontract shall contain a reference to the Contract between the Authority and Contractor and the terms of that agreement and all parts thereof shall be made a part of such Contract insofar as applicable to the work covered thereby.

B. Subcontractors employed by Contractor on the execution of the work covered in these Specifications shall be only those named by Contractor in his/her bid, except with prior written permission from the Authority, and otherwise comply with sections 4100 to 4113 inclusive of the Public Contract Code of California.

C. The Authority reserves the right to let other contracts in connection with this Work or on the Project site. Contractor shall permit other contractors reasonable access and storage of their materials and execution of their work and shall properly connect and coordinate its Work with theirs.

D. To ensure proper execution of its subsequent Work, Contractor shall immediately inspect work already in place and shall at once report to the Engineer any problems with the work in place or discrepancies with the Contract documents.

E. Contractor shall ascertain to its own satisfaction the scope of the Project and nature of any other contracts that have been or may be awarded by the Authority in prosecution of the Project to the end that Contractor may perform this Contract in the light of such other contracts, if any. Nothing herein contained shall be interpreted as granting to Contractor exclusive occupancy at site of the Project. Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the Project. If simultaneous execution of any contract for the Project is likely to cause interference with performance of some other contract or contracts, the Engineer shall decide which Contractor shall cease Work temporarily and which contractor shall continue or whether work can be coordinated so that contractors may proceed simultaneously. The Authority shall not be responsible for any damages suffered or for extra costs incurred by Contractor resulting directly or indirectly from award, performance, or attempted performance of any other contract or contracts on the Project site.

1.07 Permits and Licenses: Prior to beginning any work, the Contractor must obtain the necessary permits and licenses for the construction of the project, pay all fees, post all deposits, or bonds required by law with the Agency within whose jurisdiction the work occurs. A list of required project permits that the OWNER must secure may be found in Section 01 41 26, paragraph 1.3 of the Technical Specifications. Copies of

applications for the permits are attached as Appendix A

1.08 Preconstruction and Construction Communication: After the Notice to Proceed is received and required permits, if applicable, are obtained by Contractor, a preconstruction meeting will be scheduled by the Contractor with the Construction Manager and the Engineer's representative, to review Contract specifications, construction communications, and construction scheduling.

1.09 Examination of Plans, Specifications, Special Conditions, and Site of Work: Contractor shall examine carefully the site of the proposed work, the Proposal, Plans, Specifications, and Contract forms. The Contractor shall satisfy himself as to the character, quality, and quantities of work to be performed, materials to be furnished, and as to the requirements of these Specifications, and the Contract. The plan for the work will show conditions as they are believed by the Engineer to exist, but it is not to be inferred that all of the conditions as shown thereon are actually existent, nor shall the Authority or any of its officers, directors, employees, or agents be liable for any loss sustained by Contractor as a result of any variance between conditions as shown on the Plans and the actual conditions revealed during the progress of the work or otherwise.

Should anything be omitted from the Plans or Specifications, which is necessary for a clear understanding of the work, or should any errors appear in either the various instruments, or in the work done by other Contractors affecting the work included in the Specifications, it shall be the duty of Contractor to notify the Engineer.

In the event of Contractor's failure to give such notice, Contractor shall make good any damage or defect in the work caused thereby. The execution of work specially detailed or explained without a previous written claim for an extra charge, shall constitute an acceptance by Contractor.

1.10 Changes and Extra Work:

A. The Engineer may prescribe a modification of requirements or methods of work; and for such purposes the Engineer may at any time during the life of the Contract, by written order make such changes as he shall deem necessary in the design, line, grade, form, location, dimensions, plans, or material of any part of the work or equipment hereinafter specified, or in the quantity or character of the work or equipment to be furnished. In the event conditions develop which, in the opinion of the Contractor, make strict compliance with these Specifications impractical, Contractor shall submit to the Engineer for his consideration and approval or disapproval, a written request for modification of requirements or methods of work. This request shall set forth in detail, the reasons why the specified requirements or methods are considered impractical and Contractor's proposal for any alternate method of accomplishment, which will relieve this alleged

impracticality. If such changes increase or diminish the quantity or amount of work to be done, they shall not constitute the basis for a claim for damages or anticipated profits on the work that may be dispensed with; provided, that is, such changes or alterations render useless any work already done or materials already furnished or used in the work. The Engineer shall make reasonable allowance therefore, which action shall be binding upon both parties.

B. In the event of increasing or decreasing of work, the total amount of work actually done, materials, or equipment furnished shall be paid for according to the unit price established for such work under the Contract, wherever such unit price has been established. In the event no prices are named in the Contract to cover such changes or alterations, the cost of such changes shall be covered as hereinafter provided for extra work.

C. If during the performance of the Contract, it shall, in the opinion of the Engineer, become necessary or desirable for the proper completion of the Contract to order work done or materials or equipment furnished which in the opinion of the Engineer are not susceptible of classification under the items named in the Proposal, Contractor shall do and perform such work and furnish such materials and equipment. Such labor, materials, or equipment will be classed as extra work and shall be ordered in writing before such work is started. No extra work shall be paid for unless ordered in writing.

D. Extra work and material will ordinarily be paid for at a lump sum or unit price agreed on in writing by the Engineer and Contractor before the extra work shall be ordered. If the estimated cost of such extra work shall be ten thousand dollars ($10,000) or more, such extra work shall be approved by the Assistant General Manager.

E. Whenever extra work or extra material is not of like character to and susceptible of classification under the Contract, and it is impracticable because of the nature of the work, or for any other reason to fix the price before the extra work order shall be issued, extra work and material shall be paid for at actual necessary cost of materials, supplies, labor (including foreman's wages) worker's compensation, insurance, and the reasonable value of the use of equipment as determined by the State of California, San Diego County equipment rental rates (To obtain a copy, contact CALTRANS Publication Distribution unit, Telephone: [916] 445-3520) for the actual time it is used, all as determined by the Engineer, plus mark-up for profit, general expenses, excise and property taxes, bond premiums, license and inspection fees imposed by a governmental authority, and all other items of expense, whether of the kind enumerated herein or otherwise. The Engineer's determination and certification of said actual, necessary cost shall be binding and conclusive on Contractor, and the Engineer shall be deemed the arbiter

to determine the cost of such work. Mark-up for profit is as follows:

1. Up to ten percent (10%) for work performed by the Contractor.

2. Up to ten percent (10%) for work performed by Subcontractors, to which Contractor can not exceed two percent (2%) mark-up.

3. Up to ten percent (10%) for work performed by Sub-subcontractor (second tier sub), with the Contractor and Subcontractor each adding not to exceed three percent (3%) mark-up.

F. If any work or materials are ordered under this section on a cost-plus basis, Contractor shall, at the times directed during the performing of the work, or the furnishing of the materials, render the Engineer written reports in prescribed form; showing the name and number of each workman employed thereon, the number of hours employed thereon, the character of the work he/she is doing, and the wages paid, or to be paid to him/her, also showing the materials delivered and any other items that may enter into the cost, the quantity, and the character of each such material, from whom purchased, and the net amount paid or to be paid therefore, and such other information as directed. If required, Contractor shall produce any books, vouchers, other records, or memoranda, which will assist the Engineer in determining the true, necessary cost of the work and materials to be paid for.

G. Contractor shall not reserve a right to assert impact costs, extended job site costs, extended overhead, constructive acceleration and/or actual acceleration beyond what is stated in the change order for work. No claims shall be allowed for impact, extended overhead costs, constructive acceleration and/or actual acceleration due to a multiplicity of changes and/or clarifications. The Contractor may not change or modify the Authority's change order form in an attempt to reserve additional rights.

H. If the Authority disagrees with the proposal submitted by Contractor, it will notify the Contractor and the Authority will provide its opinion of the appropriate price and/or time extension. If the Contractor agrees with the Authority, a change order will be issued by the Authority. If no agreement can be reached, the Authority shall have the right to issue a unilateral change order setting forth its determination of the reasonable additions or savings in costs and time attributable to the extra or deleted work. Such determination shall become final and binding if the Contractor fails to submit a claim in writing to the Authority within fifteen (15) days of the issuance of the unilateral change order, disputing the terms of the unilateral change order.

I. No dispute, disagreement or failure of the parties to reach agreement on the terms of the change order shall relieve the Contractor from the obligation to

proceed with performance of the work, including extra work, promptly and expeditiously.

J. Any extra work performed hereunder, extensions of time, alterations or any other changes authorized by signed Contract change order shall be subject to all of the provisions of the Contract and Contractor's surety or sureties shall be bound with reference thereto as under the original Contract without securing consent of the Contractor's surety or sureties.

1.11 Warranty and Guarantee:

A. Contractor warrants that all materials and equipment furnished under this Contract shall be new unless otherwise specified in the Contract documents; and that all Work conforms to the Contract Document requirements and is free of any defect whether performed by the Contractor or any subcontractor or supplier.

B. Unless otherwise stated, all warranty periods shall begin upon the filing of the Notice of Completion. Unless otherwise stated, the warranty period shall be for one (1) year.

C. The Contractor shall remedy at its expense any damage to Authority-owned or controlled real or personal property.

D. Contractor shall furnish the Authority with all warranty and guarantee documents prior to final Acceptance of the Project by the Authority.

E. The Authority shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. The Contractor shall within ten (10) days after being notified commence and perform with due diligence all necessary Work. If the Contractor fails to promptly remedy any defect, or damage; the Authority shall have the right to replace, repair, or otherwise remedy the defect, or damage at the Contractor's expense.

F. In the event of any emergency constituting an immediate hazard to health, safety, property, or licensees, when caused by Work of the Contractor not in accordance with the Contract requirements, the Authority may undertake at Contractor's expense, and without prior notice, all Work necessary to correct such condition.

G. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for Work performed and Materials furnished under this Contract, the Contractor shall:

1) Obtain for Authority all warranties that would be given in normal

commercial practice;

2) Require all warranties to be executed, in writing, for the benefit of the Authority; and

3) Enforce all warranties for the benefit of the Authority, unless otherwise directed in writing by the Authority.

This Article shall not limit the Authority's rights under this Contract or with respect to latent defects, gross mistakes, or fraud. The Authority specifically reserves all rights related to defective work, including but not limited to the defect claims pursuant to California Code of Civil Procedure Section 337.15.

1.12 Document Retention Examination:

A. In accordance with Government Code Section 8546.7, records of both the Authority and the Contractor shall be subject to examination and audit by the state Auditor General for a period of three (3) years after final payment.

B. Contractor shall make available to the Authority any of the Contractor's other documents related to the Project immediately upon request of the Authority.

C. In addition to the state Auditor rights above, the Authority shall have the right to examine and audit all books, estimates, records, contracts, documents, bid documents, subcontracts, and other data of the Contractor (including computations and projections) related to negotiating, pricing, or performing the modification in order to evaluate the accuracy and completeness of the cost or pricing data at no additional cost to the Authority, for a period of four (4) years after final payment.

1.13 Power: Contractor shall provide, at Contractor's own expense, all necessary power required for his/her operations under the Contract. The Contractor shall provide and maintain in good order such modern equipment and installations as shall be adequate, in the opinion of the Engineer, to perform in a safe and satisfactory manner the work required by the Contract.

1.14 Patents and/or Royalties: The Contractor shall include in its bid amount the patent fees or royalties on any patented article or process furnished or used in the Work. Additionally, Contractor shall hold and save the Authority, its officers, agents, and employees harmless from liability of any nature or kind or claim therefore, including costs and expenses for or on account of any patented or unpatented invention, article, or appliance manufactured, furnished, or used by Contractor in the performance of this Contract. The Contractor shall include in its bid amount the patent fees or royalties on any patented article or process furnished or used in the Work.

1.15 Measurements: Before ordering any materials or doing any work, Contractor shall

verify all measurements, dimensions, elevations, and quantities. No extra charge or compensation over and above payment for the actual quantities of the various items of work at the respective bid prices therefore will be allowed because of differences between actual measurements, dimension, elevations and quantities and those indicated on the Plans and in the Specifications. Any difference therein shall be submitted to the Engineer for consideration before proceeding with the work.

1.16 Time and Order of Work: Contractor shall at all times employ such force, plant, materials, and tools as will be sufficient, in the opinion of the Engineer, to prosecute and complete the work within the time limits fixed. If Contractor shall fail to maintain adequate progress, the Contractor may, after such failure, be required to increase his/her progress at any point or points or to modify his plans and procedure in such a manner and to such extent as the Engineer may direct. No extension of time shall be made for ordinary delays and accidents, and occurrence of such shall not relieve the Contractor from maintaining the required progress.

1.17 Contract Documents:

A. Contract Documents. The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all.

B. Interpretations. The Contract Documents are intended to be fully cooperative and to be complementary. If Contractor observes that any documents are in conflict, the Contractor shall promptly notify the Engineer in writing. In case of conflicts between the Contract Documents, the order of precedence shall be as follows:

1. Change Orders or Work Change Directives
2. Addenda
3. Special Provisions (or Special Conditions)
4. Technical Specifications
5. Plans (Contract Drawings)
6. Contract
7. General Conditions
8. Instructions to Bidders
9. Notice Inviting Bids
10. Contractor's Bid Forms
11. Greenbook
12. Standard Plans
13. Reference Documents

With reference to the Drawings, the order of precedence shall be as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over General Drawings

3. Addenda or Change Order Drawings govern over Contract Drawings
4. Contract Drawings govern over Standard Drawings
5. Contract Drawings govern over Shop Drawings

C. Conflicts in Contract Documents. Notwithstanding the orders of precedence established above, in the event of conflicts, the higher standard shall always apply.

D. Organization of Contract Documents. Organization of the Contract Documents into divisions, sections, and articles, and arrangement of drawings shall not control the Contractor in dividing the Work among subcontractors or in establishing the extent of Work to be performed by any trade.

1.18 Labor Code Provisions:

A. It shall be mandatory upon the Contractor herein and upon all subcontractors California relative to Contracts for public works. Any Contractor or Subcontractor who is ineligible to perform work on a public works project for any violation of the Labor Code provisions shall not be allowed to perform any portion of the work on this project. Any subcontract between the Contractor and a debarred contractor shall be void as a matter of law, and the debarred subcontractor shall not receive any payment for performing such work. Any public money that has been paid to the debarred contractor on the project shall be returned to the Authority. The Contractor shall be responsible for the payment of wages to workers of a debarred subcontractor who has been allowed to work on the project.

B. Discrimination in Employment: Pursuant to Labor Code Section 1735 and other applicable provisions of law, the Contractor and its subcontractors shall not discriminate against any employee or applicant for employment of race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap on this Project. The Contractor will take affirmative action to insure that employees are treated during employment or training without regard to their race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap.

C. Prevailing Rates of Wages: The Contractor is aware of the requirements of Labor Code Sections 1720 et seq. and 1770 et seq., as well as California Code of Regulations, Title 8, Section 16000 et seq. ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on certain "public works" and "maintenance" projects. Since this Project involves an applicable "pubic works" or "maintenance" project, as defined by the Prevailing Wage Laws, and since the total compensation is $1,000 or more, Contractor agrees to

fully comply with such Prevailing Wage Laws. The Contractor shall obtain a copy of the prevailing rates of per diem wages at the commencement of this Agreement from the website of the Division of Labor Statistics and Research of the Department of Industrial Relations at www.dir.ca.gov/dlsr/. In the alternative, the Contractor may view a copy of the prevailing rates of per diem wages at the Authority. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to perform work on the Project available to interested parties upon request, and shall post copies at the Contractor's principal place of business and at the Project site. Contractor shall defend, indemnify and hold the Authority, its elected officials, officers, employees and agents free and harmless from any claims, liabilities, costs, penalties or interest arising out of any failure or allege failure to comply with the Prevailing Wage Laws.

The Contractor and each subcontractor shall forfeit as a penalty to the Authority not more than fifty dollars ($50) for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing wage rate for any work done by him, or by any subcontract under him, in violation of the provisions of the Labor Code. The difference between such stipulated prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

Contractor shall post, at appropriate conspicuous points on the project site, a schedule showing all determined general prevailing wage rates and all authorized deductions, if any, from unpaid wages actually earned.

D. Eight-Hour-Law: Eight (8) hours of work shall constitute a legal day's work. The Contractor and each subcontractor shall forfeit, as penalty to the Authority, twenty-five dollars ($25) for each worker employed in the execution of Work by the Contractor or any subcontractor for each day during which such worker is required or permitted to work more than eight (8) hours in any one day and forty (40) hours in any week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, except as provided in Labor Code Section 1815.

Work shall be accomplished on a regularly scheduled eight (8) hour per day work shift basis, Monday through Friday, between the hours of 7:00 a.m. and 4:00 p.m.

E. Payroll Records: Pursuant to Labor Code Section 1776, the Contractor and each subcontractor shall maintain weekly certified payroll records showing the name, address, social security number, work classification, straight time, and overtime hours paid each day and week, and the actual per diem wages

paid to each journeyman, apprentice, worker, or other employee employed connection with the work. Contractor shall certify under penalty of perjury that records maintained and submitted by Contractor are true and accurate. Contractor shall also require subcontractor(s) to certify weekly payroll records under penalty of perjury.

The payroll records described herein shall be certified and submitted by the Contractor at a time designated by the Authority. The Contractor shall also provide the following:

1) A certified copy of the employee's payroll records shall be made available for inspection or furnished to such employee or his or her authorized representative on request.

2) A certified copy of all payroll records described herein shall be made available for inspection or furnished upon request of the Department of Industrial Relations ("DIR").

The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement ("DLSE") of the DIR or shall contain the same information as the forms provided by the DLSE.

Any copy of records made available for inspection and furnished upon request to the public shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the Contractor or any subcontractor shall not be marked or obliterated.

In the event of noncompliance with the requirements of this Section, the Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying item or actions necessary to ensure compliance with this section. Should noncompliance still be evident after such ten (10) day period, the Contractor shall, as a penalty to the Authority, forfeit twenty-five dollars ($25.00) for each day, or portion thereof, for each worker until strict compliance is effectuated. Upon the request of the DIR, such penalties shall be withheld from contract payments.

F. The Contractor's attention is directed to the provisions of Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning employment of apprentices by the Contractor or any subcontractor. The Contractor shall obtain a certificate of apprenticeship before employing any apprentice pursuant to Section 1777.5, 1777.6, and 1777.7 of the Labor Code. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, the Administrator of Apprenticeships, San Francisco, California, or from the

Division of Apprenticeship Standards and its branch offices.

1.19 Storm Water:

A. Contractor shall be required to comply with all aspects of the State Water Resources Control Board (State Board) Water Quality Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity (Permit) for all projects that involve construction on or disturbance of one acre or more of land or which are part of a larger common area of development.

B. Contractor shall be responsible for filing the Notice of Intent (NOI) and for obtaining coverage under the Permit. This includes preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) for the Project site, and coordinating all submittals with the Authority's Legally Responsible Person as that term is defined in the Permit. Before any NOI, SWPPP, or other Permit related document may be submitted to the State Water Board or implemented on the Project site it must first be reviewed and approved by the Authority. Contractor shall include all costs of compliance with specified requirements in the Contract amount.

C. The Authority retains the right to procure and maintain coverage under the Permit for the Project site if the Contractor fails to draft a satisfactory NOI or SWPPP or proceed in a manner that is satisfactory to the Authority. Any costs incurred by the Authority in procuring and maintaining coverage under the Permit, or drafting an NOI or SWPPP shall be paid by the Contractor.

D. Contractor shall be responsible for maintaining compliance with all aspects of the Permit during the course of the Project. Contractor shall provide copies of all reports and monitoring information to the Authority. If the Contractor has failed or is unable to maintain compliance with the Permit, the Authority reserves the right to implement its own SWPPP at the Project site, and hire additional contractors to maintain compliance. Whether Contractor has adequately maintained compliance with the Permit shall be the Authority's sole determination. Any costs incurred by the Authority in drafting and implementing a SWPPP, or otherwise maintaining compliance with the Construction General Permit shall be paid by the Contractor.

E. In bidding on this Contract, it shall be Contractor's responsibility to evaluate and include in the contract amount the cost of procuring coverage under the Permit, preparing a SWPPP that is acceptable to the Authority, and complying with the SWPPP and any revisions to the SWPPP that become necessary during the course of construction.

F. In addition to compliance with the Permit, Contractor shall comply with the lawful requirements of any applicable municipality, the Authority, drainage

district, and other local agencies regarding discharges of storm water to the storm drain system or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.

G. Storm, surface, nuisance, or other waters may be encountered at various times during construction of the Work. The Contractor, by submitting a Bid, hereby acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.

H. Failure to comply with the Permit is a violation of federal and state law. Contractor hereby agrees to indemnify and hold harmless Authority, its officials, officers, agents, employees and authorized volunteers from and against any and all claims, demands, losses or liabilities of any kind or nature which Authority, its officials, officers, agents, employees and authorized volunteers may sustain or incur for noncompliance with the Permit arising out of or in connection with the Project, except for liability resulting from the sole established negligence, willful misconduct or active negligence of the Authority, its officials, officers, agents, employees or authorized volunteers. Authority may seek damages from Contractor for delay in completing the Contract in accordance with the Contract documents, caused by Contractor's failure to comply with the Permit.

1.20 Request for Substitutions:

A. For purposes of this provision, the term "substitution" shall mean the substitution of any material, process or article that is substantially equal or better in every respect to that so indicated or specified in the Specifications.

B. Pursuant to Public Contract Code section 3400 (b), the Authority may make a finding designating certain products, things, or services by specific brand or trade name for the statutorily enumerated purposes. As required by section 3400 (b), the Authority may have made such findings as may be further described in the Special Conditions. These findings, if made, as well as the products and their specific brand or trade names that must be used for the Project, may be found in Section 2.20 of the Special Conditions, if applicable.

C. Unless specifically designated in the Special Conditions or Technical Specifications, whenever any material, process, or article is indicated or specified by grade, patent, or proprietary name or by name of manufacturer, such specifications shall be deemed to be used for the purposed of facilitating the description of the material, process or article desired and shall be deemed to be followed by words "or equal." The Contractor may, unless otherwise stated, offer for substitution any material, process or article which shall be substantially equal or better in every respect to that so indicated or specified. However, the Authority has adopted certain uniform standards for

certain materials, processes, and articles. If any material, process, or article offered for substitution by the Contractor is not, in the opinion of the Engineer and the Authority, substantially equal or better in every respect to that specified, the Contractor shall furnish the material, process, or article specified. The burden of proof as to the equality of any material, process, or article shall rest with the Contractor.

D. The Contractor shall submit requests together with substantiating data for substitution of any "or equal" material, process, or article no later than ten (10) days after the award of Contract. Provisions authorizing submission of "or equal" substitution justification data shall not in any way authorize an extension of time for performance of this Contract. Furthermore, if a proposed "or equal" substitution request is rejected, the Contractor shall be responsible for including the specified material, process or article in its bid. The Authority shall not be responsible for any costs of the Contractor associated with "or equal" substitution requests. The Authority has the complete and sole discretion to determine if a material, process, or article is an "or equal" material, process, or article that may be substituted.

E. For purposes of subdivision (D) above, data required to substantiate requests for substitutions of an "or equal" material, process or article data shall include a signed affidavit from the Contractor stating that the substituted "or equal" material, process, or article is equivalent to that specified in the Specification in every way except as listed on the affidavit. Substantiating data shall also include any and all illustrations, specifications, and other relevant data including catalogue information which describes the requested substituted "or equal" to the material process or article specified. In addition, the submittal documentation must also include a statement of the cost implications of the substitution being requested stating whether and why the substitution of the "or equal" material, process, or article will reduce or increase the Contract price. The substantiating data must also include information regarding the durability and lifecycle cost of the requested substituted "or equal" material, process, or article. Failure to submit all the needed substantiating data, including the signed affidavit to the Engineer in a timely fashion so that the substitution can be adequately reviewed may result in the rejection of the proposed substitution. The Engineer is not obligated to review multiple substitution submittals for the same product or item due to the Contractor's failure to submit a complete package initially.

F. Time limitations in this Article must be complied with strictly and in no case will an extension of time for completion be granted because of the Contractor's failure to request the substitution of an alternative item at the times and manner set forth herein in subdivision (D). Further, the Contractor shall bear the costs of all engineering work associated with the review of submittals for substitution of equals.

G. In the event the Contractor furnishes material, process, or article more expensive that that specified, the difference in cost of such material, process, or article so furnished shall be borne by Contractor.

1.21 Notice / Notice of Third Party Claims:

A. All notices shall be in writing and either served by personal delivery or mailed to the other party as designated in the Bid Forms. Written notice to the Contractor shall be addressed to Contractor's principal place of business unless Contractor designates another address in writing for service of notice. Notice to Authority shall be addressed to the Authority as designated in the Notice Inviting Bids unless Authority designates another address in writing for service of notice. Notice shall be effective upon receipt or five (5) days after being sent by first class mail, whichever is earlier. Notice given by facsimile shall not be effective unless acknowledged in writing by the receiving party.

B. Pursuant to Public Contract Code section 9201, the Authority shall provide Contractor with timely notification of the receipt of any third party claim, relating to the Contract. The Authority is entitled to recover its reasonable costs incurred in providing such notification.

1.22 Assignment of Anti-Trust Claims: Contractor offers and agrees to assign to the Authority all rights, title, and interest in and to all cause of action as it may have under Section 4 of the Clayton Act (15 U.S.C. section 15) or under the Cartwright Act (Chapter 2, commencing with section 16700 of Part 2 of Division 7 of Business and Professions Code), and any other applicable laws, arising from purchase of goods, services, or materials, pursuant to this Contract. This assignment shall become effective at the time that the Authority tenders final payment to the Contractor, without further acknowledgment by the parties.

1.23 Traffic Control: All warning signs and safety devices used by the Contractor to perform the work shall conform to the requirements contained in the State of California, Department of Transportation's current edition of "Manual of Traffic Controls for Construction and Maintenance Work Zones."

1.24 Procedure for Resolving Disputes: The parties to this Contract are subject to the provisions of Article 1.5 (commencing with section 20104) of Chapter 1 of Part 3 of the Public Contract Code (as amended by the Statutes of 1990, Chapter 1414, effective January 1, 1991), which requires compliance with the following procedures to resolve any claim by the contractor of three hundred seventy-five thousand dollars ($375,000) or less regarding an extension of time, a change order, extra work, or any other disputed amount:

(A) The claim shall be in writing and include the documents necessary to

substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by Contract for the filing of claims.

(B) (1) For claims of less than fifty thousand dollars and no cents ($50,000), the Authority shall respond in writing to any written claim within forty-five (45) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim any additional documentation supporting the claim or relating to defenses or claims the Authority may have against the claimant.

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

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

(C) (1) For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the Authority shall respond in writing to all written claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the Authority may have against the claimant.

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

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

(D) If the claimant disputes the Authority's written response, or the Authority fails to respond within the time prescribed, the claimant may so notify the Authority, in writing, either within fifteen (15) days of receipt of the Authority's response or within fifteen (15) days of the Authority's failure to respond within the time prescribed, respectively, and demand an informal conference to

meet and confer for settlement of the issues in dispute. Upon a demand, the Authority shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

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

If after the foregoing procedures are completed a civil action is filed, the action shall be subject to the mediation and arbitration provisions required by section 20104.4 of the Public Contract Code.

(F) Submission of a claim, properly certified, with all required supporting documentation, and written rejection or denial of all or part of the claim by the Authority, is a condition precedent to any action, proceeding, litigation, suit, general conditions claim, or demand for arbitration by Contractor.

(G) Government Code Claim. In addition to any and all contract requirements pertaining to notices of and requests for compensation or payment for extra work, disputed work, construction claims and/or changed conditions, the Contractor must comply with the claim procedures set forth in Government Code Section 900 et seq. prior to filing any lawsuit against the Authority. Such Government Code claims and any subsequent lawsuit based upon the Government Code claims shall be limited to those matters that remain unresolved after all procedures pertaining to extra work, disputed work, construction claims, and/or changed conditions have been followed by Contractor. If no such Government Code claim is submitted, or if the prerequisite contractual requirements are not otherwise satisfied as specified herein, Contractor shall be barred from bringing and maintaining a valid lawsuit against the Authority.

1.25 Indemnification:

A. To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Authority, the Board, and each member of the Board, its officers, employees, and agents from and against all claims, damages, losses, expenses, and other costs, including costs of defense and attorneys' fees, arising out of or in connection with the performance of the work, both on and off the jobsite, provided that any of the foregoing (1) is attributable to personal injury, bodily injury, sickness, disease, or death, or injury to, or destruction of tangible property (other than the work itself), including the loss of use therefrom, and (2) is caused in whole or in part by any act, error, or omission of the Contractor, any subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts, errors or omissions any of them may be liable, regardless of whether or not it is caused in part by any act, error, or omission (active, passive, or comparative negligence included) of any party indemnified hereunder; provided however, that nothing herein shall relieve any party indemnified hereunder from liability to the extent that such liability arises from such party's sole established negligence or willful misconduct. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person indemnified in Paragraphs (A) and (D) of this section on indemnity.

B. In any and all claims against the indemnified parties by any employee of the Contractor, any subcontractor, any supplier, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraphs (A) and (D) of this section on indemnity shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor, or any subcontractor, or any supplier or other person under workers' compensation acts, disability benefits acts, or other employee acts.

C. The obligations of the Contractor under Paragraphs (A) and (D) of this section on indemnity shall not extend to the liability of the Authority, the Board and each member of the Board, its officers, employees, and agents arising out of or resulting from or in connection with the preparation or approval of maps, plans, opinions, reports, surveys, designs, or specification, providing that the foregoing was the sole and exclusive cause of the loss, damage, or injury. This exemption applies on the work other than that performed by the Contractor under this Contract.

D. The Contractor shall also indemnify, defend and hold harmless the Authority, the Board, each member of the Board, its officers, employees, and agents from and against all losses, expenses, damages (including damages to the work itself), attorneys' fees, and other costs, including all costs of defense,

which any of them may incur with respect to the failure, neglect or refusal of the Contractor to faithfully perform the work and all the Contractor's obligations under the Contract. Such costs, expenses, and damages shall include all costs, including attorneys' fees, incurred by the indemnified parties in any lawsuit to which they are a party and/or defending any claims or stop notices.

1.26 Quality of the Work:

A. Authority of the Engineer: The Engineer shall be responsible for monitoring the Contractor's compliance with the Contract documents, shall determine the amount, quality, and acceptability of the work, and the fitness of the labor, materials, or equipment which are to be paid for, shall answer all questions in relation to said labor, materials, or equipment, shall establish the reasonableness of allowances, and is the Authority's representative in negotiations for settling protests.

The Engineer will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction, or safety precautions and programs thereto. The Engineer will not be responsible for the Contractor's failure to perform or furnish the work in accordance with the Contract documents.

B. Obligations of the Contractor: The Contractor, at his sole cost and expense, shall perform all labor and services, and furnish all materials, tools, and appliances, except as may be provided herein, necessary and proper for performing and completing the work required by the Contact documents in the manner and in the time period stipulated in the Contract documents.

The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage, which may result from their failure or their improper construction, maintenance, or operation. No provision of any referenced specification, manual or code, whether or not specifically incorporated by reference in the Contract documents, shall be effective to change the duties and responsibilities of the Authority, the Engineer, or the Contractor from those set forth in the Contract documents. Nor shall they be effective to assign to the Engineer any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the provisions of the Contract documents.

In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons and property during the performance of the work, and the Contractor shall comply with all federal, state, and local laws,

rules, regulations, orders, and ordinances relating to the safety of workers and others. The right of the Engineer to conduct construction review or observation of the Contractor's performance will not include review of, evaluation of, or responsibility for the adequacy of the Contractor's safety measures in, on, or near the construction site.

Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four (4) years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within (ten) 10 years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, CA 95826.

1.27 Integration:

A. Oral Modifications Ineffective. No oral order, objection, direction, claim, or notice by any party or person shall affect or modify any of the terms or obligations contained in the Contract documents.

B. Contract Documents Represent Entire Contract. The Contract documents represent the entire agreement of the Authority and Contractor.

1.28 Change In Name And Nature Of Contractor's Legal Entity:

Should a change be contemplated in the name or nature of the Contractor's legal entity, the Contractor shall first notify the Authority in order that proper steps may be taken to have the change reflected on the Contract.

1.29 Prohibited Interests:

No Authority official or representative who is authorized in such capacity and on behalf of the Authority to negotiate, supervise, make, accept, or approve, or to take part in negotiating, supervising, making, accepting, or approving any engineering, inspection, construction, or material supply contract or any subcontract in connection with construction of the project, shall be or become directly or indirectly interested financially in the Contract.

1.30 Laws and Regulations:

A. Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on conduct of work as indicated and specified. If Contractor observes that drawings and specifications are at variance therewith, he shall promptly notify the Engineer in writing and any necessary

changes shall be adjusted as provided for in this Contract for changes in work. If Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, he shall bear all costs arising therefrom.

B. Contractor shall be responsible for familiarity with the Americans with Disabilities Act ("ADA") (42 U.S.C. § 12101 et seq.). The Work will be performed in compliance with ADA regulations.

1.31 Ownership of Drawings:

All Contract documents furnished by the Authority are Authority property. They are not to be used by Contractor or any subcontractor on other work nor shall Contractor claim any right to such documents. With exception of one complete set of Contract documents, all documents shall be returned to the Authority on request at completion of the Work.

1.32 Notice of Taxable Possessory Interest:

In accordance with Revenue and Taxation Code Section 107.6, the Contract documents may create a possessory interest subject to personal property taxation for which Contractor will be responsible.

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT
PART 2 - SPECIAL CONDITIONS

NOTE: These Specifications are complemented by the Sweetwater Authority Standard Specifications and Drawings and are hereby incorporated in the Contract documents and considered a part of these Specifications.

2.01 Requirement: It is required that there be performed in accordance with the Plans and Specifications the work known as SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT.

2.02 Commencement and Completion of Work: Work placed under Contract shall be commenced by Contractor within **TEN (10) DAYS** after the date of the letter giving notice to Contractor to proceed, which will be dated on or before August 1, 2011. The official starting date shall be said **TENTH (10TH)** day. **The Existing 36-inch steel raw water pipeline will be placed out of service between October 1, 2011 and December 31, 2011. All pipeline demolition and construction work shall occur within this timeframe. The new pipeline shall be fully operational no later than December 31, 2011. The contractor has until January 31, 2012 to complete all non-operational aspects of the project and remove equipment and material from the site.**

2.03 List of Drawings: All work shall be done in accordance with the following listed drawings, which are expressly made a part of this Contract:

Sheet Number	Description
1	Title, Drawing Index, and Project Locations Maps
2	Abbreviations, Symbols, and General Notes
3	Existing Conditions and Survey Control Plan 1
4	Existing Conditions and Survey Control Plan 2
5	Pipeline Demolition Plan
6	Plan and Profile, Sta 10+00 to Sta 15+00
7	Plan and Profile, Sta 15+00 to Sta 16+49.71
8	Access Ramp and Drainage Ditch
9	36" Pipeline Connection at Sta. 10+00
10	Existing Stilling Pool Dam Crossing
11	30" Pipeline Lining Section
12	Existing Blowoff/Vault Abandonment and New Blowoff Installation
13	Pipe Encasement and Lining Details
14	Typical Details - 1
15	Typical Details - 2
16	Typical Details - 3
17	Corrosion Monitoring Details - 1
18	Corrosion Monitoring Details - 2

2.04 Extension of Time:

A. The Contractor may be entitled to an extension of Contract time: (1) if the work has been suspended by the Authority, in whole or in part, or (2) where weather or other unforeseeable circumstances occur which unreasonably delays progress, and which are clearly beyond the control of the Contractor; provided that, in either case, the Contractor is not at fault and is not negligent under the terms of the Contract. The extension of time allowed shall be as determined by the Engineer.

B. To receive consideration, a request for extension of time must be made in writing to the Engineer stating the reason for said request, and such request must be received by the Engineer within three (3) days following the end of the delay-causing condition.

2.05 Delayed Completion – Damages: In the event that the Contractor fails to complete all or any portion of the work to the satisfaction of the Engineer within the specified time, Contractor shall pay as liquidated damages and not as a penalty, the sum of THREE THOUSAND ($3,000) per day. This sum represents a reasonable endeavor to estimate a fair compensation for the foreseeable losses that might result from such a delay.

A. In accordance with Government Code section 53069.85, being impractical and infeasible to determine the amount of actual damage, it is agreed that Contractor shall pay to the Authority as fixed and liquidated damages, and not as a penalty, the sum stipulated in the Contract for each day of delay until The Work is fully completed. Contractor and its surety shall be liable for any liquidated damages. Any money due or to become due the Contractor may be retained to cover liquidated damages.

B. Inclement Weather. Contractor shall abide the Engineer's determination of what constitutes inclement weather. Time extensions for inclement weather shall only be granted when The Work stopped during inclement weather is on the critical path of the Project schedule.

C. Extension of Time. Contractor shall not be charged liquidated damages because of any delays in completion of The Work due to unforeseeable causes beyond the control and without the fault or negligence of Contractor (or its subcontractors or suppliers). Contractor shall within five (5) Days of identifying any such delay notify the Authority in writing of causes of delay. The Authority shall ascertain the facts and extent of delay and grant extension of time for completing The Work when, in its judgment, the facts justify such an extension. Time extensions to the Project shall be requested by the Contractor as they occur and without

delay. No delay claims shall be permitted unless the event or occurrence delays the completion of the Project beyond the Contract completion date.

D. No Damages for Reasonable Delay. The Authority's liability to Contractor for delays for which the Authority is responsible shall be limited to only an extension of time unless such delays were unreasonable under the circumstances. In no case shall the Authority be liable for any costs which are borne by the Contractor in the regular course of business, including, but not limited to, home office overhead and other ongoing costs. Damages caused by unreasonable Authority delay, including delays caused by items that are the responsibility of the Authority pursuant to Government Code section 4215, shall be based on actual costs only, no proportions or formulas shall be used to calculate any delay damages.

2.06 Quantities of Estimate and Job Site Locations: The estimated quantities of work to be done and materials to be furnished under this Contract shown in any of the documents including the proposal are given only for use in comparing bids and to indicate approximately the total amount of the Contract; job site locations will be added or deleted after project award, and the right is especially reserved, except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Authority to complete The Work contemplated by this Contract, nor shall any such increase or diminution give cause for claims or liability for damages.

2.07 Basis for Payment: The Contract price shall include all necessary material, labor, equipment, and tools, and incidental to properly complete in accordance with the Plans and Specifications. Measurement and basis for payment for the various Contract pay items will be as noted in the Proposal and Section 01 22 00 Measurement and Payment, Timely Progress Payment of the Public Contract Code §20104.50.

2.08 Progress Estimates and Payment:

A. The Authority shall make monthly progress payments following receipt of undisputed and properly submitted payment requests. Contractor shall be paid a sum equal to ninety percent (90%) of the value of Work performed up to the last day of the previous month, less the aggregate of previous payments.

B. The Contractor shall, after the full completion of the Work, submit a final payment application. All prior progress estimates shall be subject to correction in the final estimate and payment.

C. Unless otherwise required by law, the final payment of ten percent (10%) of the value of the Work, if unencumbered, shall be paid no later than sixty (60) days after the date of recordation of the Notice of Completion.

D. Acceptance by Contractor of the final payment shall constitute a waiver of all claims against the Authority arising from this Contract.

E. Payments to the Contractor shall not be construed to be an acceptance of any defective work or improper materials, or to relieve the Contractor of its obligations under the Contract Documents.

F. The Contractor shall submit with each payment request the Contractor's conditional waiver of lien for the entire amount covered by such payment request, as well as a valid unconditional waiver of lien from the Contractor and all subcontractors and materialmen for all work and materials included in any prior invoices. Waivers of lien shall be in the forms prescribed by California Civil Code Section 3262. Prior to final payment by the Authority, the Contractor shall submit a final waiver of lien for the Contractor's work, together with releases of lien from any subcontractor or materialmen.

2.09 Payments Withheld and Backcharges:

In addition to amounts which the Authority may retain under other provisions of the Contract Documents, the Authority may withhold payments due to Contractor as may be necessary to cover:

A. Stop Notice claims.

B. Defective work not remedied.

C. Failure of Contractor to make proper payments to its subcontractors or suppliers.

D. Completion of the Contract if there exists a reasonable doubt that the work can be completed for balance then unpaid.

E. Damage to another contractor or third party.

F. Amounts which may be due the Authority for claims against Contractor.

G. Failure of Contractor to keep the record ("as-built") drawings up to date.

H. Failure to provide updates on the construction schedule.

I. Site cleanup.

J. Failure of the Contractor to comply with requirements of the Contract Documents.

K. Liquated damages.

L. Legally permitted penalties.

Upon completion of the Contract, the Authority will reduce the final Contract amount to reflect costs charged to the Contractor, backcharges or payments withheld pursuant to the Contract Documents.

2.10 Securities for Money Withheld: Pursuant to section 22300 of the Public Contract Code of the State of California, the Contractor may substitute securities for any money withheld by the Authority to ensure performance under the Contract. At the request and expense of Contractor, securities equivalent to the amount withheld shall be deposited with the Authority or with a state or federally chartered bank as the escrow agent, who shall return such securities to the Contractor upon satisfactory completion of Contract. Deposit of securities with an escrow agent shall be subject to a written agreement between the escrow agent and the Authority, which provides that no portion of the securities shall be paid to the Contractor until the Authority has certified to the escrow agent, in writing, that the Contract has been satisfactorily completed. Securities eligible for investment under this section shall be limited to those listed in section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, stand-by letters of credit, or any other security mutually agreed to by the Contractor.

2.11 Repair and Replacement of Obstructions: All fences, walls, culverts, property line monuments, or other obstructions (except property line monuments within work areas) which are removed, damaged, or destroyed in the course of the work, shall be replaced or repaired to original condition and to the satisfaction of the Authority, by and at the expense of the Contractor, whether or not those obstructions have been shown on the Plans, unless otherwise stated herein.

2.12 Setting Stakes: All stakes, marks, and other information shall be provided by the Contractor at the Contractor's expense. This shall include any rework, for any reason.

2.13 Dust Control and Cleanup: The Contractor shall be responsible for cleaning the site on a regular basis for control of dust, dirt, and debris. The use of water, resulting in mud on plant, public, or private streets, will not be permitted as substitute for sweeping or other methods. Dust control may require having a water truck onsite for the duration of the project, and/or use of temporary hoses and pipelines to convey water.

2.14 Underground Utility Locations: Contractor, except in an emergency, shall contact the appropriate regional notification center, a Regional Notification Center (Underground Service Alert – 811) at least two working days prior to commencing any excavation if the excavation will be performed 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 Authority, and obtain an inquiry identification number from that notification center. No excavation shall be commenced or carried out by the Contractor unless such an

inquiry identification number has been assigned to the Contractor or any subcontractor of the Contractor and the Authority has been given the identification number by the Contractor. This number shall become a part of the permit from the agency having jurisdiction over the street.

Should this identification number not be obtained, the agency having jurisdiction over the street will withdraw its permit and the Contractor will not be permitted to perform further work until the number is obtained. The Contractor shall notify Underground Service Alert at least forty-eight (48) hours in advance of construction so that utilities belonging to other agencies can be marked in the field.

2.15 Hazardous Materials: Where the Contractor is involved in digging trenches or other excavations that extend deeper than four (4) feet below the surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the Authority of any (1) material that Contractor believes may be hazardous waste that is required to be moved to a Class I, Class II, or Class III disposal site; (2) subsurface or latent physical conditions at the site differing from those indicated; (3) unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract, pursuant to Public Contract Code section 7104.
The Authority will promptly investigate the conditions, and if it finds that the conditions do materially differ, will issue a Change Order under the procedures described in the Contract if hazardous waste is involved which causes a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the work.

That in the event a dispute arises between the Authority and the Contractor, the Contractor will not be excused from any scheduled completion date provided for by the Contract, but will proceed with all work to be performed under the Contract.

2.16 Time of Work: Time of work shall be limited to Monday through Saturday, 7 A.M. to 4 P.M., excluding holidays observed by the Authority. Should the Contractor desire to work other than these hours, a written notice shall be submitted to the Engineer for review and approval at least three (3) business days in advance of requested time change.

2.17 Deleted

2.18 Disposal of Existing Materials: All materials removed from the work areas shall be disposed of at an approved dumpsite. Contractor shall provide evidence to the Engineer, if requested.

2.19 Deleted

2.20 Specific Items: The Authority has not made findings pursuant to Public Contract Code section 3400(b) regarding the use of specific product(s), thing(s), and/or service(s) that must be utilized for the Project.

2.21 Sanitary Facilities: Contractor shall maintain sanitary facilities on the jobsite for the duration of the project.

2.22 Incentive To Contractor: As an incentive to the Contractor, in the event that the pipeline is fully operational before December 31, 2011, the Contractor shall be paid a sum of FOUR THOUSAND DOLLARS ($4,000) per day for every day prior December 31, 2011.

2.23 Definitions: the following terms, as used in any of the Contract Documents, are respectively defined as follows:

1. "AUTHORITY" – Sweetwater Authority;
2. "ENGINEER" – Sweetwater Authority's Authorized Representative;
3. "OWNER" – Sweetwater Authority;
4. "CONTRACTOR" - The bidder who submitted the accepted Proposal and who executed the Agreement to furnish articles or materials in accordance with these Contract Documents, and the legal representatives of said party

Attachment B

CRISIS COMMUNICATION PLAN

ATTACHMENT B

SWEETWATER AUTHORITY
CRISIS COMMUNICATION PLAN

OBJECTIVE

Communicate promptly and accurately with Authority employees, directors, public officials, contractors, involved agencies, the media and other interested publics.

GOALS

To ensure that in case of a crisis:

- Top management is kept informed of situation details.
- Employees, directors, other affected publics and the general public are kept informed.
- The media receives prompt, accurate information.
- Damage to the image of Sweetwater Authority is minimized and goodwill is maintained among employees and the public.

THE BASIC PLAN

INSTALLING THE SYSTEM.

ACTION: Crisis team.

1. **Authority Spokesperson.** The general manager is the designated Authority spokesperson. At his/her discretion, or if he/she is unavailable, an appropriate crisis team member may be designated as spokesperson.

   ACTION: Crisis team.

2. **Activation.** If the Authority spokesperson determines that the emergency is of sufficient magnitude, he/she will call the team into action.

3. **Crisis Team.** The crisis team includes the general manager, the operations manager, the chief engineer, the finance director and the communications coordinator. Warranted by the nature of the crisis, the crisis team may designate alternate or additional Authority spokespersons and team members. Key members (those most involved with crisis) of the team should meet or talk to each other via telephone conference calls each day until the crisis is over.

   ACTION: Crisis team.

4. **Emergency Plans.** Safety plans aimed at preparing the Authority's operating locations and employees for a disaster must be in place. Training and other preparation measures (laying in food and other supplies) outlines in such plans

must be carried out. All crisis response measures will depend first on the safety of employees.

ACTION: Emergency planning team, operations manager.

5. **Emergency Location.** The crisis team will designate an emergency location for press operations/conferences, as necessary, based upon the nature of the crisis.

6. **Media list:** Set up a media notification list with phone and fax numbers.

   ACTION: Communications.

7. **Phone number list.** Maintain updated card list of management and communications home and cellular phone and pager numbers. Include 24-hour message line number on card.

   ACTION: Administration.

8. **General emergency numbers list.** Develop and maintain updated list of contact numbers for hospitals, emergency response agencies, contractors and names of key Authority employees working on different projects.

   ACTION: Administration.

9. **Training.** Train employees to alert their supervisors, whenever a situation occurs that might trigger a possible crisis, to refer all media calls to communications unless/until advised to refer them elsewhere, and not to comment on the incident or speculate on its causes to the media or members of the public. Ensure Authority supervisors work through appropriate channels to alert a member of the crisis team and communications.

   Provide media-interview training to all potential spokespersons.

   ACTION: Communications.

10. **Consultant/Contractors communications.** Supply Authority consultants and contractors with a copy of the Authority's Crisis Communications Plan, and inform them of their roles. These roles include working through a specified chain of command and following the Authority's media guidelines. The Authority must be satisfied that crisis/media lines of notification have been established between construction managers, construction contractors, Sweetwater Authority inspectors, and the Authority.

    ACTION: Engineering.

11. **Communications equipment.** Key Authority personnel should always be able to communicate with communications. The Communications department should have a pager and battery operated cellular phone and access to a manual typewriter, lap top computer, battery-operated television and radio at each location.

    ACTION: All departments.

12. **Communications response kit.** Assemble a communications crisis response kit to include materials needed while at the site. These items will be contained in a bag (backpack or workout bag) and will include a copy of the Crisis Communications Plan, cellular phone batteries, flash light, rain gear, media tape, notebook, pen, general background materials, hard hats, steel-toed shoes, personal hard hat, reflective vest, business cards, ID badge, water-proof boots and nonperishable food snack and drink.

    ACTION: Communications.

CHECKLIST FOR IMPLEMENTING THE PLAN

1. Crisis team or general manager (or designated spokesperson) meets with communications coordinator.

2. Identify all internal and external audiences affected/interested. Prioritize communication efforts with these audiences:

    a) Those who must take action in response to the crisis (applicable employees, contractors).
    b) Those who must comment (spokesperson and those whose input is needed).
    c) Those with a special need to know (board members, employees, family members, and public officials).
    d) The media.
    e) The general public.

3. Determine what public relations issues the situation raises and what problems must be overcome in order for public relations goals to be met. This is essentially the time to play devil's advocate so that issues that will be raised – probably by the media – are anticipated, researched, and answers/solutions are formulated ahead of time.

4. State an exact message that will be relayed to all audiences, no matter what other information communications contain or what form communications take.

5. Select spokesperson: General manager or his/her designee based on nature of crisis.

6. Work with communications staff, which will determine and implement appropriate communications tactics, including necessary coaching and research assistance.

Communications will implement the following tactics, depending on the nature of the crisis:

1. Provide extra copies of the Crisis Communications Plan to those who need it.

2. Make sure front-line employees are alerted to the situation, and that they know to direct media to designated location, as applicable. Inform all employees and contractors to direct inquiries to communications and to communications immediately if media personnel appear at crisis site.

3. Communicate with spokesperson to help prepare him/her for interviews.

4. Spokesperson and assigned communications staff member(s) will **immediately** go to crisis site (as applicable) to gather information, provide media with information, control media activities, and help spokesperson with interviews.

5. Prepare a written release for distribution (via hard copy, facsimile or e-mail, as applicable) to appropriate publics (board members, employees, contractors, member agencies, responding agencies, elected officials for affected area(s), media). As backup for other operating locations, e-mail releases should contain notification for supervisors to inform staff members (orally or, preferably, by distributing copies of e-mail).

   Press releases should be faxed, not mailed, to all audiences with fax machines. Board members without fax machines should be called by the board secretary and the release should be read to them. Releases distributed after 5 p.m. to board members' business fax machines should be followed with a phone call to their residences and the release should be read to them. If an answering machine is reached, a brief message should be left with instruction to call the 24-hour message line.

6. Record phone messages on 24-hour line (475-5217) with updates on situation and communications number to call for more information. Ensure board members and staff have message line number and that number is listed on information distributed to them. Remember to erase messages when they become obsolete.

7. Compile background information related to crisis and have on hand for reporters.

8. Provide employees with frequent updates, as well as the name of a resource person to call if they have questions. Advise employees not to release information and to refer questions to communications.

9. Arrange for additional news availability via a news conference or interviews with the spokesperson.

10. Provide follow-up information and answers to questions that could not be answered during the first stage of the crisis (such as more comprehensive damage assessment, injuries, etc.).

11. Report to media on further and unfolding developments as they develop, after crisis team review.

12. Monitor press coverage of crisis daily, making appropriate responses or corrections (formally or informally). Also use monitoring to carry out next step.

13. Assess the plan's effectiveness and make any necessary modifications after the emergency is over.

ACTION: Crisis team, communications.

REMEMBER THE GOLDEN RULES

1. Provide news quickly, completely and accurately, but never speculate.
2. Have crisis team members talk together from the same platform (if applicable).
3. Cover everything as thoroughly as possible.
4. Provide regular and, if necessary, frequent updates.

Attachment C

CONTRACTOR SAFETY

Revision: February 25, 1999
Revision: May 15, 2004
Revision 2.0: February 6, 2009

CONTRACTOR SAFETY

for

SWEETWATER AUTHORITY
Spring Valley Facility
100 Lakeview Avenue
Spring Valley, California 91977

Prepared By:

TRACER ENVIRONMENTAL SCIENCES & TECHNOLOGIES
970 Los Vallecitos Boulevard, Suite 100
San Marcos, California 92069
(760) 744-9611
FAX: (760) 744-8616
www.tracer-est.com

Project No. RS-2264

CONTRACTORS COMPLIANCE MATRIX

Compliance Element	Corresponding Cal-OSHA Title 8 Section (PSM)	Corresponding CalARP CCR Chapter 4.5 Section	Corresponding Fed-EPA 40 CFR Section (RMP)	Document Page
This paragraph applies to contractors performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process. It does not apply to contractors providing incidental services which do not influence process safety, such as janitorial work, food and drink services, laundry, delivery or other supply services.	§5189(h)(1)	§2760.12(b)(2)	§68.87(b)(2)	2
Employer responsibilities. The employer, when selecting a contractor, shall obtain and evaluate information regarding the contract employer's safety performance and programs.	§5189(h)(2)	§2760.12(b)(3)	§68.87(b)(3)	2
The employer shall inform contract employers of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process.	§5189(h)(3)	§2760.12(c)(1)	§68.87(c)(1)	2, 3
The employer shall explain to contract employers the applicable provisions of the emergency response plan required by paragraph (n) of this section.	§5189(h)(4)	N/A	N/A	3
The employer shall develop and implement safe work practices consistent with paragraph (f)(4) (OSHA); subpart E (EPA) of this section, to control the entrance, presence and exit of contract employers and contract employees in covered process areas.	§5189(h)(5)	§2760.12(b)(1)	§68.87(b)(1)	3,5
The employer shall periodically evaluate the performance of contract employers in fulfilling their obligations as specified in: paragraph (h)(3) (OSHA); paragraph (c) (EPA) of this section.	§5189(h)(6)	§2760.12(b)(5)	§68.87(b)(5)	3
The employer shall maintain a contract employee injury and illness log related to the contractor's work in process areas.	§5189(h)(7)	N/A	N/A	3
Contract employer responsibilities. The contract employer shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job.	N/A	§2760.12(b)(4)	§68.87(b)(4)	4
The contract employer shall document that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the emergency response plan.	N/A	§2760.12(c)(2)	§68.87(c)(2)	4

Compliance Element	Corresponding Cal-OSHA Title 8 Section (PSM)	Corresponding CalARP CCR Chapter 4.5 Section	Corresponding Fed-EPA 40 CFR Section (RMP)	Document Page
The contract owner or operator shall document that each contract employee has received and understood the training required by this section. The contract owner or operator shall prepare a record, which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.	N/A	§2760.12(c)(3)	§68.87(c)(3)	3
The contract owner or operator shall assure that each contract employee follows the safety rules of the stationary source including the safe work practices required by 68.89(d) of this part.	N/A	§2760.12(c)(4)	§68.87(c)(4)	3
The contract owner or operator shall advise the owner or operator of any unique hazard presented by the contract owner or operator's work, or of any hazards found by the contract owner or operator's work.	N/A	§2760.12(c)(5)	§68.87(c)(5)	3

TABLE OF CONTENTS

CONTRACTOR SAFETY

Sweetwater Authority – Spring Valley (Sweetwater Authority), in following OSHA's PSM Guideline, has established a screening process so that they hire and use only contractors who accomplish the desired job tasks without compromising the safety and health of any employees at their facility when working around or in processes that involve highly hazardous chemicals. For applicable contractors, Sweetwater Authority will ensure that the contractor has the appropriate job skills, knowledge, and certifications required, and that his/her work methods and experience is properly evaluated by experienced Sweetwater Authority personnel. In addition, Sweetwater Authority will obtain information on injury and illness rates of the contractor. Applicable contractors include all contractors performing maintenance or repair, renovation, or specialty work on or adjacent to a process utilizing hazardous chemicals. It does not apply to janitorial or other supply services other than those actually delivering the hazardous materials.

Contract employees must perform their work safely. Considering that contractors often perform very specialized and potentially hazardous tasks, their work must be controlled while they are on or near a process covered by PSM. A permit system (work authorization) for these activities is in place. (See forms at the end of this section). The use of the authorization system keeps Sweetwater Authority informed of contract employee's activities.

Sweetwater Authority Responsibilities

The specific responsibilities of Sweetwater Authority are delineated below:

1. When selecting a contractor, Sweetwater Authority will take into account the safety record and the management commitment to safety of a contract employer. The Sweetwater Authority Contract Administrator will obtain and evaluate information regarding the contract employer's safety performance and programs prior to allowing them to work on site.

2. Prior to allowing the contractor on site, the Sweetwater Authority Contract Administrator will inform the contract employer of potential fire, explosion, or toxic release hazards related to the contractor's work and the process. A contractor information packet is provided to each contractor. Specific forms requiring the contractor's signature stating that he has received the information and will make it available to each of his employees prior to their entering the Sweetwater Authority facility and must be completed before any onsite work can begin.

3. The Sweetwater Authority Contract Administrator will provide and explain Sweetwater

Authority's emergency action plan as applicable to the contractor's employees prior to their admittance into the facility. A specific form requiring the contractor's signature stating that he has received the information and will make it available to each of his employees prior to their entering the facility is required before any onsite work can begin.

4. Sweetwater Authority has implemented safe work practices consistent with their operating procedures. Sweetwater Authority will define the applicable procedures to all contractor employees and assure that they are followed on all work within the facility.

5. Sweetwater Authority personnel will meet and evaluate the performance of contract employees in meeting their responsibilities. The meetings will take place following any specific outside contract work that involves a one-time work effort, or quarterly for contractors involved in on-going programs (such as chlorine delivery). The Plant Operators will review and report inadequate procedures to Safety Committee using the Contractor Evaluation Form (see attached).

6. The Sweetwater Authority Contract Administrator will take appropriate steps to see that any deficiencies found in step 5 above, are immediately corrected or that the contractor is replaced.

7. The Sweetwater Authority Contract Administrator will maintain a log of contract employees injuries and illness related to the contractor's work in the process areas.

CONTRACT EMPLOYER RESPONSIBILITIES

The contractor employer has the primary responsibility to assure that their employees are trained in work practices necessary to safely perform their jobs. Subcontractors have the same responsibilities as the contractors. Sweetwater Authority has the responsibility to assure that the contractor's practices include the following specific areas of responsibility:

1. The contractor must assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his or her job and the process, and in the applicable provisions of the emergency response plan as provided by Sweetwater Authority.

2. The contractor must document that contract employees have received and understood the training given to them. The record must include the identity of the contractor employee, the date of training, and the means used to verify that the employee understood the training.

3. The contractor must assure that each contract employee follows the Sweetwater Authority safety rules. (See *Safe Work Practices* section of the Process Safety Management Program).

4. The contractor must advise the Contract Administrator of Sweetwater Authority of any unique hazards presented by the contractor's work, or of hazards found by the contract employer's work.

Summary of Facility and Contractor Responsibilities

RESPONSIBILITIES	FACILITY	CONTRACTOR
Review contractor safety record	x	x
Provide information on hazards: To contractor To contract employees	x	x
Explain emergency action plan: To contractor To contract employees	x	x
Safework practices: Implement Assure adherence	x	x
Control entrance, presence, exit of contractor, contract employees	x	
Evaluate contractor performance	x	
Maintain contract employee injury, illness log	x	x
Assure/document contract employee training	x	x
Advise facility of unique hazards		x

OUTSIDE CONTRACTOR HAZARD COMMUNICATION FORM

The following is a list of hazardous chemicals at Sweetwater Authority which contractors and their employees could be exposed to while performing work in the facility.

	Chemical	Hazard
1.	Chlorine	Toxic
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Sweetwater Authority's programs and operations are not intended, nor should it be construed, as an undertaking to meet whatever obligations may be imposed upon you or your company under any Occupational Safety & Health Act or any other statute establishing building or operational safety or health standards. Further, no representation is hereby made, or intended, that by compliance with the statement listed on the attached page two of this Outside Contractor Hazard Communication Form, you will be in full compliance with the standard of any such state or federal law.

OUTSIDE CONTRACTOR HAZARD COMMUNICATION FORM (Continued)

I,_____, representing _____ (company) has been instructed on the hazardous chemicals he/she or his/her employees could be exposed to while working at the Sweetwater Authority facility. The contractor has been instructed on the location of the nearest eye wash, shower station, and MSDS binder.

Contractor has reviewed the Sweetwater Authority Evacuation Plan and accepts full responsibility for implementing an evacuation plan for all employees under his/her direction to safely evacuate their work station while working at the Authority's facilities. Contractor has informed all of its employees of all hazardous chemicals they could be exposed to and which measures should be taken to lessen the exposure of these chemicals while working at Sweetwater Authority's facilities.

Signed: _____

Date: _____

****

THIS SECTION
TO BE COMPLETED BY SWEETWATER AUTHORITY

This form was presented to _____

representing _____ on _____

by _____.

****

OUTSIDE CONTRACTOR LOCK OUT/TAG OUT FORM

To comply with state and federal regulations and Sweetwater Authority's Lock Out/Tag Out Program, this form must be completed by any contractor performing work at our facility in which lock out/tag out procedures pertain.

Sweetwater Authority's programs and operations are not intended, nor should they be construed, as an undertaking to meet whatever obligations may be imposed upon you or your company under any Occupational Safety & Health Act or any other statue establishing building or operational safety or health standards. Further, no representation is hereby made, or intended, that by compliance with this form or statement listed above, you will be in full compliance with the standard of any such state and federal law.

CONTRACTOR AGREES TO FULFILL ALL ITS OBLIGATIONS AND RESPONSIBILITIES PERTAINING TO THE LOCK OUT/TAG OUT REGULATIONS AND LAWS AS STATED IN THE CAL OSHA AND FED OSHA STANDARDS.

CONTRACTOR HAS INSTRUCTED AND TRAINED ALL OF ITS EMPLOYEES IN ITS OWN LOCK OUT/TAG OUT PROGRAM. CONTRACTOR WILL PROVIDE SWEETWATER AUTHORITY WITH A COPY OF ITS LOCK OUT/TAG OUT PROGRAM BEFORE ANY WORK BEGINS. THE OUTSIDE CONTRACTOR AGREES TO FOLLOW AND ABIDE BY SWEETWATER AUTHORITY'S LOCK OUT/TAG OUT PROGRAM.

Signature: _____

Date: _____

****

THIS SECTION
TO BE COMPLETED BY SWEETWATER AUTHORITY

I have given a copy of the Sweetwater Authority Lock Out/Tag Out Program to_____

_____representing _____.

Date: _____

To Be Completed Prior To Work Initiation

CONTRACTOR SAFETY FORM

1. Contractor _____

2. Job Description _____

3. Contractor Safety Plans Available to Sweetwater Authority

	Acceptable	Unacceptable
Safe Work Practices	_____	_____
Contractor Work Hazards	_____	_____
Training Plans	_____	_____
Training Certificates for Employees	_____	_____
Emergency Response Training	_____	_____
Contractor Injury/Illnesses Report	_____	_____

4. Contractor Employee Training Program

Union Certifications

_____
_____
_____
_____

Mandatory Training Program

_____
_____
_____
_____

Sweetwater Authority's Evaluation Comments

_____
_____
_____
_____

EMERGENCY RESPONSE PLAN INFORMATION RECEIPT

I, _____, representing _____ have received and been instructed in Sweetwater Authority's Emergency Response Plan. As a selected Sweetwater Authority contractor, I have been instructed to provide this information to all contractor employees prior to their working on the Sweetwater Authority facility and to ensure that each employee understands the applicable required procedures.

Signed:_____

Date: _____

****

THIS SECTION
TO BE COMPLETED BY SWEETWATER AUTHORITY

This form was presented to _____ representing _____

on _____ and returned to _____.

Signed:_____
Sweetwater Authority

CONTRACTOR EMPLOYEE INJURY/ILLNESS LOG

Contractor _____

	Contractor Employee	Description of Injury/Illness	Disposition	Date
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____

To be completed after job completion or within 14 days of job initiation.

CONTRACTOR EVALUATION

1. Contractor _____

2. Job Description _____

3. Evaluation of Job Performance

_____

_____

_____

4. Evaluation of Contractor Employee Safe Working Practices

_____

_____

_____

5. If items 3 or 4 indicate deficiencies, what steps are required by the contractor to correct them?

_____

_____

_____

6. Should this contractor be retained again?

_____

_____

_____

SWEETWATER DAM 36-INCH RAW WATER PIPELINE REPLACEMENT

PART 3 – TECHNICAL SPECIFICATIONS

SECTION 01 10 00
SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. The work described in these Specifications includes the following general items of work:
   a. Mobilization;
   b. Providing sheeting, shoring, and bracing for all excavations;
   c. Clearing and grubbing of project areas;
   d. Performing minor earthwork and dewatering to facilitate project construction;
   e. Demolishing, removing and disposing of approximately 426 linear feet of existing 36-inch steel pipe, including fittings, appurtenances, and concrete encasement;
   f. Demolishing existing flowmeter, sensor lines, portions of old foundation and walls, and a portion of stilling pool dam structure to facilitate pipeline construction;
   g. Abandoning approximately 203 linear feet of the existing 36-inch steel pipe and a blowoff structure in-place;
   h. Furnishing and installing approximately 426 linear feet of new buried 36-inch welded steel pipe, including fittings, appurtenances, electrical conduits and concrete encasement;
   i. Furnishing and installing 203 linear feet of new above-grade 36-inch welded steel pipe, including fittings, appurtenances, electrical conduits, concrete encasement, and anchoring it to the top of the concrete encasement of the existing 36-inch steel pipe;
   j. Furnishing and installing manways;
   k. Furnishing and Installing combination air and vacuum valves;
   l. Furnishing and installing blowoffs;
   m. Furnishing and installing approximately 32 linear feet of 30-inch steel pipe liner, including all connections;
   n. Re-constructing portion of stilling pool structure;
   o. Constructing an access ramp and concrete drainage ditch;
   p. Furnishing and installing corrosion monitoring.

1.2 WORK SEQUENCE AND CONSTRUCTION SCHEDULE

A. CONTRACTOR retains responsibility for determination of sequence of work except as otherwise designated below and in Section 01 31 00: PROJECT MANAGEMENT AND COORDINATION.

B. Work sequencing must address the requirements of the Contract Documents, as well as any special requirements provided by OWNER or ENGINEER.

C. Work hours outside of the normal 7 am to 4 pm schedule must be approved by OWNER.

D. Work may not occur on weekends or holidays unless specific written permission is granted by OWNER. Conform to provisions of Paragraph 1-22 of the Authority's Standard Specifications.

E. Conform to all conditions and requirements of all project permits and approvals.

1.3 CONTRACTOR SUBMITTALS

A. The Preliminary Construction Schedule is required prior to mobilization and within 14 calendar days after the Effective Date of the Agreement.

B. CONTRACTOR does not need to acquire a building permit.

C. Submit a preliminary schedule of shop drawings and submittals within 14 calendar days after the Effective Date of the Agreement. Submit in accordance with Section 01 33 00: SUBMITTAL PROCEDURES.

1.4 CONSTRUCTION OBSERVATION

A. Observation of construction will be performed by the OWNER. Notify OWNER at all critical points and before covering up any of the Work.

1.5 OSHA STANDARDS

A. CONTRACTOR shall be bound by the latest provisions of Subpart F, Section 1926, of the OSHA Safety and Health Standards for Construction.

1.6 PROPOSAL, DRAWINGS, AND SPECIFICATIONS

A. The Proposal lists the Unit Price and Lump Sum items for the Work defined by the Contract Documents.

1. Proposal Items are assumed to be all inclusive as described; ancillary labor, materials, and equipment should be included in the item price to provide to OWNER complete and ready for use items as part of the Work.

2. The sum of the items required in the course of completing Work specified herein shall provide a physically completed project, as well as fulfill the intent of the project, as described in the Contract Documents.

3. The final quantity of each used item may vary from the approximated quantity listed in CONTRACTOR's Bid Schedule.

B. The Drawings, furnished separately, are made a part of these Specifications and show the detailed work to be completed.

C. The Specifications furnished and bound herewith are separated into several Divisions, generally according to the Construction Specifications Institute (CSI). The Specifications provide the technical and general guidelines governing the progress of Work for the project.

PART 2 PRODUCTS

2.1 MATERIALS

A. Permanent Materials: New, of good quality, and transported and handled in accordance with the Manufacturer's recommendations and the requirements of the Contract Documents.

B. Temporary Materials: Temporary chain link fencing, security fencing, traffic control items, sanitary facilities, and other OWNER-approved temporary facilities may be used materials in good condition.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 22 00
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. Measurement and payment criteria applicable to portions of Work performed under a unit price payment method.

2. Measurement and payment criteria applicable to portions of Work performed under a lump sum payment method.

1.2 SUBMITTALS

A. Administrative Submittals

1. Schedule of Values.

2. Monthly Payment Application.

3. Final Payment Application.

1.3 MEASUREMENT OF QUANTITIES

A. Measurement by Volume - Measured by cubic dimension using mean length, width, and height or thickness. Unless specified otherwise, compute volumes using the average-end-area method with cross sections surveyed at maximum 100-foot spacing. On curved alignments, utilize the length between the centroid of each area at adjacent cross sections rather than the nominal cross section spacing along the alignment.

B. Do not measure placement, installation, and backfill of materials until Work is complete. Perform measurements from the limit of the neat lines shown on the Drawings.

C. Measurement by Area - Measured by square dimension using mean length and width or radius.

D. Linear Measurement - Measured by linear dimension along the item centerline or mean chord, and based on a horizontal projection of the actual area installed except where specified as a vertical measurement.

E. Conduct surveys for measurement in accordance with the requirements of Section 01 71 23: CONSTRUCTION SURVEYING.

F. Notify OWNER at least 48 hours in advance, and obtain OWNER witness of daily field measurement for work performed under Unit Price Pay Items.

G. Include backup data and calculations with application for payment.

H. Measurement by CONTRACTOR is subject to review, verification, and approval by OWNER.

1.4 PAYMENT – GENERAL

A. No payment will be made for excavation or concrete to fill excavations or depressions made by CONTRACTOR beyond the limits shown or established in the field by ENGINEER. This applies to excavations such as haul road cuts or access ramps made for CONTRACTOR'S convenience, as well as excavation to remove damaged subgrade material that has become disturbed by exposure to the elements or CONTRACTOR'S operations.

1.5 PAYMENT FOR UNIT PRICE ITEMS

A. Unit Price Work:

1. Reflect unit price quantity and price breakdown from the Bid Proposal.

2. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Proposals and determining Initial Contract Price.

B. Final payment for Work governed by unit prices will be made based on the actual measurements and quantities accepted by OWNER, multiplied by the unit price for Work that is incorporated in or made necessary by Work.

C. Payment for unit price items covers all Work necessary to complete the line items in Table 1.

Table 1: Unit Price Items

ITEM NO.	ITEM	UNIT	DESCRIPTION	MEASUREMENT FOR SCHEDULE OF VALUES
6	Furnish and Install approximately 426 linear feet of new buried 36-inch welded steel pipe, including fittings, appurtenances, electrical conduits, concrete encasement, dewatering and earthwork.	Linear Foot	Includes all planning, labor, materials, tools, equipment and doing all work necessary to furnish, install and test the buried 36-inch diameter steel pipe and all associated valves, fittings, and appurtenances. It also includes constructing concrete encasement, including earthwork, backfill, dewatering, and electrical conduits.	Measurement will be based on the in-place length of pipeline installed.
7	Furnish and Install approximately 203 linear feet of new above-grade 36-inch welded steel pipe, including fittings, appurtenances, electrical conduits, concrete encasement, and anchoring it to the top of the concrete encasement of the existing 36-inch steel pipe	Linear Foot	Includes all planning, labor, materials, tools, equipment and doing all work necessary to furnish, install and test the above-ground 36-inch diameter steel pipe and all associated valves, fittings, and appurtenances. It also includes constructing concrete encasement and anchoring it to the existing steel pipeline's concrete encasement. Also included are earthwork, backfill, electrical conduits, and all items related to drainage relief .	Measurement will be based on the in-place length of pipeline installed.
8	Furnish and Install two (2) manways at sta. 10+50 and sta. 15+10	Each	Includes all planning, labor, materials, tools, equipment and doing all work necessary to furnish and install manways at Sta. 10+50 and Sta. 15+10. This includes any additional concrete encasement.	Measurement will be based on the in-place manways installed.

ITEM NO.	ITEM	UNIT	DESCRIPTION	MEASUREMENT FOR SCHEDULE OF VALUES
9	Furnish and Install one (1) combination air and vacuum valve at sta. 11+95	Each	Includes all planning, labor, materials, tools, equipment and doing all work necessary to furnish and install combination air and vacuum valve assembly and valve enclosure at Sta. 11+95. This includes any additional concrete encasement and enclosure mounting pad.	Measurement will be based on the in-place combination air and vacuum valves installed.

1.6 PAYMENT FOR LUMP SUM ITEMS

A. Payment for lump sum Work will be made in accordance with the accepted Schedule of Values.

B. An unbalanced or front-end loaded Schedule of Values will not be accepted.

C. Payment for lump sum work covers all work required to complete the Work as shown or specified that is not covered under the unit price items, and shall be based on the breakdown included in the approved Schedule of Values.

D. Summation of the complete Schedule of Values shall equal the lump sum Contract Price.

1.7 SCHEDULE OF VALUES

A. Provide breakdown of unit price pay items to reflect quantity and price in accordance with Bid Form.

B. Provide breakdown of lump sum pay items to facilitate review of progress payments. Payment for lump sum items covers all Work necessary to complete the items listed below.

1. List bonds and insurance premiums, mobilization, demobilization, facility startup, and contract closeout separately.

2. Break down by discrete work items. Include at least the following items and sub-items:

a. Item 1: Mobilization / Demobilization
   i. Project licenses and permits.
   ii. Mobilization of equipment, supplies and incidentals to the site.
   iii. Demobilization.
   iv. Field offices, buildings, trailers, plants and other temporary facilities and controls.
   v. Temporary fencing
   vi. Erosion and sediment control.
   vii. Temporary utilities hookups.
   viii. Management personnel at the start and end of the Work.

b. Item 2: Furnish and install sheeting/shoring
   i. Includes all planning, labor, materials, tools, equipment and doing all work necessary for sheeting, shoring and bracing for all excavations, including trenches in accordance with Cal OSHA requirements.

c. Item 3: Clearing and grub approximately 0.3 acres;
   i. Includes all planning, labor, materials, tools, equipment and doing all work necessary to clear, grub, remove and dispose of all trees, vines, stumps, roots, brush, rubbish, and other unsuitable materials within construction area, including the limits of excavation, embankment or dike construction, construction storage areas, and CONTRACTOR's field..
   ii. Furnishing equipment, labor, and trucks for disposing of material offsite.

d. Item 4: Demolition;
   i. Includes all planning, labor, materials, tools, equipment and doing all work necessary to demolish and remove existing pipelines, fittings, pipeline appurtenances, concrete encasement, and selective demolition of existing foundations and walls and stilling pool dam structure.
   ii. Furnishing equipment, labor, and trucks for disposing of material offsite.

e. Item 5: Abandon approximately 203 linear of existing 36-inch steel pipeline in-place and existing blowoff at sta. 11+40;
   i. Includes all planning, labor, materials, tools, equipment and doing all work necessary to abandon in-place a portion of the existing 36-inch steel pipeline, and blowoff structure by filling it with low strength concrete. It also includes removing and disposing of valve at blowoff assembly.
   ii. Furnishing equipment, labor, and trucks for disposing of material offsite.

f. Item 10: Furnish and Install one (1) new 12-inch blowoff at sta. 11+40;
   i. Includes furnishing all materials, tools, labor, and equipment for the installation of a new blowoff assembly including valve, steel pipe, fittings, and pipe supports.

g. Item 11: Furnish and Install one (1) new 8-inch blowoff at sta. 14+20;
   i. Includes furnishing all materials, tools, labor, and equipment for the installation of a new blowoff assembly including gate valve, valve extension, valve can, valve operator, steel pipe, fittings, and cast iron gate box. It also includes all excavation, dewatering, backfill, compaction, grading, and concrete encasement.

h. Item 12: Furnish and install approximately 32 linear feet of 30-inch pipe lining, one (1) combination air and vacuum valve at sta. 16+ 42+/-, connect liner pipe to existing 36-inch steel pipe, connect one (1) new 2.5" fire hose connection at Sta. 16+52+/-, rehabilitate combination air and vacuum drain line;
   i. Includes all planning, labor, materials, tools, equipment and doing all work necessary to furnish, and install: (1) 30-inch diameter steel lining inside the existing 36-inch diameter steel pipe and fill the annular space with gout; (2) One combination air and vacuum valve; (3) Connect liner pipe to existing 36-inch steel pipe; (4) Furnish, install and connect one new 2.5" fire hose connection; (5) rehabilitate combination air and vacuum drain line.

i. Item 13: Connect new steel pipe to existing steel pipe at Sta 10+00
   i. Field verification of exact tie-in location; determine size, material, and condition of existing pipe, including excavation, backfill, compaction, grading, and concrete encasement.
   ii. Selectively demolish existing pipeline and concrete encasement to make room for new 36-inch steel line connection.
   iii. Develop and submit connection plans to engineer, including shop drawings and special fitting to engineer.
   iv. Furnish all tools, labor, materials and equipment to perform demolition and installation work.

j. Item 14: Re-Construct portion of stilling pool structure
   i. Develop and submit calculations and plans for strucuture.
   ii. Furnish all tools, labor, material, and equipment for re-constructing in-kind the portion of the existing stilling pool concrete structure that was removed during the pipeline installation, including excavation, backfill, compaction, grading, forming, and reinforced concrete.

k. Item 15: Construct concrete access ramp and concrete drainage ditch
   i. Includes all planning, labor, materials, tools, equipment and doing all work necessary for constructing the access ramp and concrete drainage ditch, including excavation, backfill, compaction, grading, forming, and reinforced concrete.

l. Item 16: Furnish and install corrosion monitoring
   i. Includes all planning, labor, materials, tools, equipment and doing all work necessary for installing corrosion monitoring system on the new steel pipeline, including field testing.

C. Submit on CONTRACTOR's standard form.

D. CONTRACTOR'S schedule of values will be acceptable to the OWNER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the work.

1.8 PROGRESS PAYMENTS

A. At the end of each calendar month, submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

B. Include accepted schedule of values for lump sum Work and the unit price breakdown for Work to be paid on unit price basis.

C. Preparation:

1. List each Change Order and Written Amendment executed prior to date of payment request as separate line items.

1.9 NONPAYMENT FOR REJECTED OR UNUSED ITEMS

A. Payment will not be made for the following:

1. Materials excavated and/or placed beyond the Design Lines shown on the Drawings, except as specifically required by ENGINEER.

2. Loading, hauling, and disposing of rejected material.

3. Quantities of material wasted or disposed of in a manner not called for under Contract Documents.

4. Rejected loads of material, including material rejected after it has been placed by reason of failure of CONTRACTOR to conform to provisions of Contract Documents.

5. Material not unloaded from transporting vehicle.

6. Defective work not accepted by OWNER.

7. Material remaining on hand after completion of Work.

PART 2 Products

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. Definition and frequency of required Project meetings
2. Construction sequence for key features of Work
3. Utility notification procedures
4. Request for Information procedures

1.2 SUBMITTALS

A. Administrative:

1. CONTRACTOR's Daily Site Report: Submit to OWNER no later than 3 days after the report date.
2. CONTRACTOR's water usage plan. Indicate CONTRACTOR's schedule of monthly water usage including peak daily water demands for the Work.

1.3 PROJECT MEETINGS

A. Schedule project meetings, prepare meeting agenda with participant input, preside at meetings, record meeting minutes to include significant proceedings and decisions, and distribute meeting minutes within 5 days after meeting.

B. Preconstruction Conference

1. Prior to starting Work at the site, meet with OWNER and ENGINEER to discuss the following items:
    a. Project schedule
    b. Bonds and insurance
    c. Project permits
    d. Administrative procedures
        i. Submittals

ii. Progress payments
iii. Changes in the Work
iv. Weekly progress meetings

e. Construction sequence
f. Quality control and testing
g. Site safety
h. Site access, security, and temporary facilities
i. OWNER authority and responsibilities
j. CONTRACTOR authority and responsibilities
k. ENGINEER authority and responsibilities

2. The Preconstruction conference shall be attended by the following people:

a. OWNER's representative (attendance mandatory).
b. CONTRACTOR's office representative (attendance mandatory).
c. CONTRACTOR's resident superintendent (attendance mandatory).
d. CONTRACTOR's safety representative (attendance mandatory).
e. ENGINEER's representative (attendance mandatory).
f. Subcontractors whom CONTRACTOR, ENGINEER, or OWNER request to attend.
g. Others as appropriate.

C. Progress Meetings

1. Meet with OWNER and ENGINEER at the job site once a week during construction to discuss Work progress. Coordinate location and time of meeting at the preconstruction conference. Give verbal reports of the following items:

a. Progress of construction, including specific work completed since last Progress Meeting.
b. Project schedule, including a detailed projection of activities for the next 3 weeks
c. Status of submittals
d. Status of progress payments
e. Conflicts, discrepancies, or other difficulties requiring resolution

2. The progress meetings shall be attended by the following people:

a. OWNER's representative (attendance mandatory).
b. CONTRACTOR's resident superintendent (attendance mandatory).
c. ENGINEER's representative (as needed).
d. Subcontractors whom CONTRACTOR, ENGINEER, or OWNER request to attend.
e. Others as appropriate.

D. Special Meetings

1. Meet with OWNER and ENGINEER, when requested, to discuss technical issues, construction planning, construction schedule, and contract administration.

2. Special meetings shall be attended by the following people:

a. CONTRACTOR's resident superintendent (attendance mandatory).
b. OWNER's representative (attendance mandatory).
c. ENGINEER's representative (attendance mandatory).
d. Others as appropriate.

1.4 CONSTRUCTION SEQUENCE

A. Include the following general provisions and requirements:

1. Erosion Protection and Sediment Control:

a. Install erosion protection and sediment control in accordance with applicable permits and requirements of these Specifications.
b. Maintain erosion protection and sediment control throughout the duration of the project.
c. Remove erosion protection and sediment control facilities when no longer needed.

1.5 UTILITY NOTIFICATION

A. Prior to the start of construction, verify the existence and location of all existing utilities; notify respective utility companies in accordance with state law.

B. Conform to the provisions of Article 2.22 of the Special Conditions.

C. Coordinate Work with utilities as required.

1.6 REQUEST FOR INFORMATION

A. Submit questions and requests for clarifications to ENGINEER using the Request for Information (RFI) form attached at the end of this section.

1. Submit RFI's for clarification of information provided in Specifications and shown on Drawings, and to request substitutions for materials or methods.

B. Numbered sequentially, starting with No. 001.
C. Maintain a log of all RFI requests submitted including, at a minimum, the date of submittal, subject, and receipt of response.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

Request for Information Number:_____
Date:_____

To: _____ From: _____

Subject:	
Specification Section:	
Drawing Number:	

Question:

Written By: _____ Date: _____
Attachments: _____

Response:

Written By: _____ Date: _____
Attachments: _____

Contractor Acceptance: _____
Title: _____ Date: _____

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. Photographs and video documentation

2. Schedule updates

3. Record Drawings

1.2 DEFINITIONS

A. Critical Path Method – Critical path method (CPM) shall be interpreted to be generally as outlined in the Association of General Contractors (AGC) publication. "The Use of CPM in Construction." except that either "i-j" arrow diagrams or precedence diagramming format may be utilized.

B. CPM Network – CPM network in a form of a time scaled "i-j" activity-on-arrow or precedence type diagram and may be divided into a number of separate sheets with suitable match lines relating the interface points among the sheets.

C. Float – Unless otherwise provided herein, float as referenced in these documents is total float. Total float is a period of time measured by the number of days each non-critical path activity may be delayed before it and its succeeding activities become part of the critical path. If a non-critical path activity is delayed beyond its float period, that activity then becomes part of the critical path and controls the end date of the project.

D. Float Ownership – Neither OWNER nor CONTRACTOR owns the float time. The project owns the float time. As such, liability for delay of the project completion date rests with the party actually causing delay to the project completion date. For example, if Party A uses some, but not all, of the float time and Party B later uses the remainder of the float time as well as additional time beyond the float time, Party B shall be liable for the costs associated with the time that represents delay to the project's completion date. Party A would not be responsible for any costs since it did not consume all of the float time and additional float time remained; therefore, the project's completion date was unaffected.

1.3 SUBMITTALS

A. Administrative:

1. Preliminary Progress Schedule
2. Updated CPM Progress Schedules
3. Final CPM schedule
4. Construction Photographs
5. Video Recordings.

1.4 CONSTRUCTION SCHEDULES

A. Preliminary Progress Schedule

1. A bar chart schedule prepared to show:

   a. CONTRACTOR's early activities (mobilizations, permits, all submittals and activities required in the first 90 days)
   b. The major components of Work
   c. The sequence relations between major components and subdivisions of major components.

2. Include sufficient detail for the identification of subdivisions of major components into such activities as:

   a. Obtaining permits
   b. Mobilization
   c. Staging/stockpile area development
   d. Submittal development and review
   e. Clearing and Grubbing
   f. Demolition activities
   g. Pipeline Survey
   h. Pipe Fabrication
   i. Pipeline Construction
   j. Pipeline Encasement
   k. Pipeline Testing
   l. Liner Pipe Installation
   m. Concrete Drain and Access Ramp Construction
   n. Project milestones

o. Project closeout
p. Demobilization

3. Indicate planned start dates and durations for each Work item subdivision.

B. CPM Schedule

1. Describe the activities to be accomplished and their logical relationships; show the critical path.

2. Include, as a minimum, the following items:

a. Obtaining permits
b. Mobilization
c. Staging/stockpile area development
d. Submittal development and review
e. Clearing and Grubbing
f. Demolition activities
g. Pipeline Survey
h. Pipe Fabrication
i. Pipeline Construction
j. Pipeline Encasement
k. Pipeline Testing
l. Liner Pipe Installation
m. Concrete Drain and Access Ramp Construction
n. Project milestones
o. Project closeout
p. Demobilization

3. Provide sufficient detail and information to cost load the CPM schedule in accordance with the schedule of values. Provide cost loads for each construction activity.

4. Include the number of shifts, length of shift, production rates for concrete and embankment placement, and number of days worked per week.

5. Submission of CONTRACTOR's CPM schedule to OWNER shall not relieve CONTRACTOR of total responsibility for scheduling and sequencing Work.

C. Updated CPM Schedule

1. Submit a revised CPM schedule monthly with the payment request.

a. Failure to include an updated schedule will cause OWNER to withhold the monthly progress payment.

2. Each schedule update submitted must be complete, including all information requested in the original CPM schedule submittal.

3. Include the following information:

   a. Delays in submittals, resubmittals, or deliveries
   b. Changes in the sequences of Work
   c. Revisions to durations and completion dates
   d. Changes in the number or length of shifts
   e. Changes in the number of days worked per week

4. Show all Work activities on each update, including those already completed.

   a. Show "as built" information by indicating when the Work was actually started and completed.
   b. The updated schedule should reflect actual construction progress, changes to the schedule as a result of Change Orders, construction delays, and other schedule impacts.

5. Basis for time adjustment

   a. Changes or delays that do not affect the critical path will not be considered as a basis for a time adjustment.
   b. Changes or delays that affect the critical path will be considered in granting an extension of time for completion of the contract only if the total available float is absorbed by the delay.

6. If CONTRACTOR fails to complete activities that are on the critical path, submit in writing a statement of how CONTRACTOR intends to correct the deficiency and return the Work to an acceptable schedule.

D. Final CPM Schedule

1. Submit a final CPM schedule that updates the CPM schedule to reflect actual construction progress.

E. Compute the duration estimate indicated for each activity in days, representing the single best estimate considering the scope of the activity work and resources planned for the activity.

F. Schedule Report Format

1. Provide Schedules in Times New Roman or Arial font type. Font size may be no smaller than 10-point.

2. Schedules may be divided into a number of separate sheets with suitable match lines relating the interface points among the sheets.

   a. Individual sheets may not exceed 22- by 34-inch.

3. Project Information – Preface each Schedule Report with the following summary data:

   a. Project Name
   b. Contractor
   c. Type of Tabulation
   d. Project Duration
   e. Contract Completion Date (revised to reflect time extensions)
   f. The Commencement Date Stated in the Notice to Proceed
   g. The Data Date and Plot Date of the Network Diagram
   h. If an update, cite the new schedule completion date

4. Prepare Schedule Reports based on the Construction Schedule.

5. Include the following minimum data for each activity:

   a. Activity Numbers and Responsibility Codes
   b. Estimated Activity Duration
   c. Activity Description
   d. Activity's Percent Completion
   e. Early Start Date (Calendar Dated)
   f. Early Finish Date (Calendar Dated)
   g. Late Start Date (Calendar Dated)
   h. Late Finish Date (Calendar Dated)
   i. Status (Whether Critical)
   j. Total Float for Each Activity
   k. Free Float for Each Activity
   l. Cost Value for Each Activity

1.5 PROJECT STATUS REPORTING

A. Submit monthly project status reports in the form of a written status report and Updated CPM Schedules.

B. Written status reports to include:

1. Number of days worked, construction force, weather conditions, and list of equipment on site.

2. The status of major project components (percent complete, amount of time ahead or behind schedule).

3. The progress made on critical activities indicated on the CPM schedule.

4. The status of major material and equipment procurement.

5. Any delays encountered during the reporting period.

6. An assessment of delays encountered and impacts to the progress of the Work.

7. Changes in the Contract.

8. Additional status information requested by ENGINEER.

9. Other information pertinent to the status of the project.

1.6 CONSTRUCTION PHOTOGRAPHS

A. Photographically document all phases of construction including preconstruction, construction progress, and post construction.

B. ENGINEER reserves the right to select the subject matter and vantage point from which photographs are to be taken.

C. Preconstruction and post construction:

1. Perform preconstruction photos after the Effective Date of the Agreement but before Work begins at the Site.

2. Perform post construction photos at the issuance of Substantial Completion.

3. Take a minimum of 72 exposures of the site and property adjacent to the site.

4. Take post construction photos from the same vantage points as the Preconstruction photos.

D. Construction progress photos:

1. Demonstrate progress on construction.

2. Take a minimum of 24 exposures each week.

E. Format:

1. Digital Images

a. Submit on compact disk
b. Date stamp on all photos

2. Label each photo with the following:

a. Project name
b. Date
c. Description of photo

1.7 VIDEO RECORDINGS

A. Video recording of the existing condition of private property immediately adjacent to the site and of access roads to the site.

B. DVD Format, 2 copies.

1.8 RECORD DRAWINGS

A. Provide and maintain one complete set of prints of the project Drawings at the project Site.

B. Keep the Drawings in good, clean, and readable condition.

C. Drawing updates:

a. Include the following information:

i. All changes in Work including relocation of lines, change in type of materials, etc.
ii. Date of each change.

b. Frequency: No less than once per week.
c. Note the changes with red pencil or red ink.
d. Provide sufficient detail and clarity necessary for preparation of record drawings.

D. Review changes with OWNER and ENGINEER at monthly pay request submittal.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general item of work:

1. Submittals

1.2 DEFINITIONS

A. Submittals - All Work plans or procedures, Drawings, shop drawings, schedules, data, manuals, certifications, test reports, curves, samples, brochures, and other items furnished by CONTRACTOR for approval, information, or other purposes.

B. Shop drawings – All submittals that reflect processes, layout, or method of construction.

C. Samples - All submittals that reflect type or quality of product.

D. Administrative Submittals - All submittals that do not reflect quality of product or method of construction.

E. Quality Control Submittals – All submittals that present results of inspections or tests or compliance with the Specifications.

1.3 SUBMITTAL PROCEDURES

A. Each submittal will be returned within fourteen (14) days by ENGINEER following receipt of submittal, unless otherwise indicated in the Specification section. Resubmittals shall be subject to the same review time.

B. Obtain submittal approval from ENGINEER prior to performing Work related to submittals.

C. Utilize a 10-character submittal identification numbering system in the following manner:

1. The first six digits shall be the applicable Specification section number.

2. The next three digits shall be the numbers 001 to 999 to sequentially number each initial separate item or submittal under each specific section number.

3. The last character shall be a letter (A to Z) indicating the submission, or resubmission of the same Submittal, i.e., "A = 1st submission, B = 2nd submission (first resubmission), C = 3rd submission, etc.

4. A typical submittal number would be as follows: 03 31 00 - 008 - B

D. Submittals will be reviewed no more than twice at OWNER's expense.

1. Subsequent reviews will be performed by ENGINEER at CONTRACTOR's expense.

2. CONTRACTOR will be invoiced on a time and materials basis using the same hourly rates that are being charged to OWNER for engineering services.

3. Invoice amounts will be deducted from amounts due, or to become due, to CONTRACTOR.

4. Submittals are required until approved.

5. Delays resulting from resubmittals will not entitle CONTRACTOR to a Contract Time extension or change in Contract Price.

E. If the items as submitted describe variations and show a departure from the Contract requirements which ENGINEER finds to be in the interest of OWNER and to be so minor as not to involve a change in Contract Price or Contract Time, ENGINEER may return the reviewed submittals without noting an exception.

F. In accordance with the applicable provisions of the General Conditions.

G. Complete and submit a transmittal form with each submittal package. A copy of the form is attached at the end of this section.

1.4 SUBMITTALS

A. Administrative:

1. Schedule of Submittals: Submit 14 days after Notice to Proceed. Include the following information:

a. List of submittals (group by Specification number)
b. Estimated submission date
c. Estimated start date for corresponding items of Work

1.5 SHOP DRAWINGS

A. Copies: Post electronic copies to Project ftp site and provide one hard copy of shop drawings and product data.

B. Include the following information:

1. The date of submission and the dates of any previous submissions

2. The project title and number

3. The name of CONTRACTOR (and Subcontractor where applicable)

4. Identification of the items/submittal/product, with the Specification section number, page, and paragraph(s), and Drawing reference, if any

5. Field dimensions, clearly identified as such

6. Relation to adjacent or critical features of the Work or materials

7. Design Data: show calculations, dimensions, logic, and assumptions upon which the design is based.

8. Applicable standards, such as ASTM, ANSI, or Federal Specification numbers

9. Identification of deviations from Contract Documents

10. Identification of revisions on resubmittals

11. A blank space suitably sized for CONTRACTOR and CONTRACTOR's engineer (if necessary) stamps

C. Prepare the submittal as follows:

1. Present in a clear and thorough manner.

2. Include sufficient detail to show the kind, size, arrangement, and function of components or materials and compliance with the Contract Documents.

3. Include drawings that are to scale.

4. Mark pertinent products or models and show performance characteristics, capacities, dimensions, clearances, anchorages, external connections, or supports required.

5. Submit hard copy on 8 1/2- by 11-inch or 11- by 17-inch paper. If paper larger than 11- by 17-inch is required, use 22- by 34-inch paper. Submit electronic copies on Project ftp site in pdf form.

D. Disposition: ENGINEER will review and mark up submittals and distribute marked-up copies as described below.

1. Final For Construction:

a. Electronic copy to OWNER
b. Electronic copy to ENGINEER
c. Electronic copy to CONTRACTOR
d. CONTRACTOR may begin Work described in the submittal

2. Final For Construction, As Corrected:

a. Electronic copy to OWNER
b. Electronic copy to ENGINEER
c. Electronic copy to CONTRACTOR
d. CONTRACTOR may begin Work described in submittal in accordance with ENGINEER's notations, subject to CONTRACTOR's written verification and acceptance of ENGINEER's notations.

3. For Correction and Resubmittal:

a. Electronic copy returned to CONTRACTOR appropriately annotated.
b. CONTRACTOR shall make corrections or develop a replacement submittal and resubmit.

4. Rejected - Resubmit:

a. Electronic copy returned to CONTRACTOR appropriately annotated.
b. CONTRACTOR shall complete and resubmit or submit missing portions of the submittal.

1.6 SAMPLES

A. Unless otherwise noted, submit four samples for each required submittal.

B. All sample submittals shall contain the following information:

1. The date of submission and the dates of any previous submissions

2. The project title and number

3. The name of CONTRACTOR (and Subcontractor where applicable)

4. Identification of the items/submittal/product, with the Specification section number, page, and paragraph(s), and Drawing reference, if any

5. Applicable standards, such as ASTM, ANSI, or Federal Specification numbers

6. Identification of deviations from Contract Documents

7. Identification of revisions on resubmittals

8. Source, location, date obtained, and who obtained the sample

C. Prepare the sample submittal as follows:

1. Present in a clear and thorough manner. Include sufficient detail to show the kind, size, arrangement, and function of components or materials, and compliance with the Contract Documents.

2. Mark pertinent products or models and show performance characteristics, capacities, dimensions, clearances, anchorages, external connections, or supports required.

D. Disposition: ENGINEER will review and mark up submittals and distribute marked-up copies as described below.

1. Final for Construction:

a. Electronic copy of transmittal and one sample to OWNER.
b. Electronic copy of transmittal and one sample to ENGINEER.
c. Electronic copy of transmittal and one sample to CONTRACTOR.
d. CONTRACTOR may begin Work described in the submittal.

2. Final for Construction, as Corrected:

a. Electronic copy of transmittal, with annotations, and one sample to OWNER.
b. Electronic copy of transmittal, with annotations, and one sample to ENGINEER.
c. Electronic copy of transmittal, with annotations, and one sample to CONTRACTOR.

d. CONTRACTOR may begin Work described in submittal in accordance with ENGINEER's notations, subject to CONTRACTOR's written verification and acceptance of ENGINEER's notations.

3. For Correction and Resubmittal:

a. Electronic copy of transmittal and one sample retained by ENGINEER.
b. Remaining samples returned to CONTRACTOR appropriately annotated.
c. CONTRACTOR shall make corrections or develop a replacement submittal and resubmit.

4. Rejected-Resubmit:

a. Electronic copy of transmittal, with annotations, and one sample retained by ENGINEER.
b. Remaining samples returned to CONTRACTOR appropriately annotated.
c. CONTRACTOR shall complete and resubmit or submit missing portions of the submittal.

1.7 ADMINISTRATIVE SUBMITTALS

A. Copies: Post electronic copies to Project ftp site and provide one hard copy of administrative submittals.

B. Administrative submittals include, but are not limited to, the following items:

1. Applications for Payment.

2. Construction Photographs: In accordance with the applicable provisions of Section 01 32 00: CONSTRUCTION PROGRESS DOCUMENTATION.

3. Video Recordings: In accordance with the applicable provisions of Section 01 32 00: CONSTRUCTION PROGRESS DOCUMENTATION.

4. Schedules: In accordance with the provisions of Section 01 32 00: CONSTRUCTION PROGRESS DOCUMENTATION.

5. Submittals Required By Law, Regulations or Governing Agencies.

6. Record Documents: In accordance with the applicable provisions of Section 01 32 00: CONSTRUCTION PROGRESS DOCUMENTATION.

C. Include the following information:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. The name of CONTRACTOR (and Subcontractor where applicable).

4. Identification of the items/submittal/product, with the Specification section number, page, and paragraph(s), and Drawing reference, if any.

5. Identification of deviations from Contract Documents.

6. Identification of revisions on resubmittals.

D. Prepare as follows:

1. Present in a clear and thorough manner. Include sufficient detail to show compliance with the Contract Documents.

2. Include drawings that are to scale.

3. Prepare schedules in accordance with the applicable requirements of Section 01 32 00: CONSTRUCTION PROGRESS DOCUMENTATION.

4. Submit hard copy on 8 1/2- by 11-inch or 11- by 17-inch paper. If paper larger than 11- by 17-inch is required, use 22- by 34-inch paper. Electronic copies shall be in pdf form.

E. Disposition: ENGINEER will review and mark up submittals and distribute marked-up copies as described below.

1. Final For Construction:

a. Electronic copy to OWNER.
b. Electronic copy to ENGINEER.
c. Electronic copy to CONTRACTOR.
d. CONTRACTOR may begin Work described in the submittal.

2. Final For Construction, as Corrected:

a. Electronic copy, with annotations, to OWNER.
b. Electronic copy, with annotations, to ENGINEER.
c. Electronic copy, with annotations, to CONTRACTOR.

d. CONTRACTOR may begin Work described in submittal in accordance with ENGINEER's notations, subject to CONTRACTOR's written verification and acceptance of ENGINEER's notations.

3. For Correction and Resubmittal:

a. Electronic copy retained by ENGINEER.
b. Electronic copy returned to CONTRACTOR appropriately annotated.
c. CONTRACTOR shall make corrections or develop a replacement submittal and resubmit.

4. Rejected-Resubmit:

a. Electronic copy returned to CONTRACTOR appropriately annotated.
b. CONTRACTOR shall complete and resubmit or submit missing portions of the submittal.

1.8 QUALITY CONTROL SUBMITTALS

A. Copies: Post electronic copies to Project ftp site and provide one hard copy of quality control submittals.

B. Include the following information:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. The name of CONTRACTOR (and Subcontractor where applicable).

4. Identification of the items/submittal/product, with the Specification section number, page, and paragraph(s), and Drawing reference, if any.

5. Applicable standards, such as ASTM, ANSI, or Federal Specification numbers.

6. Identification of deviations from Contract Documents.

7. Identification of revisions on resubmittals.

C. Prepare as follows:

1. Certificates:

a. Manufacturer's Certificates of Compliance or Manufacturer's Certificate of Installation: Submit in accordance with the provisions of the individual Specification section.
b. Testing Certificates: Submit in accordance with the provisions of the individual Specification section.

2. Statement of Qualifications: Evidence of qualification, certification, or registration.

3. Inspection or Test Reports: Include the following information, as a minimum:

a. Test date, testing laboratory, name of inspector.
b. Date and time of test or sample, location of test or sample, temperature at time of the test, weather conditions at the time of the test.
c. Related Specification section, type of test or inspection performed, results of test or inspection, and Specification requirement.

D. Disposition: ENGINEER will review and mark up submittals and distribute marked-up copies as described below.

1. Final For Construction:

a. Electronic copy to OWNER.
b. Electronic copy to ENGINEER.
c. Electronic copy to CONTRACTOR.
d. CONTRACTOR may begin Work described in the submittal.

2. Final For Construction, as Corrected:

a. Electronic copy, with annotations to OWNER.
b. Electronic copy, with annotations to ENGINEER.
c. Electronic copy, with annotations to CONTRACTOR.
d. CONTRACTOR may begin Work described in submittal in accordance with ENGINEER's notations, subject to CONTRACTOR's written verification and acceptance of ENGINEER's notations.

3. For Correction and Resubmittal:

a. Electronic copy retained by ENGINEER.
b. Electronic copy returned to CONTRACTOR appropriately annotated.
c. CONTRACTOR shall make corrections or develop a replacement submittal and resubmit.

4. Rejected-Resubmit:

a. Electronic copy, with annotations, retained by ENGINEER.
b. Electronic copy returned to CONTRACTOR appropriately annotated.
c. CONTRACTOR shall complete and resubmit or submit missing portions of the submittal.

1.9 RECORD DRAWINGS

A. Submit record drawings at time of final acceptance and prior to final payment.

1.10 GUARANTEES, WARRANTIES, AND CERTIFICATES

A. Submit all guarantees, warranties, and certificates prior to final payment.

1.11 TEST REPORTS

A. Refer to Section 01 45 00: QUALITY CONTROL.

1.12 DELIVERY TICKETS

A. Submit to ENGINEER one legible copy of each delivery ticket as required by the Specifications.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

Sweetwater Dam South Spillway Repairs Project
TRANSMITTAL OF CONTRACTOR'S SUBMITTAL
(ATTACH TO EACH SUBMITTAL)

DATE: _____

TO: _____

SUBMITTAL NO.: _____

☐ NEW SUBMITTAL ☐ RESUBMITTAL

PREVIOUS SUBMITTAL NO.: _____

SPECIFICATION SECTION NO.: _____

(Cover only one section with each transmittal)

FROM: _____
CONTRACTOR

SCHEDULE DATE OF SUBMITTAL: _____

SUBMITTAL TYPE:

☐ SHOP DRAWING ☐ ADMINISTRATIVE

☐ QUALITY CONTROL ☐ SAMPLE

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: _____ Date Received: _____
CONTRACTOR (Authorized Signature)

SECTION 01 41 26
PROJECT PERMITS AND ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. Project Permits
2. Abatement of Air Pollution
3. Abatement of Noise Pollution
4. Abatement of Water Pollution
5. Landscape and Habitat Preservation
6. Preservation of Trees and Shrubs
7. Preservation of Historical and Archaeological Data
8. Protection of Endangered and Sensitive Species

B. The CONTRACTOR will meet the following general requirements:

1. All construction site workers and supervisors shall attend a brief (approximately ½ hour) environmental orientation provided by the OWNER at the start of the project. All of the CONTRACTOR's personnel and subcontractors working on the project site will be required to attend.

2. Prior to the initiation of ground-disturbing activities, the OWNER shall ensure that all construction personnel shall receive training by a qualified archaeologist regarding the recognition of possible buried cultural remains and protection of all cultural resources. Documentation shall be maintained showing when training of personnel was completed. Training shall inform all construction personnel of the procedures to be followed upon the discovery of archaeological materials or human remains. Training shall inform all construction personnel that travel and construction activity must be confined to designated roads and areas. All personnel shall be instructed that unauthorized collection or disturbance of artifacts or other cultural materials

will not be allowed and that violators will be subject to prosecution under the appropriate State and federal laws.

3. Prior to the initiation of ground-disturbing activities, the OWNER shall ensure that all construction personnel shall receive training by a qualified professional paleontologist, as defined by the Society for Vertebrate Paleontology (1995), to ensure they are aware that fossils are a protected resource, that they can recognize fossil materials, and that they will follow proper notification procedures in the event any are uncovered during construction. This training may occur along with other sensitivity trainings (e.g. archeological and biological resources). Procedures to be conveyed to workers include halting construction within 50 feet of any potential fossil find and notifying paleontologist, who shall document the location, type and significance of the find.

1.2 SUBMITTALS

A. Shop Drawings:

1. Water Quality Management Plan

a. Submit at least 30 days prior to the discharge or handling of any wastewaters.
b. Include the following information:

i. Name of the person who will be responsible for implementing and carrying out the plan.
ii. Precautions that will be taken to avoid discharge or accidental spills of oil or wastewater into the reservoir or stream.
iii. Methods and facilities for preventing or controlling runoff and erosion for all construction sites, both during and after construction, including the following areas:

a) Work pad areas
b) Stockpile and staging areas
c) All excavated surfaces and other incidental ground disturbances
d) Other impacted areas

iv. Sequence and schedule for installation and removal of facilities.
v. Relate the methods, facilities, and descriptions above to the conditions of required permits.

B. Administrative:

1. Copies of all necessary state and local permits required to complete the Work. Submit prior to beginning related portions of the Work.

1.3 PROJECT PERMITS

A. Comply with OWNER obtained permits.

1. The OWNER has obtained the following permits for the project:

a) San Diego Regional Water Quality Control Board - Section 401 Certification
b) U.S. Army Corps of Engineers- Section 404 Nationwide Permit
c) California Department of Fish and Game - Streambed Alteration Agreement
d) U.S. Fish and Wildlife Service - Concurrence Letter

2. Copies of OWNER draft MND and applications for the above permits are provided in Appendix A. The approved permits will be provided to the contractor before construction begins.

B. CONTRACTOR is responsible for obtaining and complying with all other state and local permits required for the Work. Such permits may include, but are not limited to, the following:

1. Right-of-way uses, driveway, or special use permits from state and local transportation agencies.

2. State Water Resources Control Board - NPDES General Construction Permit

3. San Diego Regional Water Quality Control Board - Storm Water Pollution Prevention Plan

C. If the aggregate storage of oil at the Site is over 1,320 gallons, prepare a Spill Prevention Control and Countermeasure (SPCC) plan.

1. The plan shall be prepared and certified by a Registered Professional Engineer registered in the State of California

D. Place all oil storage tanks at least 20 feet from streams, flowing or dry watercourses, lakes, wetlands, reservoirs, and any other water source. Dike the area surrounding the

tanks to contain a minimum of 1½ times the volume of the largest tank, or more than half the volume of all tanks within the diked area, whichever is greater.

1. Underground storage tanks will not be allowed.

E. CONTRACTOR shall bear the responsibility of obtaining, through OWNER, clarification of any and all permit requirements.

F. Immediately cease work that is in violation of any permit or guideline requirements.

G. Representatives of permitting agencies for any of the required project permits may periodically visit the work site.

1. Notify OWNER and ENGINEER of all concerns addressed to CONTRACTOR by agency representatives.

2. Cease work considered by agency representatives to be a violation of permit requirements or guidelines until the issue is resolved and OWNER has provided permission to CONTRACTOR to continue the task in question, within proper restraints or guidelines.

H. Fulfill permit obligations without any additional cost to OWNER.

1.4 ABATEMENT OF AIR POLLUTION

A. Perform abatement of air pollution in accordance with the requirements of the Air Pollution Emission Permit and applicable Laws and Regulations concerning the prevention and control of air pollution.

1. Use such methods and devices as are reasonably available to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.

B. Burning of cleared materials, combustible construction materials, and rubbish will not be allowed.

C. Apply a dust-preventive treatment or periodically water access and haul roads to prevent dust.

1.5 ABATEMENT OF NOISE POLLUTION

A. To reduce noise impacts due to construction, the applicant shall require construction contractors to implement the following measures:

1. Construction activities shall be limited to between 7 a.m. and 4 p.m. Monday through Saturday to avoid noise-sensitive hours of the day. Construction activities shall be prohibited on Sundays and holidays.

2. During construction, the CONTRACTOR shall outfit all equipment, fixed or mobile, with properly operating and maintained exhaust and intake mufflers, consistent with manufactures' standards.

B. Perform abatement of noise pollution in accordance with applicable Laws and Regulations regarding the prevention, control, and abatement of harmful noise levels.

C. Construction noise is governed by the County of San Diego Noise Ordinance (Chapter 4, Noise Abatement and Control, of the San Diego County Municipal Code).

1.6 ABATEMENT OF WATER POLLUTION

A. Abatement of water pollution shall be performed in accordance with the requirements of the Stormwater Discharge Permit, Erosion and Sediment Control Plan, and Section 31 25 00: EROSION PROTECTION AND SEDIMENT CONTROL and this Section.

B. Stockpile or waste excavated materials or other construction materials in an approved location away from streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can in any way encroach upon the watercourse itself.

C. Include prevention measures to control silting and erosion, and to intercept and settle any runoff of sediment-ladened waters.

1. Prevent wastewater from general construction activities, such as drain water collection, drilling, grouting, or other construction operations, from entering flowing or dry watercourses without the use of approved turbidity control methods.

2. All such wastewaters discharged shall contain the least concentration of settleable material possible, and shall meet all conditions of the National Pollutant Discharge Elimination System (NPDES) Section 402 permit.

D. Soil erosion and sediment control measures would include, but not limited to, sediment barrier traps, silt basins, and silt fences.

E. Dewatering water from excavated trenches shall be discharged into retention basins or other holding facilities to maximize re-infiltration and to settle most of the solids prior to discharge to storm drains and creeks.

F. Sediment barriers shall be placed near drainage swales to prevent sediment, construction materials, or fluid spills from entering the rivers, creeks, or drainage canals.

G. Storm water pollution control facilities would be implemented and inspected once every working day during the wet weather period and on calendar day before/after forecasted/actual storm events.

H. Three days before forecasted storm events sediment accumulated in basins shall be removed.

I. If pollutants or sediments from the construction site enter the rivers, creeks, or drainage swales, the pollutants and sediments shall be removed immediately.

J. Flow barriers shall be erected around temporary equipment storage areas to prevent storm water flow from entering or leaving the area. If storm water becomes contaminated as a result of contact with construction materials, the runoff from storage areas shall be disposed of in a manner acceptable to the Regional Water Quality Control Board.

K. All spills of fuel, hydraulic fluid, or oil from construction equipment or vehicles shall be immediately contained and cleaned to prevent spilled material from entering storm drains or being absorbed by underlying pavement or soil.

L. Backfill material stored on-site shall be protected from storm water flows with solid barriers or covers to prevent the material from flowing into water courses.

M. Water from equipment washing shall not be discharged to creeks, drainage swales, or drainage canals or allowed to percolate into the ground.

N. Fueling, maintenance, and parking of vehicles and vehicle maintenance equipment are prohibited within 0.20 miles of any river, creek, stream, drainage canal, or drainage swale.

1.7 LANDSCAPE AND HABITAT PRESERVATION

A. Preserve the natural landscape, and conduct operations so as to prevent unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the Work.

B. Movement of crews and equipment within the rights-of-way and over routes provided for access to the Work shall be performed in a manner to prevent damage to property.

C. When no longer required, restore construction roads to original contours and make impassable to vehicular traffic.

D. All construction site workers and supervisors shall attend a brief (approximately ½ hour) environmental orientation provided by the OWNER at the start of the project. All of the CONTRACTOR's personnel and subcontractors working on the project site will be required to attend.

E. CONTRACTOR assumes the responsibility for any unanticipated environmental damage, beyond what is approved by the projects permits, occurring on the project site for the duration of the project. This includes all financial costs to repair, recover, or mitigate species or habitat per OWNER's requirements.

F. No WORK or access is permitted within the Environmentally Sensitive Areas (ESAs)

G. CONTRACTOR shall install and maintain orange safety fencing along limits of work and staging areas as shown on Drawings. CONTRACTOR shall remove fencing after completion of project.

H. Signage shall be installed and maintained along site access roads at 500-foot intervals to ESAs. Signage shall state the requirements for vehicles to stay on the access roads and establish passing lanes at all times. Contractor shall remove signs at the completion of the project.

1.8 PRESERVATION OF TREES AND SHRUBS

A. Temporary exclusionary fencing (i.e. orange fencing) shall be installed along the project boundaries adjacent to sensitive habitats to avoid accidental intrusions into adjoining sensitive habitats.

B. A project biologist should be assigned to ensure compliance with all biological constraints. Duties would include: field review of staked project limits; providing a biological resources education program to construction managers and crew prior to any construction, regular inspection of the project construction site, and coordination with the project inspection team from prompt remedy of any potential compliance issues.

C. Any temporary impacts to sensitive habitats resulting from construction of the pipeline, road improvements, and staging areas shall be re-vegetated in place. Temporarily disturbed areas or manufactured slopes should be re-vegetated with appropriate native species as determined by the project biologist.

D. Mitigation for impacts to riparian and jurisdictional wetland habitat will be performed by either (1) enhancing the existing habitat through the removal and treatment of invasive plant species that occur in the area (Fig, Pecan, Flowering bean, etc.) or (2) using credits within the HMP area. Under Option 1, areas where invasive species have

been removed would be replanted with native willows trees, mulefat, and other common riparian species to improve the quality of existing habitat.

E. A post construction survey and impact analysis will be performed to identify actual project impacts and determine actual mitigation acreages and re-vegetation areas. The results of this action will be submitted to the appropriate permitting jurisdictions as the formal record of project impacts, mitigation, and re-vegetation actions to be performed.

F. Preserve and protect existing vegetation not required or otherwise authorized to be removed.

G. Protect vegetation from damage or injury caused by construction operations, personnel, or equipment by the use of protective barriers or other methods.

H. Obtain ENGINEER's approval prior to removal of existing vegetation not specifically required to be removed.

1.9 PRESERVATION OF HISTORICAL AND ARCHAEOLOGICAL DATA

A. If a cultural resource is encountered, all activity in the vicinity of the find shall cease until it can be evaluated by a qualified archaeologist, defined as one meeting the Secretary of the Interior's Professional Qualification Standards for archaeology. If the find is determined to be potentially significant, the archaeologist, in consultation with the Authority and appropriate Native American group(s) (if the find is a prehistoric or Native American resource), shall develop a treatment plan. All work in the immediate vicinity of the unanticipated discovery shall cease until the qualified archaeologist has evaluated the discovery, or the treatment plan has been implemented.

B. If paleontological resources are encountered during the course of construction and monitoring, the Authority shall halt or divert work and notify a qualified paleontologist who shall document the discovery as needed, evaluate the potential resource, assess the significance of the find, and develop an appropriate treatment plan in consultation with the Authority.

C. Follow the following procedure if CONTRACTOR, any of CONTRACTOR's employees, or parties operating or associating with CONTRACTOR in the performance of this Contract, discovers evidence of possible scientific, prehistorical, historical, or archeological data:

1. Immediately cease work at that location.

2. Notify ENGINEER of the location and nature of the findings.

3. Forward written confirmation to OWNER within 2 days.

4. Do not disturb or damage artifacts or fossils uncovered during excavation operations.

5. Cooperate and assist to preserve the findings for removal or other disposition by OWNER.

D. Where appropriate by reason of discovery, ENGINEER may order delays in the time of performance or changes in the Work, or both.

1. If such delays or changes are ordered, an equitable adjustment will be made in the Contract in accordance with the applicable clauses of the Contract.

1.10 PROTECTION OF ENDANGERED AND SENSITIVE SPECIES

A. Conform to requirements of applicable project permits, approvals, and local, state and federal laws, regulations and ordinances.

B. Any brushing activities in occupied coastal sage scrub should be conducted between September 1 and February 15 to avoid the California gnatcatcher nesting season. Where least Bell's vireo are determined to be present or potentially suitable habitat exists, removal of vegetation should occur between October 1 and March 15 to avoid impacts to this species. Impacts to nesting raptors and other migratory birds will be avoided by constructing within the timeframes outlined above.

C. Follow the following procedure if CONTRACTOR, any of CONTRACTOR's employees, or parties operating or associating with CONTRACTOR in the performance of this Contract, discover evidence of endangered or threatened species during construction:

1. Immediately cease work at that location.

2. Notify ENGINEER of the location and nature of the findings.

3. Forward written confirmation to OWNER within 2 days.

4. Do not disturb the discovered species or damage habitat.

5. Cooperate and assist to relocate the species or other disposition by OWNER.

D. Where appropriate by reason of a discovery, ENGINEER may order delays in time of performance or changes in the Work, or both.

1. If such delays, or changes, or both, are ordered, the time of performance and Contract Price will be adjusted in accordance with the applicable clauses in the Contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTUION

Not Used

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. CONTRACTOR quality control (QC) responsibilities

2. ENGINEER quality control responsibilities

1.2 DEFINITIONS

A. Quality Control Representative – An individual or entity responsible for the coordination of CONTRACTOR QC responsibilities. QC Representative may also perform QC tests, inspections, or both, provided they possess current and applicable credentials for the associated responsibilities.

B. Quality Control Subcontractor – An individual or entity engaged to perform specific QC tests, inspections, or both, and possessing current and applicable credentials (registrations, certifications, or other as appropriate) for the associated QC assignments.

1.3 REFERENCES

A. The following is a list of standards that may be referenced in this Section:

1. ASTM International (ASTM):

a. C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
b. C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
c. C138 – Standard Test Method for Density, Yield, and Air Content of Concrete
d. C143 – Standard Test Method for Slump of Hydraulic Cement Concrete
e. C172 – Standard Practice for Sampling Freshly Mixed Concrete.
f. C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
g. C617 – Standard Practice for Capping Cylindrical Concrete Specimens.
h. C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete

i. C1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

1.4 SUBMITTALS

A. Quality Control (QC) Plan

1. At least 10 calendar days prior to the start of Work on Site, submit a QC Plan, to include names of people and entities, Statements of Qualifications, and lists of responsibilities for each of the following roles:

a. CONTRACTOR's QC Representative, and
b. CONTRACTOR's QC Subcontractors.

2. If the persons or entities charged with the above roles change, update QC Plan no later than 10 calendar days after changes come into effect.

a. Notify ENGINEER of all changes to QC Plan no later than 1 calendar day after changes come into effect.

1.5 TESTING STANDARDS

A. Concrete quality control testing:

1. Sampling Fresh Concrete - ASTM C172
2. Unit Weight - ASTM C138
3. Air Content - ASTM C231
4. Slump - ASTM C143
5. Temperature – ASTM C1064
6. Concrete Test Cylinders - ASTM C31
7. Capping Concrete Cylinders - ASTM C617
8. Compressive Strength - ASTM C39
9. Laboratory Qualifications - ASTM C1077

B. Other test requirements as described in individual Specification sections.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 CONTRACTOR QUALITY CONTROL

A. CONTRACTOR's Testing Responsibilities:

1. Mix designs for concrete.

2. Tests on items manufactured or fabricated off-site.

3. Field QC tests to control concrete placement operations.

B. Perform concrete QC testing as outlined in the individual Specification sections.

C. Provide assistance for ENGINEER as necessary for sampling and testing.

D. Perform all other testing and certifications as outlined in these Specifications.

3.2 ENGINEER QUALITY CONTROL

A. ENGINEER will observe Work for the purposes of evaluating quality and general compliance with requirements of the Contract Documents.

B. ENGINEER may perform, on OWNER's behalf, additional field and laboratory testing as deemed necessary by ENGINEER to check CONTRACTOR's test results and verify continued compliance with requirements of the Contract Documents.

1. If additional testing by OWNER is required, CONTRACTOR shall provide representative samples to ENGINEER from source for testing at no additional cost to OWNER or ENGINEER.

C. Unless otherwise indicated, results of all completed tests by ENGINEER will be available to CONTRACTOR at ENGINEER's field office by the end of the next working day following completion of the tests.

D. Final acceptance of Work will be based on a review of quality control tests, ENGINEER's visual observations of Work, additional testing by the Authority (if any).

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. Items necessary for performance of Work that are not part of the permanent construction.

2. Identification of OWNER furnished items

1.2 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. ASTM International (ASTM):

a. C94 - Standard Specifications for Ready-Mixed Concrete

1.3 SUBMITTALS

A. Shop Drawings:

1. Site Facilities Plan. As a minimum, include the following:

a. Location of access roads; permits and approvals required for site access.
b. Locations of all gates and associated codes for Authority and Engineer combination padlocks.
c. Locations and layouts for field offices and parking areas, anticipated stockpile locations with descriptions of associated material, and storage yard limits and layouts.
d. Locations of all known on-site utility facilities providing service to field offices, and utility services access locations.
e. Temporary drainage provisions; locations of temporary fences and barriers; locations and layouts of oil, fuel and water storage facilities; details of phasing (if any) for development and removal of site facilities.

B. Administrative:

1. CONTRACTOR Health and Safety Plan.

2. Proposed off-site waste disposal facility.

1.4 OWNER FURNISHED ITEMS

A. Construction Water

1. Water will be available to CONTRACTOR at 8-inch blowoff at 42-inch treated water transmission pipeline at pump station and/or fire hydrant.

2. Include expected water requirements when submitting construction schedules.

3. Provide adequate means of withdrawing, transporting and storing water for CONTRACTOR's operations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TEMPORARY UTILITIES

A. Power

1. Provide, install and maintain power to construction facilities as necessary to complete Work in accordance with Article 1.12 of General Conditions.

B. Telephone

1. Coordinate and pay for telephone service installation for field offices.

2. Pay monthly charges for CONTRACTOR's telephone service only.

C. Potable Water

1. Provide and maintain adequate supplies of drinking water for CONTRACTOR personnel.

D. Sanitary Facilities

1. Provide and maintain suitable, weather-tight, painted, sanitary toilet facilities for all work persons during the construction period. When toilet facilities are no longer required, promptly remove from site.

2. Keep all toilet facilities clean and supplied with toilet paper and sanitizing gel at all times.

E. Lighting

1. Provide temporary lighting to meet applicable safety and constructability requirements for erection, application, and installation of materials; and observation and inspection of Work.

3.2 FIELD OFFICES

A. Provide adequate space for field office trailer in the staging and stockpile area as shown on Drawing G-03.

B. Provide CONTRACTOR's field office, if needed.

3.3 CONSTRUCTION ACCESS

A. Access to site shall be through the County gate at Conduit Road and Perdue Treatment Plant (main gate). CONTRACTOR shall marry their lock at County gate with OWNER lock. Gates should be closed and remain locked at all times except when crossing through gates.

B. Construct additional access roads within the limits of site disturbance as approved by the ENGINEER.

C. Maintain adequate and clear access, free of obstructions, to work areas, field offices, and parking spaces.

3.4 RESERVOIR CONTROL

A. Sweetwater Reservoir is an active raw water supply facility, and is one of the Authority's principal water supply facilities. The reservoir provides raw water to the adjacent Robert A. Perdue Water Treatment Plant.

B. The Authority will retain full operational control of the reservoir throughout construction.

C. The Authority will endeavor to maintain the reservoir water surface at or below elevation 239.0 throughout the construction period.

D. The Authority has limited control over waters entering the reservoir due to natural runoff. The Contractor shall be responsible for sequencing the work and providing and maintaining such facilities as are appropriate to protect completed Work and Work in progress from damage due to runoff entering the reservoir.

E. In the event of flooding of any magnitude at the site or reservoir water surfaces in excess of elevation 239.0, Contractor shall remain fully responsible for:

1. Safety of Contractor's personnel on the site.

2. Damage or losses related to Contractor's on-site equipment, plant and facilities.

3. Damage to or losses of construction materials which are stored or stockpiled on site and which are not incorporated into the Work.

3.5 PROTECTION OF EXISTING ROADS

A. Obtain all permits required by Caltrans, San Diego County, and all other applicable public agencies during construction.

B. Repair damage to public roads as required by the respective public agency.

C. Prior to using public and project access roads, perform a condition survey of these roads, including existing culverts and head walls under these roads, to extend 300 feet in each direction from the intersection with the project access road.

3.6 CONTRACTOR PARKING AREAS

A. Parking for the employees of CONTRACTOR and for OWNER and ENGINEER personnel will be allowed in the staging/ stockpile area noted on the Drawings.

3.7 STAGING/STOCKPILE AREA

A. Establish CONTRACTOR shop and office(s) in the staging/stockpile area shown on the Drawings.

B. Stockpile equipment, supplies, imported earthfill materials and other materials incidental to the construction in the staging/ stockpile area.

C. Install temporary fencing around staging/stockpile area.

D. Establish additional staging/stockpile areas only with prior approval of Engineer.

3.8 WEATHER PROTECTION

A. Provide protection against weather to maintain all materials, apparatus, fixtures, and work free from damage whether in shipment, in storage, or in place.

3.9 SITE SECURITY

A. Provide adequate security for protection of OWNER's and CONTRACTOR's property, equipment, and facilities.

B. Secure and lock all existing and temporary gates and fences during non-working hours.

1. Secure all gates with two sets of padlocks to allow OWNER and ENGINEER access to the site without disturbing CONTRACTOR's locks. Provide combination padlock for OWNER and ENGINEER.

2. Submit padlock access codes for all gates to OWNER and ENGINEER with the Site Facilities Plan.

3.10 OPERATIONS AND STORAGE AREAS

A. Do not enter on or occupy with workers, tools, equipment or material any ground outside areas shown on the Drawings without the written consent of the owner of such ground.

B. Other contractors and employees or agents of OWNER may for all necessary purposes enter upon Work and premises used by CONTRACTOR. Conduct Work so as not to impede unnecessarily any work being done by others on or adjacent to the Site.

3.11 SAFETY

A. Safety and Health

1. CONTRACTOR retains sole responsibility for construction site safety in accordance with Authority's Standard Specifications and the General Conditions.

2. Maintain an accurate record of, and report immediately to OWNER, all cases of death, occupational diseases, or traumatic injury to employees or the public and property damage.

3.12 CLEANUP AND DISPOSAL OF WASTE MATERIALS

A. SCOPE

1. Clean up and dispose of waste materials and rubbish in accordance with these Specifications and applicable Laws and Regulations. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement applies.

B. CLEANUP

1. Keep work and storage areas free from accumulations of waste materials and rubbish.

2. Before completing Work, remove all plant and storage facilities, buildings, including concrete footings and slabs, rubbish, unused materials, concrete forms and other materials that are not a part of the permanent Work.

3. Upon completion of the Work, and following removal of construction facilities and required cleanup, regrade and reclaim work areas such that they conform to the natural appearance of the landscape.

C. DISPOSAL OF WASTE MATERIALS

1. Remove waste materials from the construction site and disposal in an appropriate off-site waste disposal facility.

2. Waste materials include, but are not limited to:

a. Cleared and grubbed vegetation.
b. Sediment collected by erosion and sediment control devices.
c. Demolished metal and concrete materials, including concrete reinforcement.
d. Refuse.

e. Garbage.
f. Sanitary wastes.
g. Chemical additives.
h. Industrial wastes.
i. Oil and other petroleum products.

3. Burning of cleared vegetation and waste materials will not be permitted.

END OF SECTION

SECTION 01 52 00
SECURITY

PART 1 GENERAL

1.1 SUMMARY

A. The CONTRACTOR shall:

1. Work in coordination with the OWNER's existing security system at job mobilization, and throughout the duration of the Work including project demobilization.

2. Protect existing premises and the OWNER's operations from theft, vandalism, and unauthorized entry.

3. CONTRACTOR shall be required to maintain a logbook noting access by non-project related personnel, and individuals not employed by the CONTRACTOR. This shall include name of individual, company, and time of arrival and departure from project site.

1.2 ENTRY CONTROL

A. All ingress/egress will be either through the Purdue Treatment Plant (main gate) gate as shown on Drawings G-01 and G-03 or via the access road gate from Conduit Road shown on Drawings G-01 and G-04. The CONTRACTOR shall be issued an electronic pass card and/or key to operate the existing electronic and manual gates to gain entry to the project site. During construction, these gates can be opened for deliveries and for ingress/egress needed by the CONTRACTOR for this project. Gates shall be closed and locked at all times except when crossing through gates. No personnel, equipment unrelated to this project shall be allowed to enter the project area. Failure to comply with these provisions may result in a fine of FIVE HUNDRED DOLLARS ($500) per incident.

B. The CONTRACTOR is cautioned that the OWNER takes no responsibility for protecting CONTRACTOR's tools, equipment, materials, and vehicles. CONTRACTOR shall make provisions for security of those items.

1.3 RESTRICTIONS

A. It is the CONTRACTOR's responsibility to prevent the entry of anyone who is not associated with the Project at all times during work hours. The electronic pass card will not be given to any of the CONTRACTOR's vendors or suppliers. A list must be submitted to the ENGINEER for those to receive this pass card for review, approval and issuance by the ENGINEER. The CONTRACTOR shall not allow cameras onsite or

photographs taken other than staff, or non-staff members access the site, except by written approval of the OWNER.

B. Failure to prohibit entry by anyone not associated with this project may result in a fine of FIVE HUNDRED DOLLARS ($500) per incident.

C. Replacement of pass cards for any reason will require a $50 per card replacement fee.

D. No one associated with this Project shall enter the reservoir area for any reason (wet or dry) at any time unless approved by the OWNER.

1.4 CONTRACTOR SECURITY

A. CONTRACTOR is responsible for security of his equipment, tools, and materials for the duration of the project. Use of private security must be approved by the OWNER.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. Project Closeout Procedures

1.2 SUBMITTALS

A. Administrative:

1. Record Drawings

2. Record Surveys

1.3 MOBILIZATION

A. CONTRACTOR retains sole responsible for the adequacy, efficiency, use, protection, maintenance, repair, and preservation of all facilities, plants, and equipment. Obtain written permission of OWNER prior to dismantling or removing facilities, plants, or equipment from the work site prior to completion of Work under the contract.

B. Prior to commencement of Mobilization and construction:

1. Provide 48-hour advanced written notice of intent to commence mobilization and construction to OWNER and ENGINEER stating date and time of commencement.

2. A pre-construction conference is to be held and attended by, but not limited to, OWNER, ENGINEER, CONTRACTOR, CONTRACTOR's superintendent assigned to the project, and representatives of other entities affected by the proposed construction. A representative of the Division of Safety of Dams shall be invited.

3. Provide to OWNER photographs showing original conditions of the construction site and all important features existing prior to construction commencement.

4. Provide to OWNER video recordings showing original conditions of the construction site and all important features existing prior to construction commencement.

1.4 FINAL INSPECTION

A. Request a final inspection in writing at least ten (10) calendar days prior to the anticipated date of completion.

B. Perform final inspection with CONTRACTOR, OWNER, and ENGINEER.

C. Certify the following prior to final inspection:

1. All Work has been completed.

2. All items are operating properly and in compliance with all Contract terms and conditions.

1.5 DEMOBILIZATION & CLOSEOUT

A. Completion of all project closeout items including provision of all submittals, warranties, test results, site grading, and finalization of all punch list items.

B. Demobilization includes, but is not limited to:

1. Moving off the site of all plant equipment and surplus materials,

2. Final grading and dressing of the project area, and

3. Final cleanup.

1.6 RECORD DRAWINGS

A. Submit the record copy of the drawing set that was maintained at the site during construction.

1.7 FINAL CONDITIONS SURVEY

A. Perform detailed survey of final pipeline alignment including locations of all manways, valves, and blowoffs.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 71 23
CONSTRUCTION SURVEYING

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this Section includes the following general items of work:

1. Description of primary control points for field surveys.

2. Minimum required CONTRACTOR field surveys for acceptable completion of Work.

1.2 SUBMITTALS

A. Quality Control:

1. Survey Control Plan

a. Describe, at a minimum, survey work required by the Contract Documents, including methods and time tables for performing survey activities.

2. Surveys

a. Pipeline

i. Submittal deadline: Within 21 calendar days following completion of New Pipeline.
ii. Pipeline centerline alignment and profile. As a minimum, centerline of new pipeline horizontal location, top of pipeline elevation, top of encasement elevation, and top of finished grade elevation at each 25-ft station and at each horizontal and vertical deflection.
iii. Tie survey to existing horizontal and vertical control noted on the Drawings.

3. Field Survey Books

a. Submit a copy of notes for a survey, or portion of a survey, within 2 calendar days of completing and reducing such notes.

b. Submit a copy of the original field survey book within 2 calendar days of completing a field survey book.

4. Daily Notes

a. If requested by ENGINEER, submit a copy of the workday's survey notes at the conclusion of that workday.

5. Statement of Qualifications

a. Professional Land Surveyor (PLS) responsible for the survey work.

1.3 SURVEYOR QUALIFICATIONS

A. Surveys shall be performed by, or under the supervision and direction of, a surveyor with the following minimum qualifications:

1. Professional Land Surveyor registered in the State of California.

2. 2 years responsible charge of construction surveys for construction similar in nature to that required by this Contract.

B. Maintain sufficient qualified personnel to perform required surveying work.

C. All survey work performed by CONTRACTOR is subject to field and office review by ENGINEER.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 LAYOUT OF WORK

A. Perform all layout surveys required for the control and completion of Work.

B. Primary Control Points

1. Use the primary control points shown on Drawings for establishing lines and grades required for Work.

2. Preserve and maintain primary control points.

3. ENGINEER will reestablish primary control points damaged or destroyed by CONTRACTOR at the CONTRACTOR's expense.

C. Establish, place, and replace as required:

1. Additional monuments

2. Control points

3. Survey stakes

4. Markers

5. Other controls as may be necessary for control, intermediate checks, and guidance of construction operations

3.2 RECORDS

A. Record survey data in accordance with recognized professional surveying standards.

B. Record original field notes, computations, and other surveying data in standard survey field books.

C. Perform corrections by ruling or lining out errors.

D. Rejection of part or all of a field book may necessitate resurveying. Field survey books may be rejected as follows:

1. Notes or data not in accordance with standard formats.

2. Illegible notes or data, or erasures on any page of a field book.

3.3 DEGREE OF ACCURACY

A. Provide a degree of accuracy high enough to satisfy tolerances specified for Work.

B. Provide the following minimum tolerances, except where Work requires tighter tolerances:

1. Pipeline Centerline Elevation: within 0.1-foot.

2. Topographic elevations: within 0.1-foot.

END OF SECTION

SECTION 03 31 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide cast-in-place concrete, joints in concrete, reinforcement steel and appurtenant WORK, formwork, bracing, shoring, supports, and shall design and construct falsework, complete and in place, in accordance with the Contract Documents.

1.02 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 –Submittal Procedures.

B. Shop Drawings

1. Detailed drawings of the falsework proposed to be used. Such drawings shall be in sufficient detail to indicate the general layout, sizes of members, anticipated stresses, grade of materials to be used in the falsework, and typical soil conditions.

2. Shop bending diagrams, placing lists, and drawings of reinforcing steel prior to fabrication.

3. Details of the concrete reinforcing steel and concrete inserts shall be submitted at the earliest possible date after receipt by the CONTRACTOR of the Notice to Proceed. Details of reinforcing steel for fabrication and erection shall conform to ACI 315V and the requirements herein. The shop bending diagrams shall show the actual lengths of bars, to the nearest inch measured to the intersection of the extensions (tangents for bars of circular cross section) of the outside surface. Include bar placement diagrams which clearly indicate the dimensions of each bar splice.

4. Where mechanical couplers are required or permitted to be used to splice reinforcing steel, submit manufacturer's literature which contains instructions and recommendations for installation for each type of coupler used; certified test reports which verify the load capacity of each type and size of coupler used; and Shop Drawings that show the location of each coupler with details of how they are to be installed in the formwork.

5. If reinforcement steel is spliced by welding at any location, submit mill test reports that contain the information necessary for the determination of the carbon equivalent per AWS D1.4 Structural Welding Code – Reinforcing Steel. The CONTRACTOR shall submit a written welding procedure for each type of weld for each size of bar which is to be spliced by welding; merely a statement that AWS procedures will be

followed is not acceptable. The CONTRACTOR shall submit certifications of procedure qualifications for each welding procedure used and welder qualifications, for each welding procedure, and for each welder performing the WORK. Such qualifications shall be as specified in AWS D1.4.

6. Manufacturer's information demonstrating compliance with requirements of the following:

   a. Bearing pads

   b. Neoprene sponge

   c. Preformed joint filler

   d. Backing rod

   e. Elastomeric joint sealant

   f. Bond breaker

   g. Slip dowels

   h. PVC tubing

   i. Form ties and related accessories

   j. Form gaskets

   k. Form release agent

   l. List of form materials and locations of use

   m. Mill tests for cement

   n. Admixture certification. Chloride ion content shall be included.

   o. Aggregate gradation test results and certification

   p. Aggregate reactivity test results and certification

   q. Materials and methods for curing

7. Placement drawings showing the location and type of joints for each structure.

A. **Mix Designs:** Prior to beginning the WORK, submit preliminary concrete mix designs which shall show the proportions and gradations of materials proposed for each class and type of concrete. The mix designs shall be checked by an independent testing laboratory

acceptable to the ENGINEER. Costs related to such checking shall be the CONTRACTOR's responsibility. When a water reducing admixture is to be used, the CONTRACTOR shall furnish mix designs for concrete both with and without the admixture.

B. **Delivery Tickets:** Where ready-mix concrete is used, the CONTRACTOR shall furnish certified delivery tickets at the time of delivery of each load of concrete. Each ticket shall show the state certified equipment used for measuring, and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, the amounts of water in the aggregate, added at the batching plant, and the amount allowed to be added at the Site for the specific design mix. In addition, each certificate shall state the mix number, total yield in cubic yards, and the time of day to the nearest minute, corresponding to the time when the batch was dispatched, when it left the plant, when it arrived at the Site, when unloading began, and when unloading was finished.

1.03 QUALITY ASSURANCE

A. Testing of Reinforcing Steel

1. If requested by the ENGINEER, the CONTRACTOR shall furnish samples from each heat of reinforcing steel in a quantity adequate for testing. Costs of initial tests will be paid by the OWNER. Costs of additional tests, if material fails initial tests, shall be the CONTRACTOR's responsibility.

2. If requested by the ENGINEER, the CONTRACTOR shall furnish samples of each type of welded splice used in the WORK in a quantity and of dimensions adequate for testing. At the discretion of the ENGINEER, radiographic testing of direct butt welded splices will be performed. The CONTRACTOR shall provide assistance necessary to facilitate testing. The CONTRACTOR shall repair any weld that fails to meet the requirements of AWS D1.4. The costs of testing will be paid by the OWNER; but the costs of tests that fail to meet requirements shall be the CONTRACTOR's responsibility.

B. Testing of Materials

1. Tests on component materials and for compressive strength of concrete will be performed as indicated herein. Tests for determining slump will be in accordance with the requirements of ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

2. Testing for aggregate shall include sand equivalence, reactivity, organic impurities, abrasion resistance, and soundness in accordance with ASTM C 33 - Concrete Aggregates.

3. The cost of laboratory tests on cement, aggregates, and concrete, will be paid by the OWNER. However, the CONTRACTOR shall pay the cost of any additional tests

and investigations on WORK that does not meet the Specifications. The laboratory will meet or exceed the requirements of ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

4. Concrete for testing shall be furnished by the CONTRACTOR at no cost to the OWNER, and the CONTRACTOR shall assist the ENGINEER in obtaining samples and disposal and cleanup of excess material.

C. Field Compression Tests

1. Compression test specimens shall be taken during construction from the first placement of each class of concrete herein and at intervals thereafter as selected by the ENGINEER to insure continued compliance with these Specifications. Each set of test specimens will be a minimum of 4 cylinders.

2. Compression test specimens for concrete will be made in accordance with Section 9.2 of ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field. Specimens will be 6-inches diameter by 12-inches high cylinders.

3. Compression tests will be performed in accordance with ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens. One test cylinder will be tested at 7 Days and 2 at 28 Days. The remaining cylinder will be held to verify test results, if needed.

D. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete will be according to the requirements of ACI 318 - Building Code Requirements for Reinforced Concrete, Chapter 5 "Concrete Quality", and as indicated herein.

2. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for subsequent batches of the type of concrete affected.

3. Concrete that fails to meet the ACI requirements and these Specifications is subject to removal and replacement as part of the WORK.

E. **Construction Tolerances:** The CONTRACTOR shall set and maintain concrete forms and perform finishing operations so that the concrete is within the tolerances herein. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the permissible variation from lines, grades, or dimensions indicated. Where tolerances are not indicated, permissible deviations will be in accordance with ACI 117 - Standard Tolerance for Concrete Construction and Materials.

1. The variation from required lines or grades shall not exceed 1/4-inch in 10-feet and there shall be no offsets or visible waviness in the finished surface.

PART 2 - PRODUCTS

2.01 FORM AND FALSEWORK MATERIALS

A. Except as otherwise expressly accepted by the ENGINEER, lumber brought on the Site for use as forms, shoring, or bracing shall be new material.

B. Materials for concrete forms, formwork, and falsework shall conform to the following requirements:

1. Lumber shall be Douglas Fir or Southern Yellow Pine, construction grade or better, in conformance with U.S. Product Standard PS 20 - American Softwood Lumber Standard.

2. Form materials shall be metal, wood, plywood, or other material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade required. Metal forms shall be an approved type that will accomplish such results. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Ext. Grade.

C. Unless otherwise indicated, exterior corners in concrete members shall be provided with 3/4-inch chamfers or be tooled to a 1/2-inch radius. Re-entrant corners in concrete members shall not have fillets unless otherwise indicated.

D. Forms and falsework to support the roof and floor slabs shall be designed for the total dead load, plus a live load of 50 psf (minimum). The minimum design load for combined dead and live loads shall be 100 psf.

2.02 FORM TIES

A. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties or other removable form-tie fasteners having a circular cross-section shall not exceed 1-1/2 inches; and such fasteners shall be such as to leave holes of regular shape for reaming. Form ties shall be **ST-4 Hex Head Snap Ties** by **MeadowBurke, Snap Ties** by **Dayton/Richmond**, or equal.

B. Removable taper ties may be used when approved by the ENGINEER. Taper ties shall be **Taper Ties** by **MeadowBurke, Taper Ties** by **Dayton/Richmond**, or equal.

2.03 REINFORCEMENT STEEL

A. **General:** Reinforcement steel for cast-in-place reinforced concrete construction shall conform to the following requirements:

1. Bar reinforcement shall conform to the requirements of ASTM A 615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, for Grade 60 Billet Steel Reinforcement, unless otherwise indicated.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A 185 - Steel Welded Wire Fabric, Plain, for Concrete Reinforcement, and the details indicated. Welded wire fabric with longitudinal wire of W4 size wire and smaller shall be either furnished in flat sheets or in rolls with a core diameter of not less than 10-inches. Welded wire fabric with longitudinal wires larger than W4 size shall be furnished in flat sheets only.

3. Spiral reinforcement shall be cold-drawn steel wire conforming to the requirements of ASTM A 82 - Steel Wire, Plain, for Concrete Reinforcement.

B. Accessories

1. Accessories shall include necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement. Bar supports shall meet the requirements of the CRSI Manual of Standard Practice including special requirements for supporting epoxy coated reinforcing bars. Wire bar supports shall be CRSI Class 1 for maximum protection with a 1/8-inch minimum thickness of plastic coating which extends at least 1/2-inch from the concrete surface. Plastic shall be gray in color.

2. Concrete blocks (dobies) used to support and position reinforcement steel shall have the same or higher compressive strength than required for the concrete in which they are located. Where concrete blocks are used on concrete surfaces exposed to view, the color and texture of the concrete blocks shall match that required for the finished surface. Wire ties shall be embedded in concrete block bar supports.

2.04 MECHANICAL COUPLERS

A. Mechanical couplers shall be provided where indicated and where approved by the ENGINEER. Couplers shall develop a tensile strength that exceeds 125 percent of the yield strength of the reinforcing bars being spliced at each splice.

2.05 WELDED SPLICES

A. Welded splices shall be provided where indicated and where approved by the ENGINEER. Welded splices of reinforcement steel shall develop a tensile strength exceeding 125 percent of the yield strength of the reinforcing bars that are connected.

B. Materials required to perform the welded splices to the requirements of AWS D1.4 shall be provided.

2.06 CONCRETE MATERIALS

A. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Only one brand of cement shall be used. Cement reclaimed from cleaning bags or leaking containers shall not be used. Cement shall be used in the sequence of receipt of shipments.

B. Materials for the WORK shall comply with the requirements of Sections 201, 203, and 204 of ACI 301- Structural Concrete for Buildings, as applicable.

C. Storage of materials shall conform to the requirements of Section 205 of ACI 301.

D. Materials for concrete shall conform to the following requirements:

1. Cement shall be standard brand Portland cement conforming to ASTM C 150 - Portland Cement for Type II or Type V.

2. Where Portland cement plus a pozzolan is used the pozzolan shall not constitute more than 20% by weight of the total cementitious materials. Pozzolan shall meet the requirements of ANSI/ASTM C618 for Class N or F with the following additional requirements:

   a. The maximum percentage of sulfur trioxide shall be 4.0 percent for Class F.

   b. The maximum percentage loss on ignition shall be 8.0 percent for Class N and 2.5 percent for Class F.

   c. The pozzolanic activity index with lime shall be determined using 2-inch cubes and the minimum strength at seven (7) days shall be 900 pounds per square inch.

   d. Unless the CONTRACTOR selects aggregates that are not potentially alkali-reactive, pozzolan shall be tested for reduction of mortar expansion at fourteen (14) days as specified for Class N pozzolan under the optional physical requirements in Table 2A of ANSI/ASTM C618. However, the cement used in the test shall be low-alkali. For the pozzolan to be acceptable, it shall result in an expansion reduction of zero percent or greater when compared to the control test.

   e. Pozzolan shall not decrease the sulfate resistance of concrete. Before a Class N pozzolan is used, it shall be shown by test and experience not to detract from the sulfate resistance. Before a Class F pozzolan is used, it shall be shown to have an "R" factor of less than 2.5, determined in accordance with ASTM C114.

3. Water shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts, and other impurities. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local

governmental agencies. Agricultural water with high total dissolved solids (over 1000 mg/l TDS) shall not be used.

4. Aggregates shall be obtained from pits acceptable to the ENGINEER, shall be non-reactive, and shall conform to ASTM C 33. Maximum size of coarse aggregate shall be as indicated. Lightweight sand for fine aggregate will not be permitted. Sand shall not exceed 40% of the total aggregates.

5. Ready-mix concrete shall conform to the requirements of ASTM C 94 - Ready-Mixed Concrete.

6. Air-entraining agent meeting the requirements of ASTM C 260 – Air Entraining Admixtures for Concrete shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. Concrete floors to receive a dry-shake floor hardener shall have an air content not to exceed 3 percent. The OWNER reserves the right, at any time, to sample and test the air-entraining agent. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement. Air content shall be tested at the point of placement. Air entraining agent shall be **Micro-Air** by **Master Builders, Daravair** by **Grace Construction Products, Sika AEA-15** by **Sika Corporation,** or equal.

7. Admixtures: Admixtures may be added at the CONTRACTOR's option to control the set, affect water reduction, and increase workability. In either case, the addition of an admixture shall be at the CONTRACTOR's expense. The use of an admixture shall be subject to acceptance by the ENGINEER. Concrete containing an admixture shall be first placed at a location determined by the ENGINEER. If the use of an admixture is producing an inferior end result, the CONTRACTOR shall discontinue use of the admixture. Admixtures shall conform to the requirements of ASTM C 494 - Chemical Admixtures for Concrete. The required quantity of cement shall be used in the mix regardless of whether or not an admixture is used. Admixtures shall contain no free chloride ions, shall be non-toxic after 30 Days, and shall be compatible with and made by the same manufacturer as the air entraining admixture.

   a. Concrete shall not contain more than one water-reducing admixture. Concrete containing an admixture shall be first placed at a location determined by the ENGINEER.

   b. Set controlling admixture may be either with or without water-reducing properties. Where the air temperature at the time of placement is expected to be consistently over 80 degrees F, a set retarding admixture such as **Sika Corporation Plastocrete 161MR, Master Builder Pozzolith, Dartard 17** by **Grace Construction Products,** or equal shall be used. Where the air temperature at the time of placement is expected to be consistently under 40 degrees, a set

accelerating admixture such as **Sika Corporation Plastocrete 161 FL, Polarset** by **Grace Construction Products,** or equal shall be used.

c. Normal range water reducer shall conform to ASTM C 494, Type A. It shall be **WRDA 79** by **Grace Construction Products, Plastocrete 161** by **Sika Corporation,** or equal. The quantity of admixture used and the method of mixing shall be in accordance with the manufacturer's instructions and recommendations.

8. Calcium Chloride: Calcium chloride will not be permitted in concrete.

2.07 CURING MATERIALS

A. Materials for curing concrete shall conform to the following requirements and ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete and shall either be approved for potable water use per NSF 61 or removed after curing:

1. Curing compounds shall be white-pigmented and resin-based. Sodium silicate compounds shall not be allowed. Concrete curing compound shall be **Kurez VOX White Pigmented** by **Euclid Chemical Company, Cure R-2** by **L&M Construction Chemicals, 1200-White** by **W.R. Meadows,** or equal. When curing compound must be removed for finishes or grouting, curing compounds shall be **Kurez DR VOX** by **Euclid Chemical Company, Masterkure-100W** by **ChemRex MBT, L&M Cure R** by **L&M Construction Chemicals, 1100-Clear** by **WR Meadows,** or equal. Curing compounds shall meet local VOC requirements.

2. Polyethylene sheet for use as concrete curing blanket shall be white and shall have a nominal thickness of 6-mils. The loss of moisture when determined in accordance with the requirements of ASTM C 156 - Standard Test Method for Water Retention by Concrete Curing Materials, shall not exceed 0.055 grams per square centimeter of surface.

3. Evaporation retardant shall be a material such as **Confilm** by **ChemRex MBT, Eucobar** by **Euclid Chemical Company, E-CON** by **L&M Construction Chemicals, Inc.,** or equal.

2.08 JOINT MATERIALS

A. Materials for joints in concrete shall conform to the following requirements:

1. Joint filler material shall be of the preformed non-extruding type joint filler constructed of cellular neoprene sponge rubber or polyurethane of firm texture. Bituminous fiber type will not be permitted. Non-extruding and resilient-type preformed expansion joint fillers shall conform to the requirements and tests set forth in ASTM D 1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers

for Concrete Paving and Structural Construction; for Type I, except as otherwise indicated.

2. Elastomeric joint sealer shall be a two component, self-leveling, polyurethane or polysulfide sealant conforming to Federal Specification TT-S-227E, Class A, Type I, and ASTM C 920, Type M, Class 25, Grade P such as **Products Research & Chemical Corp. "RC-2SL" or Bostik "Chem-Calk 550" or a** one component, self-leveling, polyurethane or polysulfide sealant conforming to Federal Specification TT-S-230C, Class A, Type I, and ASTM C 920, Type S, Class 25, Grade P such as **Products Research & Chemical Corp. "6006" or Mameco "Vulkem 45."**

3. Mastic joint sealer shall be a material that does not contain evaporating solvents; that will tenaciously adhere to concrete surfaces; that will remain permanently resilient and pliable; that will not be affected by continuous presence of water and will not in any way contaminate potable water; and that will effectively seal the joints against moisture infiltration even when the joints are subject to movement due to expansion and contraction. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable mastic substance containing no volatile oils or lubricants and shall be capable of meeting the test requirements set forth hereinafter, if testing is required by the ENGINEER.

2.09 MISCELLANEOUS MATERIALS

A. Dampproofing agent shall be an asphalt emulsion such as **Hydrocide 600** by **ChemRex Sonneborn, Emulsified Asphalt** by **Euclid Chemical Company, Sealmastic** by **W. R. Meadows Inc.,** or equal.

B. Epoxy adhesives shall be the following products:

1. For bonding freshly-mixed, plastic concrete to hardened concrete, **Sikadur 32 Hi-Mod Epoxy Adhesive** by **Sika Corporation, Concresive Liquid (LPL)** by **Chem Rex MBT; BurkEpoxy MV** by **Burke** by **Edoco,** or equal.

2. For bonding hardened concrete or masonry to steel, **Sikadur 31 Hi-Mod Gel** by **Sika Corporation, BurkEpoxy NS** by **Burke** by **Edoco, Concresive Paste (LPL)** by **Chem Rex MBT**; or equal.

C. Epoxy grout for grouting reinforcing bars shall be specifically formulated for such application, for the moisture condition, application temperature, and orientation of the hole to be filled. Epoxy grout shall meet the requirements in Section 03 62 00 - Grout.

2.10 CONCRETE DESIGN REQUIREMENTS

A. General

1. Concrete shall be composed of cement, admixtures, aggregates, and water of the qualities indicated. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage, and where deposited in forms, to have good consolidation properties and maximum smoothness of surface. The proportions shall be changed whenever necessary or desirable to meet the required results at no additional cost to the OWNER. Mix changes shall be subject to review by the ENGINEER.

2. The CONTRACTOR is cautioned that the limiting parameters below are **NOT** a mix design. Admixtures may be required to achieve workability required by the CONTRACTOR's construction methods and aggregates. The CONTRACTOR is responsible for providing concrete with the required workability.

B. **Water-Cement Ratio and Compressive Strength:** The minimum compressive strength and cement content of concrete shall be not less than the following tabulation.

Type of Work	Class of Concrete Min 28-Day Compressive Strength, psi	Max Size Aggregate in	Cement Content Per cu yd, lbs	Max W/C Ratio (by weight)
Structural concrete	4,000	1	564 to 600	0.46
Sitework concrete	3,000	1	470 (min)	0.50
Lean concrete	2,000	1	376 (min)	0.60

2.11 CONSISTENCY

A. Consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. The slumps shall be as follows:

Part of Work	Slump (in
All concrete unless indicated otherwise	3-inches plus or minus 1-inch
Ductbank and pipe encasement	5-inches plus or minus 1-inch

2.12 MEASUREMENT OF CEMENT AND AGGREGATE

A. The amount of cement and of each separate size of aggregate entering into each batch of concrete shall be determined by direct weighing equipment furnished by the CONTRACTOR and acceptable to the ENGINEER; provided that, where batches are so proportioned as to contain an integral number of conventional sacks of cement and the cement is delivered at the mixer in the original unbroken sacks, the weight of the cement contained in each sack may be taken without weighing as 94 pounds.

2.13 MEASUREMENT OF WATER

A. The quantity of water entering the mixer shall be measured by a suitable water meter or other measuring device of a type acceptable to the ENGINEER and capable of measuring the water in variable amounts within a tolerance of one percent.

2.14 READY-MIXED CONCRETE

A. At the CONTRACTOR's option, ready-mixed concrete may be used if it meets the requirements as to materials, batching, mixing, transporting, placing, the supplementary requirements as required herein, and is in accordance with ASTM C 94.

B. Ready-mixed concrete shall be delivered to the WORK, and discharge shall be completed within one hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever comes first. In hot weather, under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 60 minutes.

C. Truck mixers shall be equipped with electrically-actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type, and shall be mounted in the driver's cab. The counter shall be actuated at the time of starting the mixer at mixing speed.

D. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. Materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolutions of mixing.

E. Each batch of ready-mixed concrete delivered to the WORK shall be accompanied by a delivery ticket furnished to the ENGINEER in accordance with the requirements above.

F. The use of non-agitating equipment for transporting ready-mixed concrete will not be permitted. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted. The quality and quantity of materials used in ready-mixed

concrete and in batch aggregates shall be subject to continuous inspection at the batching plant by the ENGINEER.

PART 3 - EXECUTION

3.01 GENERAL FORMWORK REQUIREMENTS

A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The CONTRACTOR shall assume full responsibility for the adequate design of forms, and any forms that are unsafe or inadequate in any respect shall promptly be removed from the WORK and replaced. A sufficient number of forms of each kind shall be available to permit the required rate of progress to be maintained. The design and inspection of concrete forms, falsework, and shoring shall comply with applicable local, state and federal regulations. Design, construction, maintenance, preparation, and removal of forms shall be in accordance with ACI 347 - Guide to Formwork for Concrete and the requirements herein.

B. Forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete.

3.02 CONSTRUCTION

A. **Vertical Surfaces:** Vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is indicated. Not less than 1-inch of concrete shall be added to the indicated thickness of a concrete member where concrete is permitted to be placed against trimmed ground in lieu of forms. Permission to do this on other concrete members will be granted only for members of comparatively limited height and where the character of the ground is such that it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

B. **Construction Joints:** Concrete construction joints will not be permitted at locations other than those indicated, except as may be acceptable to the ENGINEER. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. Pipe stubs and anchor bolts shall be set in the forms where required.

C. Form Ties

1. Embedded Ties: Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spalling of the

concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1-inch back from the formed face or faces of the concrete.

2. Removable Ties: Where taper ties are approved for use, after the taper tie is removed, the hole shall be thoroughly cleaned and roughened for bond. A precast neoprene or polyurethane tapered plug shall be located at the wall centerline. The hole shall be completely filled with non-shrink or regular cement grout. Exposed faces of walls shall have at least the outer 2-inches of the exposed face filled with a cement grout which shall match the color and texture of the surrounding wall surface.

3.03 REUSE OF FORMS

A. Forms may be reused only if in good condition and only if acceptable to the ENGINEER. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view.

3.04 REMOVAL OF FORMS

A. Careful procedures for the removal of forms shall be strictly followed, and this WORK shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. Members which must support their own weight shall not have their forms removed until they have attained at least 75 percent of the 28-Day strength of the concrete. Forms for vertical walls and columns shall remain in place at least 48 hours after the concrete has been placed. Forms for parts of the WORK not specifically mentioned herein shall remain in place for periods of time as recommended in ACI 347.

3.05 GENERAL REINFORCEMENT REQUIREMENTS

A. Reinforcement steel, welded wire fabric, couplers, and other appurtenances shall be fabricated, and placed in accordance with the requirements of the Building Code and the supplementary requirements indicated herein.

3.06 FABRICATION

A. General

1. Reinforcement steel shall be accurately formed to the dimensions and shapes indicated, and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

2. The CONTRACTOR shall fabricate reinforcement bars for structures in accordance with bending diagrams, placing lists, and placing drawings. Said drawings, diagrams, and lists shall be prepared by the CONTRACTOR.

3. Unless otherwise indicated, dowels shall match the size and spacing of the spliced bar.

B. **Bending or Straightening:** Reinforcement shall not be straightened or rebent in a manner that will injure the material. Bars shall be bent or straight as indicated. Do not use bends different from the bends indicated. Bars shall be bent cold unless otherwise permitted by the ENGINEER. No bars partially embedded in concrete shall be field-bent except as indicated or specifically permitted by the ENGINEER.

3.07 PLACING

A. Reinforcement steel shall be accurately positioned as indicated and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. Reinforcement steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers that are strong and rigid enough to prevent any displacement of the reinforcement steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. Concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the CONTRACTOR shall provide concrete, metal, plastic, or other acceptable bar chairs and spacers.

B. The portions of accessories in contact with the formwork shall be made of concrete, plastic, or steel coated with a 1/8-inch minimum thickness of plastic which extends at least 1/2-inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the required concrete coverage.

D. Bars additional to those indicated which may be found necessary or desirable by the CONTRACTOR for the purpose of securing reinforcement in position shall be provided by the CONTRACTOR as part of the WORK.

E. Unless otherwise indicated, reinforcement placing tolerances shall be within the limits specified in Section 7.5 of ACI 318 except where in conflict with the requirements of the Building Code.

F. The minimum spacing requirements of ACI 318 shall be followed for reinforcing steel.

G. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters having gray, plastic-coated standard type legs. Slab bolsters shall be spaced not

more than 30-inches on centers, shall extend continuously across the entire width of the reinforcing mat, and shall support the reinforcing mat in the plane indicated.

H. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3-feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

3.08 SPLICING

A. **General:** Reinforcement bar splices shall only be used at locations indicated. When it is necessary to splice reinforcement at points other than where indicated, the character of the splice shall be reviewed and accepted by the ENGINEER.

B. Splices of Reinforcement

1. The length of lap for reinforcement bars, unless otherwise indicated, shall be in accordance with ACI 318, Section 12.15.1 for a Class B splice.

2. Welded splices shall be performed in accordance with AWS D1.4.

3. Laps of welded wire fabric shall be in accordance with the ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

3.09 CLEANING AND PROTECTION

A. Reinforcement steel shall always be protected from conditions conductive to corrosion until concrete is placed around it.

B. The surfaces of reinforcement steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcing shall be reinspected and, if necessary recleaned.

3.10 PROPORTIONING AND MIXING

A. **Proportioning:** Proportioning of the concrete mix shall conform to the requirements of Chapter 3 "Proportioning" of ACI 301.

B. **Mixing:** Mixing of concrete shall conform to the requirements of Chapter 7 ACI 301.

C. **Slump:** Slumps shall be as indicated herein.

D. **Retempering:** Retempering of concrete or mortar which has partially hardened shall not be permitted.

3.11 PREPARATION OF SURFACES FOR CONCRETING

A. **General:** Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. **Joints in Concrete:** Concrete surfaces upon or against which concrete is to be placed, where the placement of the concrete has been stopped or interrupted so that, as determined by the ENGINEER, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bonding. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of laitance, loose or defective concrete, and foreign material, and be roughened to a minimum 1/4-inch amplitude. Such cleaning and roughening shall be accomplished by hydroblasting. Pools of water shall be removed from the surface of construction joints before the new concrete is placed.

C. **Placing Interruptions:** When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means, that will secure proper union with subsequent WORK; provided that construction joints shall be made only where acceptable to the ENGINEER.

D. Embedded Items

1. No concrete shall be placed until formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the ENGINEER at least 4 hours before placement of concrete. Surfaces of forms and embedded items that have become encrusted with dried grout from previous usage shall be cleaned before the surrounding or adjacent concrete is placed.

2. Reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms at locations indicated or by Shop Drawings and shall be acceptable to the ENGINEER before any concrete is placed. Accuracy of placement is the responsibility of the CONTRACTOR.

E. **Casting New Concrete Against Old:** Where concrete is to be cast against old concrete (defined as any concrete which is greater than 60 Days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydroblasting (exposing aggregate) prior to the application of an epoxy bonding agent. Application shall be according to the bonding agent manufacturer's instructions and recommendations.

F. No concrete shall be placed in any structure until water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the WORK. No concrete shall be deposited underwater

nor shall the CONTRACTOR allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, shall be subject to the review of the ENGINEER.

G. **Corrosion Protection:** Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2-inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.

H. Openings for pipes, inserts for pipe hangers and brackets, and anchors shall, where practicable, be provided for during the placing of concrete.

I. Anchor bolts shall be accurately set and shall be maintained in position by templates while being embedded in concrete.

3.12 HANDLING, TRANSPORTING, AND PLACING

A. **General:** Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section. No aluminum materials shall be used in conveying any concrete.

B. **Non-Conforming WORK or Materials:** Concrete which during or before placing is found not to conform to the requirements indicated herein shall be rejected and immediately removed from the WORK. Concrete which is not placed in accordance with these Specifications or which is of inferior quality shall be removed and replaced.

C. **Unauthorized Placement:** No concrete shall be placed except in the presence of a duly authorized representative of the ENGINEER. The CONTRACTOR shall notify the ENGINEER in writing at least 24 hours in advance of placement of any concrete.

D. Placement in Wall and Column Forms

1. Concrete shall not be dropped through reinforcement steel or into any deep form nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4-feet in walls and 8-feet in columns below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing and in no case after depositing shall any portion be displaced in the forms more than 6-feet in horizontal direction. Concrete in wall forms shall be deposited in uniform horizontal layers not deeper than 2-feet; and care shall be taken to avoid

inclined layers or inclined construction joints except where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in wall forms shall not exceed 5-feet of vertical rise per hour. Sufficient illumination shall be provided in the interior of forms so that the concrete at the places of deposit is visible from the deck or runway.

2. The surface of the concrete shall be level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of walls, a wood strip at least 3/4-inch thick shall be tacked to the forms on these surfaces. The concrete shall be carried about 1/2-inch above the underside of the strip. About one hour after the concrete is placed, the strip shall be removed and any irregularities in the edge formed by the strip shall be leveled with a trowel, and laitance shall be removed.

E. **Conveyor Belts and Chutes:** Ends of chutes, hopper gates, and other points of concrete discharge throughout the CONTRACTOR's conveying, hoisting, and placing system shall be so designed and arranged that concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyor belts, if used, shall be of a type acceptable to the ENGINEER. Chutes longer than 50-feet will not be permitted. Minimum slopes of chutes shall be such that concrete of the required consistency will readily flow in them. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. Conveyor belts and chutes shall be covered.

F. **Temperature of Concrete:** The temperature of concrete when it is being placed shall be not more than 90 degrees F nor less than 40 degrees F in moderate weather, and not less than 50 degrees F in weather during which the mean daily temperature drops below 40 degrees F. Concrete ingredients shall not be heated to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the required minimum temperature. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F, the CONTRACTOR shall employ effective means, such as precooling of aggregates and mixing water, using ice, or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90 degrees F. The CONTRACTOR shall be entitled to no additional compensation on account of the foregoing requirements.

G. Cold Weather Placement

1. Placement of concrete shall conform to ACI - 306.1 - Cold Weather Concreting, and the following.

2. Earth foundations shall be free from frost or ice when concrete is placed upon or against them.

3. Maintain the concrete temperature above 50 degrees F for at least 72-hours after placement.

3.13 PUMPING OF CONCRETE

A. **General:** If the pumped concrete does not produce satisfactory end results, the CONTRACTOR shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. Pumping Equipment

1. The pumping equipment shall have 2 cylinders and be designed to operate with one cylinder only in case the other one is not functioning. In lieu of this requirement, the CONTRACTOR may have a standby pump on the Site during pumping.

2. The minimum diameter of the hose conduits shall be in accordance with ACI 304.2R - Placing Concrete by Pumping Methods.

3. Pumping equipment and hose conduits that are not functioning properly, shall be replaced.

4. Aluminum conduits for conveying the concrete shall not be permitted.

3.14 TAMPING AND VIBRATING

A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete. Vibrators shall be high speed power vibrators (8000 to 12,000 rpm) of an immersion type in sufficient number and with at least one standby unit as required.

B. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the required results within 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall not contact the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.15 FINISHING CONCRETE SURFACES

A. **General:** Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions indicated are defined as tolerances and are indicated above. These tolerances

are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

B. **Formed Surfaces:** No treatment is required after form removal except for curing, repair of defective concrete, and treatment of surface defects.

C. Surface holes larger than [1/2]-inch in diameter or deeper than [1/4]-inch are defined as surface defects in basins and exposed walls.

D. **Unformed Surfaces:** After proper and adequate vibration and tamping, unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools. Whenever the air temperature exceeds 85 degrees F or the wind speed exceeds 25 mph at the time of placement, the concrete shall be treated as follows. Immediately after the concrete has been screeded, it shall be treated with a liquid evaporation retardant. The retardant shall be used again after each WORK operation as necessary to prevent drying shrinkage cracks. The classes of finish for unformed concrete surfaces are designated and defined as follows:

1. Finish U1 - Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch. No further special finish is required.

2. Finish U2 - After sufficient stiffening of the screeded concrete, surfaces shall be float finished with wood or metal floats or with a finishing machine using float blades. Excessive floating of surfaces while the concrete is plastic and dusting of dry cement and sand on the concrete surface to absorb excess moisture will not be permitted. Floating shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Surface irregularities shall not exceed 1/4-inch. Joints and edges shall be tooled where indicated or as determined by the ENGINEER.

3. Finish U3 - After the Finish U2 surface has hardened sufficiently to prevent excess of fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples, and trowel marks. The finish shall be smooth and free of irregularities.

4. Finish U4 - Trowel the Finish U3 surface to remove local depressions or high points. In addition, the surface shall be given a light broom finish with brooming perpendicular to drainage unless otherwise indicated. The resulting surface shall be rough enough to provide a nonskid finish.

E. Unformed surfaces shall be finished according to the following schedule:

UNFORMED SURFACE FINISH SCHEDULE

Area	Finish
Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with grouted tile or topping grout	U2
Slabs to be covered with built-up roofing	U2
Interior slabs and floors to receive architectural finish	U3
Slabs	U4
Top surface of walls	U3

3.16 CURING AND DAMPPROOFING

A. **General:** Concrete shall be cured for not less than 7 Days after placing, in accordance with the methods indicated below for the different parts of the WORK.

Surface to be Cured	Method
Unstripped forms	1
Construction joints between footings and walls, and between floor slab and columns	2
Encasement and ductbank concrete and thrust blocks	3
Concrete surfaces not specifically provided for elsewhere in this Paragraph	4
Buried slabs and backfilled walls	5

B. **Method 1:** Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removal. If steel forms are used, the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed within 7 Days of placing the concrete, curing shall be continued in accordance with Method 4 below.

C. **Method 2:** The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.

D. **Method 3:** The surface shall be covered with moist earth not less than 4 hours nor more than 24 hours after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 Days after placement of concrete.

C. **Method 4:** The surface shall be sprayed with a liquid curing compound.

1. It shall be applied in accordance with the manufacturer's printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film that will seal thoroughly.

2. Where the curing compound method is used, care shall be exercised to avoid damage to the seal during the 7 Day curing period. If the seal is damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.

3. Wherever curing compound has been applied by mistake to surfaces against which concrete subsequently is to be placed and to which it is to adhere, compound shall be entirely removed by wet sandblasting just prior to the placing of new concrete.

4. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on unformed surfaces, and within 2 hours after removal of forms. Repairs required to be made to formed surfaces shall be made within the said 2 hour period; provided, however, that any such repairs which cannot be made within the said 2 hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound.

5. During the curing period, no traffic of any nature and no depositing of any materials, temporary or otherwise, shall be permitted on surfaces coated with curing compound. Foot traffic and the depositing of materials may be allowed after 3 Days if the surface is covered with 5/8-inch plywood placed over polyethylene sheets.

E. **Method 5:** This method applies to both buried slabs and walls to be backfilled.

1. The concrete shall be kept continuously wet by the application of water for a minimum period of at least 7 Days beginning immediately after the concrete has reached final set or forms have been removed.

2. Until the concrete surface is covered with the curing medium, the entire surface shall be kept damp by applying water through nozzles that atomize the flow so that the surface is not marred or washed.

3. Heavy curing mats shall be used as a curing medium to retain the moisture during the curing period. The curing medium shall be weighted or otherwise held

substantially in contact with the concrete surface to prevent being dislodged by wind or any other causes. Edges shall be continuously held in place.

4. The curing blankets and concrete shall be kept continuously wet by the use of sprinklers or other means both during and after normal working hours.

5. Immediately after the application of water has terminated at the end of the curing period, the curing medium shall be removed, any dry spots shall be rewetted, and curing compound shall be immediately applied in accordance with Method 4 above.

6. The CONTRACTOR shall dispose of excess water from the curing operation to avoid damage to the WORK.

F. The CONTRACTOR may submit alternate methods of curing which maintain the concrete in a continuously wet condition for acceptance by the ENGINEER.

3.17 PROTECTION

A. The CONTRACTOR shall protect concrete against injury until final acceptance.

B. Fresh concrete shall be protected from damage due to rain, hail, sleet, or snow. The CONTRACTOR shall provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.18 CURING IN COLD WEATHER

A. Water curing of concrete may be reduced to 6 Days during periods when the mean daily temperature in the vicinity of the Site is less than 40 degrees F; provided that, during the prescribed period of water curing, when temperatures are such that concrete surfaces may freeze, water curing shall be temporarily discontinued.

B. Concrete cured by an application of curing compound will require no additional protection from freezing if the protection at 50 degrees F for 72 hours is obtained by means of approved insulation in contact with the forms or concrete surfaces; otherwise, the concrete shall be protected against freezing temperatures for 72 hours immediately following 72 hours protection at 50 degrees F. Concrete cured by water shall be protected against freezing temperatures for 72 hours immediately following the 72 hours of protection at 50 degrees F.

C. Discontinuance of protection against freezing temperatures shall be such that the drop in temperature of any portion of the concrete will be gradual and will not exceed 40 degrees F in 24 hours. In the spring, when the mean daily temperature rises above 40 degrees F for more than 3 Days, 72 hour protection at a temperature not lower than 50 degrees F may be discontinued for as long as the mean daily temperature remains above 40 degrees F; provided, that the concrete shall be protected against freezing temperatures for not less than 48 hours after placement.

D. Where artificial heat is employed, special care shall be taken to prevent the concrete from drying. Use of unvented heaters will be permitted only when unformed surfaces of concrete adjacent to the heaters are protected for the first 24 hours from an excessive carbon dioxide atmosphere by application of curing compound; provided, that the use of curing compound for such surfaces is otherwise permitted by these Specifications.

3.19 TREATMENT OF SURFACE DEFECTS

A. As soon as forms are removed, exposed concrete surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the ENGINEER. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall be repaired as indicated below. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced. Repairs and replacements shall be performed promptly.

B. Defective surfaces to be repaired shall be cut back from trueline a minimum depth of 1/2-inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of laitance or soft material, plus not less than 1/32-inch depth of the surface film from hard portions by means of an efficient sandblast. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar so that while the repair material is being applied, the surfaces underneath will remain moist but not so wet as to overcome the suction upon which a good bond depends. The material used for repair shall consist of a mixture of one sack of cement to 3 cubic feet of sand. For exposed walls, the cement shall contain such a proportion of Atlas white Portland cement as is required to make the color of the patch match the color of the surrounding concrete.

C. Holes left by tie-rod cones shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. These holes then shall be repaired in an approved manner with dry-packed cement grout. Holes left by form-tying devices having a rectangular cross-section, and other imperfections having a depth greater than their least surface dimension, shall not be reamed but shall be repaired in an approved manner with dry-packed cement grout.

D. Repairs shall be built up and shaped in such a manner that the completed WORK will conform to the requirements of this Section as applicable, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures. Surfaces of repairs shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.

3.20 CARE AND REPAIR OF CONCRETE

A. The CONTRACTOR shall protect concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, which becomes defective at any time prior to the final acceptance of the completed WORK, which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete.

END OF SECTION

SECTION 03 62 00
GROUT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide grout, complete and in place, in accordance with the Contract Documents.

B. The following types of grout are covered in this Section:

1. Non-Shrink Grout: This type of grout shall be used wherever grout is indicated, unless another type is specifically referenced.

2. Cement Grout

3. Epoxy Grout

4. Topping Grout and Concrete Fill

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Specifications, codes, and standards shall be as listed in Section 03 31 00 - Cast-in-Place Concrete, and as indicated herein.

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures

B. **Shop Drawings:** Include certified test results verifying compliance with the compressive strength, shrinkage, and expansion requirements; and manufacturer's literature containing instructions and recommendations on the mixing, handling, placement, and appropriate uses for each proposed type of non-shrink and epoxy grout.

C. Provide manufacturer's independent certification of ASTM C 1107 - Packaged Dry, Hydraulic-Cement Grout (Nonshrink), compliance without modification of the standard methods certifying that the Class B or C grout post hardening non-shrink properties are not based on gas expansion, grouts have strengths of 3500 psi at 1 day, 6500 psi at 3 days and 7500 psi at 28 days when cured at 72 degrees F as well as meeting the 3,7, and 28 day strengths when tested and cured at the 45 degree and 95 degree limits and all other requirements of ASTM C 1107.

D. The CONTRACTOR shall engage an independent testing laboratory to run a 24 hour grout evaluation in accordance with ASTM C 1107 of each grout submitted for approval showing compliance to all aspects of the evaluation and submit results to the ENGINEER for review.

1.4 QUALITY ASSURANCE

A. Field Tests

1. Compression test specimens will be taken during construction from the first placement of each type of grout and at intervals thereafter selected by the ENGINEER to insure continued compliance with these specifications. The specimens will be made by the ENGINEER or its representative.

2. Compression tests and fabrication of specimens for cement grout and non-shrink grout will be performed in accordance with ASTM C 109 - Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in or 50-mm Cube Specimens) at intervals during construction selected by the ENGINEER . A set of three specimens will be made for testing at 7 days, 28 days, and each additional time period as appropriate.

3. Compression tests and fabrication of specimens for epoxy grout will be performed in accordance with ASTM C 579 - Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes, Method B, at intervals during construction selected by the ENGINEER . A set of three specimens will be made for testing at 7 days, and each earlier time period as appropriate.

4. Grout which fails to meet requirements is subject to removal and replacement.

5. The cost of laboratory tests on grout will be paid by the OWNER except where test results show the grout to be defective. In such case, the CONTRACTOR shall pay for the tests, removal and replacement of Defective Work, and retesting, all at no increased cost to the OWNER.

6. The CONTRACTOR shall assist the ENGINEER in obtaining specimens for testing and shall furnish all materials necessary for fabricating the test specimens.

B. **Construction Tolerances:** Construction tolerances shall be in accordance with Section 03 31 00 – Cast-in-Place Concrete, unless indicated otherwise.

PART 2 -- PRODUCTS

2.1 CEMENT GROUT

A. **Cement Grout:** Cement grout shall be composed of one part cement, three parts sand, and the minimum amount of water necessary to obtain the desired consistency. Where needed to match the color of adjacent concrete, white portland cement shall be blended with regular cement as needed. The minimum compressive strength at 28 days shall be 4000 psi.

B. Cement grout materials shall be as indicated in Section 03 31 00 – Cast-in-Place Concrete, except that no cement from kilns burning metal-rich hazardous waste fuel shall be used.

2.2 PREPACKAGED GROUTS

A. Non-Shrink Grout

1. Non-shrink grout shall be a prepackaged, inorganic, non-gas-liberating, non-metallic, cement-based grout requiring only the addition of water. Cement from kilns burning metal-rich hazardous waste fuel shall not be used. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout herein shall be that recommended by the manufacturer for the particular application. All grouts (Grade A, B, C) shall be tested for height change of the hardened grout at 1, 3, 14, and 28 days in accordance with ASTM C 1090 - Test Method for Measuring Changes in Height of Cylindrical Specimens from Hydraulic-Cement Grout, and shall be tested for compression at 1, 3, 7, and 28 days in accordance with the modified ASTM C 109 testing procedure.

2. Class A non-shrink grouts shall have a minimum 28 day compressive strength of 5000 psi and shall meet the requirements of ASTM C 1107 when mixed to a flowable, plastic, or stiff consistency. When tested in accordance with ASTM C 1090, grout shall have a maximum of 4.0 percent expansion in the pre-hardened state.

3. Class B or C high precision, fluid, extended working time, non-shrink grouts shall have a minimum 28 day compressive strength of 7500 psi; shall have no shrinkage (0.0 percent) and a maximum 4.0 percent expansion in the plastic state when tested in accordance with ASTM C 827 - Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures; and shall have no shrinkage (0.0 percent) and a maximum of 0.2 percent expansion in the hardened state; and when mixed to a fluid consistency of 20 to 30 seconds per ASTM C 939 – Test Method for Flow of Grout for Preplaced – Aggregate (Flow Cone Method), at temperature extremes of 45 to 90 degrees F shall have an extended working time of 30 minutes when tested in accordance with ASTM C 1107. Class B or C non-shrink grout shall be **Master Builders Masterflow 555** by **Master Builders**; **Sika Grout 212** by **Sika Corporation** or equal.

4. Application:

a. Class A non-shrink grout shall be used for the repair of holes and defects in concrete members which are not water-bearing and not in contact with soil or other fill material, and grouting railing posts in place.

b. Class B or C non-shrink grout shall be used for the repair of holes and defects in concrete members which are water bearing or in contact with soil or other fill material, grouting under all base plates for structural steel members, grouting under all equipment base plates, and at all locations where grout is required by the Contract Documents except where epoxy grout is specifically required. Class B or C non-shrink grout may be used in place of Class A non-shrink grout for all applications. Class B or C non-shrink grout shall not be used for dry packing applications.

B. Epoxy Grout

1. Epoxy grout shall be a pourable, non-shrink, 100 percent solids system. The epoxy grout system shall have three components: resin, hardener, and specially blended aggregate, all premeasured and prepackaged. The resin component shall not contain any non-reactive diluents. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturer's instructions shall be printed on each container in which the materials are packaged. Epoxy grout shall be **Master Builders Ceilcote 648 CP+** by **Master Builders; Sikadur 42, Grout-Pak** by **Sika Corporation** or equal.

2. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application.

3. The mixed epoxy grout system shall have a minimum working life of 90 to 120 minutes at 70 degrees F.

4. The epoxy grout shall develop a compressive strength of 9000 psi in 24 hours and 13,000 psi in seven days when tested in accordance with ASTM C 579, Method B. There shall be no shrinkage (0.0 percent) and a maximum 4.0 percent expansion when tested in accordance with ASTM C 827.

5. The epoxy grout shall exhibit a minimum effective bearing area of 90 percent. This shall be determined by testing in accordance with ASTM C 1339 - Test Method for Flowability and Bearing Area of Chemical-Resistant Polymer Machinery Grouts, for bearing area and flow.

6. Application: Epoxy grout shall be used to embed all anchor bolts and reinforcing steel required to be set in grout, and for other applications specifically required in the Contract Documents.

2.3 TOPPING GROUT AND CONCRETE FILL

A. Grout for topping of slabs and concrete fill for built-up surfaces of tank, channel, and basin bottoms shall be composed of cement, fine aggregate, coarse aggregate, water, and

admixtures. All materials and procedures for concrete in Section 03 31 00 – Cast-in-Place Concrete shall apply except as noted otherwise herein.

B. Topping grout and concrete fill shall contain a minimum of 564 pounds of cement per cubic yard with a maximum water/cement ratio of 0.45. Where concrete fill is thicker than 3 inches, sitework concrete in accordance with Section 03 31 00 – Cast-in-Place Concrete may be used if accepted by the ENGINEER .

C. Coarse aggregate shall be graded as follows:

U.S. STANDARD SIEVE SIZE	PERCENT BY WEIGHT PASSING
1/2"	100
3/8"	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 30	0-10

D. Final mix design shall be determined by trial mix design under supervision of the approved testing laboratory.

E. **Strength:** Minimum compressive strength of topping grout and concrete fill at the end of 28 days shall be 3000 psi.

2.4 CURING MATERIALS

A. Curing materials shall be in accordance with Section 03 31 00 – Cast-in-Place Concrete for cement grout and be as recommended by the manufacturer of prepackaged grouts.

2.5 CONSISTENCY

A. The consistency of grout shall be as necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is required by the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as indicated herein for the particular application.

B. The slump for topping grout and concrete fill shall be adjusted to match placement and finishing conditions but shall not exceed 4 inches.

2.6 MEASUREMENT OF INGREDIENTS

A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurement shall not be allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 -- EXECUTION

3.1 GENERAL

A. Surface preparation, curing, and protection of cement grout shall be in accordance with Section 03 31 00 – Cast-in-Place Concrete. The finish of the grout surface shall match that of the adjacent concrete unless otherwise indicated.

B. The manufacturer of Class B or C non-shrink grout and epoxy grout shall provide on-Site technical assistance upon request at no cost to the OWNER.

C. Base concrete or masonry shall have attained its design strength before grout is placed, unless authorized otherwise by the ENGINEER .

3.2 GROUTING PROCEDURES

A. **Prepackage Grouts:** Mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

B. All structural, equipment, tank, and piping support bases shall be grouted, unless indicated otherwise.

1. The original concrete shall be blocked out or finished off a sufficient distance below the plate to provide for a one-inch thickness of grout or a thickness as indicated on the Drawings.

2. After the base plate has been set in position at the proper elevation by steel wedges or double nuts on the anchor bolts, the space between the bottom of the plate and the original pour of concrete shall be filled with non-shrink-type grout. The mixture shall be of a trowelable consistency and be tamped or rodded solidly into the space between the plate and the base concrete. A backing board or stop shall be provided at the back side of the space to be filled with grout. Where this method of placement is not practical or where required by the ENGINEER , alternate grouting methods shall be submitted for acceptance.

C. Topping Grout

1. All mechanical, electrical, and finish work shall be completed prior to placement of topping or concrete fill. The base slab shall be given a roughened textured surface by sandblasting or hydroblasting, exposing the aggregates to ensure bonding to the base slab.

2. The minimum thickness of grout topping and concrete fill shall be one inch. Where the finished surface of concrete fill is to form an intersecting angle of less than 45 degrees with the concrete surface it is to be placed against, a key shall be formed in the concrete surface at the intersection point. The key shall be a minimum of 3-1/2-inches wide by 1-1/2-inches deep.

3. The base slab shall be thoroughly cleaned, at saturated surface dry (SSD) condition per ICRI standards for surface preparation, and be free from standing pools or ponds of water prior to placing topping and fill. A thin coat of neat cement grout shall be broomed into the surface of the slab just before topping of fill placement. The topping and fill shall be compacted by rolling or tamping, brought to established grade, and floated. Grouted fill for tank and basin bottoms where scraping mechanisms are to be installed shall be screened by blades attached to the revolving mechanism of the equipment in accordance with the procedures outlined by the equipment manufacturer after the grout is brought to the established grade.

4. Topping grout placed on sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement.

5. The surface shall be tested with a straight edge to detect high and low spots which shall be immediately eliminated. When the topping and fill has hardened sufficiently, it shall be steel troweled to a smooth surface free from pinholes and other imperfections. An approved type of mechanical trowel may be used as an assist in this operation, but the last pass over the surface shall be by hand-troweling. During finishing, no water, dry cement, or mixture of dry cement and sand shall be applied to the surface.

3.3 CONSOLIDATION

A. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

- END OF SECTION -

SECTION 13 11 00
CORROSION MONITORING

PART 1 GENERAL

1.1 DESCRIPTION

A. This section includes the material procurement, installation, and testing of the corrosion monitoring system for the steel pipes.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03 31 00 Cast-In-Place Concrete

B. Section 33 11 13.1 Steel Pipe

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. The reference standards of the organizations listed below form a part of these Standard Specifications to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise stated.

1. American Association of State Highway and Transportation Officials (AASHTO)

2. American Society for Testing and Materials (ASTM)

   a. B3- Soft or Annealed Copper Wire

   b. B8- Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

   c. C94- Ready Mix Concrete

   d. C109- Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)

   e. D1248 - Standard Test Method for Polyethylene Plastics, Molding and Extrusion Materials for Wire and Cable

3. American Water Works Association (AWWA) Latest Revision

a. C217- Application and Handling of Wax-Type Protective Coatings and Wrapper Systems for Underground Pipelines

4. NACE International

a. SP0169- Control of External Corrosion on Underground or Submerged Metallic Piping Systems

b. SP0286- Electrical Isolation of Cathodically Protected Pipelines

5. National Fire Protection Association (NFPA)

a. 70- National Electric Code

6. Underwriters Laboratories, Inc. (UL)

a. 651- Sch. 40 and Sch. 80 Rigid PVC Conduit

1.4 GENERAL REQUIREMENTS

A. The Plans indicate the general arrangement of the corrosion monitoring facilities to be constructed. Where no dimensions are indicated on the Plans, the locations of corrosion monitoring test stations (CTS), and conduits may be changed up to 5 feet without the approval of the ENGINEER to avoid interference with other utilities and unforeseen obstacles. Where specific dimensions are shown on the Plans, or where proposed changes are greater than 5 feet, written approval by the ENGINEER is required. Where applicable, materials and equipment shall bear evidence of UL approval and conform to the requirements of all applicable federal, state and local laws, codes, and regulations.

1.5 SUBMITTALS

A. Qualifications of the CONTRACTOR's Corrosion Engineer and Corrosion Technician.

B. Certification by the CONTRACTOR's Corrosion Engineer stating that the corrosion protection criteria in these specifications have been met.

C. Manufacturer's information for each item listed below and its subcomponents. Include sufficient information to show that the materials meet the requirements provided herein, including references to specific sections and details shown on the Plans. Where more than one item or catalog number appears on a catalog cut, clearly identify the item proposed. Catalog cuts of the following items shall be submitted to the ENGINEER (or their designated representative) for approval.

1. Test Stations
2. Wire and Conduit
3. Reference Electrodes
4. ER Probes and Meter
5. Pipe Flange Insulating Kit
6. Monolithic Insulating Joints
7. Lining for Insulated Joints
8. Coating for Buried Insulated Pipe Flanges and Uncoated Pipe Specials
9. Plastic Warning Tape
10. Exothermic Weld Kits
11. Weld Coating

D. Test Reports: All testing performed during the progression of this project shall be submitted in a tabulated and written report format within ten (10) days of its conclusion. All testing reports shall be submitted in both hardcopy and electronic formats: the electronic copies shall be in PDF and Microsoft Office 2003 formats. The following tests are required as a minimum for this project. This does alleviate the need for additional testing as deemed necessary by the CONTRACTOR's ENGINEER, or the ENGINEER or representative.

1. Insulating Flange Tests
2. Electrical Continuity Tests for Bonded Pipe Sections
3. Electrical Isolation Tests

a. New Pipe from Existing Pipe for Relined Segment

b. Pipe from Exiting Pipe and Other Foreign Structures

4. Calibration of ER probes
5. Final Inspection

E. Record drawings for the corrosion monitoring system installation of the equipment. Properly identify all items of equipment and material. Provide GPS locations with sub-foot accuracy of all CP test boxes, buried wires, and insulated pipe flanges.

1.6 QUALITY ASSURANCE

A. The installation of the corrosion monitoring system's electrical components shall conform to the National Electrical Code, applicable local codes, and the NACE Standard Practice SP0169.

B. Provide all materials, equipment, labor, and supervision necessary for the completion of all installations and testing.

C. The CONTRACTOR shall be responsible for testing the corrosion monitoring systems. All testing shall be performed by or under the direct supervision of a Corrosion Engineer. All field tests shall be performed at the expense of the CONTRACTOR. This testing shall include all insulators, wires, continuity testing, and corrosion monitoring system activation. The tests shall be conducted in the presence of the District or its representative. The CONTRACTOR shall correct, at his expense, all deficiencies in the installation observed by these tests and inspections. The CONTRACTOR shall pay for all retests made necessary after the corrections.

1. Services of Corrosion Engineer: Obtain the services of a Corrosion Engineer to inspect, locate electrical discontinuities, and evaluate the effectiveness of the corrosion monitoring system. The Corrosion Engineer is herein defined as a registered Professional Engineer with certification or licensing that includes education and experience in corrosion monitoring/cathodic protection of buried or submerged metal structures, or a person accredited or certified by NACE International at the level of Corrosion Specialist or Cathodic Protection Specialist (i.e. NACE International CP Level 4). Such a person shall have not less than five years experience inspecting pipeline corrosion monitoring systems.

2. Services of Cathodic Protection Technician: If necessary, obtain the services of a Cathodic Protection Technician to inspect, activate, adjust, and evaluate the effectiveness of the corrosion monitoring system. The Cathodic Protection Technician is herein defined as a person accredited or certified by NACE International as a Cathodic Protection Level 2 Technician. Such a person shall have not less than five years experience inspecting pipeline corrosion monitoring systems and shall be under the direct supervision of the Corrosion Engineer.

D. The District reserves the right to test and/or inspect all phases of the CONTRACTOR's work. The CONTRACTOR shall notify the ENGINEER at least 5 days in advance of the tests. Failure to do so will void all test results and will be subject to retesting at the CONTRACTOR's expense.

PART 2 MATERIALS

2.1 GENERAL

A. Provide corrosion monitoring system materials and equipment that are new, undamaged, and in the original packaging marked with the manufacturer's name or trademark. The materials and equipment shall be of the manufacturer's latest standard design and shall be fully compatible to provide a complete and functional corrosion monitoring system.

2.2 TEST STATION

A. Provide an electrical pull box or concrete valve box for all below grade CP Test Stations. Boxes shall be installed outside of any roads or parking lots. Where traffic loading of the boxes is required, they shall be designed to withstand AASHTO H-20 traffic loads. Boxes shall be a minimum of 10-3/8-inches inside diameter, 12-inches deep, and have a cast iron cover with a locking lid. Covers for test stations shall have the words "SWA CP TEST" cast or welded thereon. Letters shall be minimum 3/4-inches tall and ¼-inch raised from the surrounding flat area. Use Christy Concrete Products, G5, or equal.

2.3 WIRE AND CONDUIT

A. Use stranded copper wire. Wires shall be stranded copper conforming to ASTM B3 and ASTM B8. All test wires shall be sized as indicated on the drawings. Wires shall be sufficient length to extend from the point of installation on the pipeline to the appropriate corrosion monitoring test box without splices and provide for a minimum of 24-inches of slack within the test box.

B. Direct Buried CP Wires: Test wires shall have a 7/64-inch thick HMWPE insulation specifically designed for cathodic protection service and suitable for direct burial in corrosive soil, conforming to ASTM D1248, Type I, Grade J3, Class C, Category 5 (HMWPE Type CP). Wires with cut or damaged insulation are not acceptable and replacement of the entire lead will be required. Color shall be as noted on drawings. No phase taping is allowed.

C. Pipe Joint Bonding Wire: In the event that joint bonding is required across non-circumferentially welded joints, the wire shall be No. 4 AWG and shall have 7/64-inch thick HMWPE insulation specifically designed for cathodic protection

service and suitable for direct burial in corrosive soil, conforming to ASTM D1248, Type I, Grade J3, Class C, Category 5 (HMWPE Type CP). Install bond wires at the minimum length required. Piping, pipe fittings, and specials 18-inches or smaller in diameter require 2 cables for each joint. All piping, pipe fittings, and specials larger than 18 inches diameter require 3 bond cables. All bond wires shall be installed long enough to properly bond across the specified joints without a splice, and allow for maximum deflection of the pipe joint or fitting without imparting stress on the cable. A note of final bond cable lengths shall be documented for use in the final test report.

D. All buried wire runs shall be routed underground to concrete test boxes in an appropriately sized, Schedule 40 PVC, electrical conduit.

2.4 REFERENCE ELECTRODES

A. Copper-copper-sulfate type, suitable for direct burial and designed to remain stable for at least 20-years.

B. Minimum sensing surface area of 28-square inches and capable of maintaining a stable potential within plus or minus 10-millivolts to that of another new reference electrode while a 3-microampere electrical current is applied.

C. Contain a barrier to inhibit migration of chloride ions from the soil into the reference electrode.

D. Reference electrode lead wire shall be No. 14 AWG, stranded copper, with RHH-RHW yellow or black colored insulation as shown on the drawings and shall be silver soldered to the copper core of the reference electrode with the connection epoxy sealed by the manufacturer.

E. Use Stelth 2 Model SRE-007-CUY by Borin Manufacturing, or Staperm Model CU-1-UGPC by GMC Corrosion, or equal.

2.5 ELECTRICAL RESISTANCE (ER) PROBES

A. Low profile probe made from the same material as the main pipeline, i.e., steel pipelines shall have steel ER probes and ductile iron pipelines shall have ductile iron probes complete with the annealing oxide layer intact for accurate corrosion rate measurements.

B. Measure cumulative corrosion and calculate in-situ corrosion rates.

C. Dimensions of 6.00" x1.00" x 0.15".

D. Measurement element area of 1 square inch.

E. Grounding wire to tie back into pipeline

F. Mil-spec 6-pin connector capable of connecting to Metal Samples MS0500, MS1500E, or Rohrback Casasco's CK-3.

G. A new meter for monitoring the ER probes shall be used by the Corrosion Engineer and turned over to the District upon completion of the project.

H. Use Tinker and Rasor's CSP-1 for steel or approved equal.

2.6 PIPE FLANGE INSULATING KIT

A. For purposes of this specification, the terms "Pipe Flange Insulating Kit", "Insulated Flange", "Insulated Joint", and "Dielectric Flange" are used synonymously.

B. Pipe flange insulating kit materials shall be designated by the manufacturer as suitable for service at the operating temperatures and pressures specified on the Plans.

C. Flange insulating kits shall consist of a one piece, full-face, insulating gasket, and an insulating sleeve, insulating washers, and steel washers for each bolt. For nominal pipe diameters up to and including 36-inches, provide one insulating washer and one steel washer on each side of the flange. For nominal pipe diameters greater than 36-inches, the insulating washers shall be installed sandwiched between a pair of matching steel washers on each side of the flange.

D. Insulating Gasket: Insulating gasket retainers shall be full face, Type E, NEMA G-10 glass reinforced epoxy retainers with a nitrile (Buna-N) rectangular cross section O-ring seal. Minimum total gasket thickness shall not be less than 1/8-inch. The gasket shall have the same outside diameter as the pipe flange. For cement-mortar lined pipe, the gasket's inside diameter shall be 1/4-inch smaller than the pipe's steel can diameter. For epoxy lined pipe, the gasket's inside diameter shall be equal to the nominal pipe diameter. Dielectric strength shall be not less than 550-volts per mil, and compressive strength shall be not less than 50,000-psi. The manufacturer's name and date of manufacture shall be marked on both sides of the gasket with two-inch tall letters. The gasket shall be installed within 6 months of the date of manufacture. Use PSI Linebacker insulating gasket, or equal.

E. Insulating Sleeves: Provide full length, one piece, NEMA G-10 glass reinforced epoxy insulating flange bolt sleeves. Dielectric strength shall be not less than

400-volts per mil. The length of the insulating sleeves shall provide an air gap between the end of the insulating sleeve and inside surface of the stud bolt nut with a tolerance of 1/32-inch minimum and 1/16-inch maximum.

F. Insulating Washers: Insulating washers shall be NEMA G-10 glass reinforced epoxy with a minimum thickness of 1/8-inch. Dielectric strength shall not be less than 550-volts per mil, and compressive strength shall not be less than 50,000-psi. The insulating washer's inside diameter shall be sized to fit over the insulating sleeve's outside diameter.

G. Provide ASTM F436 steel washers for placement over the insulating washers. The inside and outside diameter of the steel washers shall match those of the insulating washers. The steel washers must be able to freely rotate around the insulating sleeve. Attention must be paid to the fit between the steel washers and the insulating sleeve in order to avoid the washers twisting the sleeves when the flange bolts are torqued.

H. Provide four extra insulating sleeves and eight extra insulating washers for each insulating flange upon successful inspection of the insulating flange.

2.7 MONOLITHIC INSULATING JOINTS

A. Monolithic Insulating Joints can be installed in-lieu of insulating flange kits where ever insulating flange kits are shown in the piping system. Monolithic Insulating Joints shall be boltless, factory assembled, and welded into the piping section with butt strap connections.

B. The insulating component shall be as recommended by the Monolithic Insulating Joint manufacturer and as approved in writing by the ENGINEER. The steel components of the Monolithic Insulating Joint shall match the pipe section to which it is attached.

C. Each pipe section with a Monolithic Insulating Joint shall be hydrostatic tested to 1.5-times the rated operating pressure. Testing shall be conducted between testing plates or end caps to ensure the most arduous conditions and shall be witnessed by the ENGINEER.

D. The manufacturer shall inspect all welds used to construct the Monolithic Insulating Joint with ultrasonic, magnetic particle, and dye penetrant tests. The manufacturer shall test each Monolithic Insulating Joint for electrical isolation after the completion of hydrostatic tests. Testing shall be witnessed by the ENGINEER. Electrical resistance shall be a minimum of 5-Megohms. Written test results shall be submitted to the ENGINEER.

E. Each Monolithic Insulating Joint shall be provided with a lining material that matches the type and thickness of the lining material of the pipe to which it is attached.

F. Each Monolithic Insulating Joint shall be externally coated with a two part epoxy coating applied to a minimum dry film thickness of 0.010 inches to within 2-inches of each end. Each pipe section with a Monolithic Insulating Joint shall be coated with 1-inch thick cement mortar The steel reinforcement in the cement mortar coating shall be held back 2-inches from both sides of the Monolithic Insulating Joint's insulating ring so as to avoid creating a metallic path across the insulated gap.

G. Electrical isolation tests shall be repeated by the ENGINEER at the job site when the Monolithic Insulating Joint is delivered, before it is attached to the pipeline, and before any field applied linings or coatings are applied to it. The Monolithic Insulating Joint electrical resistance shall be a minimum of 5-Megohms.

H. The Monolithic Insulating Joint shall be one of the following trademark/trade name products: Iso-Joint, Iso-Bloc, Electro-Stop, or approved equal.

2.8 INTERIOR INSULATING FLANGE/JOINT COATING

A. A 100% solids, solvent-free two-component epoxy resin system thixotropic in nature and filled with select fillers to minimize permeability and provide sag resistance acceptable to these specifications. Certified to the requirements of ANSI/NSF Standard 61- Drinking Water System Components.

Product Type	Amine cured epoxy
Color	White
Solids Content (vol %)	100
Mix Ratio	1:1
Compressive Strength	10,000 psi
Tensile Strength	6,000 psi
Tensile Elongation	1.3%
Flexural Strength	9,400 psi
Hardness, Type D	87
Adhesion – D4541	930 psi

2.9 COATING FOR BURIED INSULATED PIPE FLANGES AND UNCOATED PIPE SPECIALS

A. Apply a wax tape coating system which conforms to AWWA C217 and consists of three parts: surface primer, wax-tape, and outer covering.

B. The primer shall be a blend of petrolatum, plasticizer, and corrosion inhibitors having a paste like consistency. It shall have a pour point of 100-degrees F to 110-degrees F and a flash point of 350-degrees. Use Trenton Wax-Tape Primer, or approved equal.

C. The wax-tape shall consist of a synthetic-fiber felt, saturated with a blend of high melt microcrystalline wax, solvents, and corrosion inhibitors, forming a tape coating that is easily formable over irregular surfaces and which firms up after application. The tape shall have a saturant pour point between 125-degrees F and 130-degrees F and a dielectric strength equal to a minimum of 100-volts per mil. Tape thickness shall be 50-mils to 90-mils in 6-inch wide rolls. Use Trenton No. 1 wax-tape, or equal.

D. The outer covering shall consist of two layers of a plastic wrapper. The plastic wrapper material shall consist of three 10-mil thick clear polyvinylidene chloride, high cling membranes wound together as a single sheet. Use Trenton Poly-Ply, or equal.

2.10 PLASTIC WARNING TAPE

A. Plastic warning tape for horizontal runs of buried leads in cable trenches shall be a minimum of 4-mils thick and 6-inches wide, inert yellow plastic film designed for prolonged use underground. The tape shall have the words, "CAUTION CATHODIC PROTECTION CABLE BELOW," or similar, clearly visible in repeating patterns along its entire length.

2.11 EXOTHERMIC WELD KITS

A. Exothermic weld material shall be a mixture of copper oxide and aluminum, packaged by size in plastic tubes as shown in the Plans. The materials shall be non-explosive and not subject to spontaneous ignition.

B. The largest charge allowable for use in the exothermic weld process is Erico's CA15 or equivalent.

C. Exothermic weld material and accessories shall be Erico Products, Inc., ThermOweld® or equal. Materials from different manufacturers shall not be mixed.

2.12 WELD COATING

A. Handy Cap: A prefabricate assembly containing a tough protective plastic dome filled with a corrosion resistant compound with an integrated elastomeric adhesive and integrated primer. The assembly shall be Royston Laboratory's Tape Handy Cap IP or approved equal.

B. Epoxy Coating: A high build, zero VOC, 100% solids surface tolerant epoxy coating. The epoxy shall have a maximum curing time of 2 hours at 70°F capable of providing a minimum coating thickness of 20 mils. The surface shall be prepped and the coating applied with time to cure before repairing the pipeline coating and backfilling according to the manufacturer's instructions. The epoxy coating shall be Tape Coat's TC 7010 or approved equal.

C. Bitumastic Coating: An alternative to the 100% solids epoxy is a cold-applied, fast drying mastic consisting of bituminous resin and solvents. The minimum percentage of solids shall be 74-percent.

2.13 CONCRETE

A. Concrete used for corrosion monitoring test station installations shall be Sitework concrete per Section 03 31 00.

PART 3 EXECUTION

3.1 GENERAL

A. All materials, workmanship, and installation shall conform to NACE Publication SP0169 – "Recommended Practice, Control of External Corrosion on Underground or Submerged Metallic Piping Systems"; NACE Publication SP0286 "Electrical Isolation of Cathodically Protected Pipelines", and with all requirements of the legally constituted authorities having jurisdiction. Of special interest in SP0169 is section 8.6: "Corrosion Control Test Stations, Connections and Bonds". Of special interest in SP0286 is Section 8; "Field Testing and Maintenance". Nothing in the Drawings or Specifications is to be construed to permit work not conforming to minimum requirements of these Standard Practices, regulations and codes. Where larger size or better grade materials than required by these regulations and codes are specified, the Specification and Drawings shall take precedence.

3.2 STORAGE OF MATERIAL

A. All materials and equipment to be used in construction shall be stored in such a manner to be protected from detrimental effects from the elements. If actual storage cannot be secured, materials and equipment shall be stacked well above ground level and protected from the elements as appropriate.

3.3 INSTALLATION OF TEST STATION

A. Construct Corrosion Test Stations (CTS) to enable periodic inspection of the corrosion monitoring system.

B. A minimum of two test wires are to be welded to each pipeline to be monitored at the CTS.

C. Provide a minimum of 24-inches of slack in all test wires to enable them to be removed from the box during periodic CP system testing.

D. Place a single 4-inch square tube or steel pipe marker post to denote the location of each test station. The marker post shall be 5-feet long with the lower 18-inches below ground in a 12-inch square (diameter) by 24 inch deep 3,000 PSI concrete footing. Paint the marker post with white epoxy paint. Paint the letters "CP TEST" and the pipeline station number using black high gloss epoxy paint.

3.4 INSTALLATION OF REFERENCE ELECTRODE

A. Measure the accuracy of each copper/copper sulfate reference electrode before installation by measuring the direct current (DC) voltage difference between it and one or more reference electrodes of known accuracy. The measurements shall be less than plus or minus 0.010 DC Volts for all reference electrodes. Perform these measurements after totally submerging the reference electrodes in a 5-gallon bucket of potable water for a minimum period of 15 minutes. Brackish water or saltwater will not be allowed. Provide five days written notice to the ENGINEER to allow these tests to be witnessed. This testing shall be performed by the CONTRACTOR's Cathodic Protection Technician/Engineer and witnessed by the ENGINEER.

B. Install the copper/copper sulfate reference electrodes as shown on the Plans. Provide 24 inches minimum of slack wire around the reference electrode to allow for movement during backfill and soil compaction. Exercise care so as not to damage or pierce the insulation of the reference electrode lead wire. Cover the reference electrode with 6-inches of native rock free soil and saturate it with 5-gallons minimum of potable drinking water. Backfill as shown in the Plans.

3.5 INSTALLATION OF ER PROBE

A. Install the ER probe at joints as shown in the drawings. Clean the pipe surface and affix the ER probe on the pipe at the 10:00 position using Master Bond's EP21TDC polymer adhesive, Simpson Strong-Tie Epoxy-Tie anchoring adhesive, or equal with the bare element surface facing out.

B. Route the ER probe cable to the test station by exiting the diaper's fill hole as shown on the drawings. Once the joint mortar and has cured for minimum of 48 hours, seal the ER probe cable penetration into the joint mortar and coat a minimum of 1 inch of the cable and surrounding joint mortar using Bitumastic or

100% solids epoxy. Allow bitumastic or epoxy to cure in accordance with manufacturer's instructions before burial.

3.6 INSTALLATION OF CATHODIC TEST STATION

A. For purposes of this specification, the terms "Cathodic Test Station", "Cathodic Protection Test Station", "Cathodic Test Box, "CP Test Box", and "Corrosion Monitoring Test Station" are used synonymously to refer to a group of test wires welded to a pipeline, casing, or tunnel which are trenched to an electrical junction box, flush mounted valve box, or flush mounted meter box.

B. The location of the test station may be moved up to 20 feet in either direction in order to connect wire at pipe joints. Note on drawings and in the final report the station number at which the test leads are attached.

C. All wires shall be trenched at a minimum depth of 24 inches and be placed in Schedule 40 PVC electrical conduit. Terminate the ends of buried conduit with sweeps with open end facing down to prevent dirt intrusion when backfilling. Seal all lead-in conduits to test boxes with Dux-Seal.

D. Provide a minimum of 12 inches of slack wire at the weld connections and a minimum of 24 inches of extra wire or cable for termination in each test box to enable them to be removed during periodic CP system testing.

E. Install plastic warning tape shall be installed 12 inches above all horizontally trenched wires.

F. Wire identification labels shall be left exposed.

3.7 WIRE-TO-PIPE CONNECTIONS ON BURIED PIPE

A. Exothermically weld the CP test wires at the nearest pipe joint to the pipeline station indicated on the Plans.

B. Install the cables with sufficient slack so that the cable insulation and conductors will not be damaged during the pipe backfilling process. Protect the cables by routing in SCH 40 PVC electrical conduit. Begin the PVC conduit within 3-feet of the welded connection to the pipe.

C. Cover the exothermically welded connection with a polyethylene weld cap. Seal all around the weld cap and coat (20 mil dry film thickness) any other areas of exposed steel with a bitumastic coating or a high build fast cure 100% solids epoxy coating.

1. For dielectrically coated pipe the hand applied repair coating must be compatible with the pipeline's dielectric coating. The bitumastic or epoxy coating shall also extend a minimum of 3 inches onto the pipe's dielectric coating. Allow the bitumastic or epoxy coating to cure before backfilling or repairing of the pipe's cement-mortar overcoat if applicable.

2. For cement-mortar and concrete coated pipelines seal all cement-mortar/steel interface edges where the pipeline's coating was removed. Cover the exothermic weld nugget and all disturbed areas of the pipeline coating with a quick cure, non-shrink, cementitious, patching compound. Apply the compound to a minimum thickness of 1-inch or match the surrounding pipe coating thickness, whichever is greater. The patching compound shall have a set time of 20 minutes, a maximum shrinkage of 0.087 percent after seven days (ASTM C 596 test method), achieve a minimum compressive strength of 3,570-PSI in one day, and a minimum compressive strength of 8000-PSI in 28 days (ASTM C109). Use "Jet Set Complete Repair" as manufactured by Jet Set Cement Corporation or approved equal.

3.8 WIRE-TO-PIPE CONNECTIONS ON EXPOSED PIPE

A. For wire-to-pipe connections inside vaults and other structures, exothermically weld the CP test wires to the pipe within 1-foot of the pipe-wall penetration, on the interior side. The welded connections shall be positioned so that the wires do not interfere with the installation or removal of flange bolts.

B. Paint the exothermically welded connection with a coating that matches material and color of the surrounding pipe coating.

3.9 EXOTHERMIC WELDS

A. Make wire connections to the pipeline or other structure with an exothermic weld process ("Cadweld", "ThermOweld", or equal) per manufacturer's recommendations.

B. Provide a minimum separation of 6-inches between multiple exothermic welds.

C. Remove a minimum amount of the existing coating required for placement of the weld mold on the steel structure. The steel surface must be completely clean and dry (near white metal surface preparation).

D. Test the weld integrity by striking it from the side with a 2-pound hammer. If the weld comes off, move away a minimum of 3-inches and repeat steps A through D.

E. After testing, apply weld coating.

3.10 PIPE JOINT BONDING WIRES

A. During installation of the pipe, electrically bond across all buried pipe joints which are not circumferentially welded. Install bond wires across buried or submerged metallic in-line valves, flex couplings, bolted flanges, and fittings, except for insulated pipe flanges and monolithic insulating joints. Install bond wires using the minimum length required. For pipeline diameters less than 18-inches, a minimum of two (2) No. 4 AWG copper bond wires are required for each bonded joint. For pipeline diameters 18-inches and greater, a minimum of three (3) No. 4 AWG copper bond wires are required for each bonded joint.

B. Do not install bond wires across pipe joints or pipe flanges inside valve vaults and other structures unless specifically shown on the Plans.

3.11 INSTALLATION OF INSULATING FLANGE MATERIALS

A. Install pipe flange insulating materials at the locations shown on the Plans. Install pipe flange insulating materials in accordance with the manufacturer's recommendations and NACE recommended practice SP0286, "Electrical Isolation of Cathodically Protected Pipelines."

B. Particular attention shall be paid to properly aligning the flanges prior to inserting the insulating sleeves around flange bolts.

C. Prevent moisture, soil, or other foreign matter from contacting any portion of the insulating joint prior to or during installation. If moisture, soil, or other foreign matter contacts any portion of the insulating joint, disassemble the entire joint, clean with a suitable solvent and dry prior to reassembling.

D. Follow the manufacturer's recommendations regarding the torquing pattern of the bolts and the amount of torque to be used when installing the flange insulating kit.

E. Do not use conductive grease on the flange bolts or any other flange components. The following products have been tested and approved for use as grease during installation: Huskey 2000 Lubricating Paste & Anti-Seize compound and Triflow aerosol lubricant with Teflon additive.

F. After testing and acceptance by the ENGINEER or designated representative, coat the exterior of the insulating flange and a minimum of 12 inches or 18-inches away from the outside flange face, whichever distance is greater, of the pipe

manufacturer's coating with wax tape. Upon completion, the wax tape shall be inspected by the ENGINEER or designated representative.

G. Coat the interior pipe surface of the insulating flange or joint a minimum of 2 pipe diameters in each direction with a 10 mils dry film thickness of a high-solids epoxy per manufacturer's instructions except as follows.

1. Acid etching for surface preparation is not permitted.

3.12 COATING OF BURIED INSULATED PIPE FLANGES, MECHANICAL JOINTS, FLEXIBLE COUPLINGS WITH AND WITHOUT THRUST HARNESS, AND VALVES

A. Coat buried insulated pipe flanges with a wax tape coating system in accordance with AWWA C217. The wax tape coating system shall extend over the adjacent pipe coating by a minimum 12-inches or 18-inches away from the flange surface, whichever is greater.

B. The surfaces to receive the wax tape coating shall be clean and free of all dirt, grease, and other foreign material by wire brushing and by wiping with a clean cloth until clean and dry.

C. Apply the wax tape immediately after the primer application. Extra layers of the wax tape shall be cut and carefully molded and worked into crevices and around all sharp projections, nuts, bolts, etc. before the final application of wax tape. Wrap the wax tape spirally around the pipe and across the flanges to the other pipe or valve. Use a minimum overlap of 55 percent of the tape width. While applying the tape, enough tension and pressure shall be used to provide continuous adhesion without stretching the tape. Edges of the tape must be continuously smoothed and sealed by hand during wrapping. Work the tape into the crevices and contours of the irregularly shaped surfaces and smooth out so that there is a continuous protective layer with no voids or spaces under the tape. This minimum wax tape thickness shall be 70 mils over smooth surfaces and 140 mils over sharp and irregular surfaces, or of a thickness required to fill all voids.

D. Apply by hand two layers of polyvinylidene chloride, high cling membrane sheet with a 55 percent minimum overlap over the wax tape coating by tightly spirally wrapping it around the pipe such that it adheres and conforms to the wax tape. Secure the plastic wrap to the pipe with adhesive tape.

3.13 FIELD TESTING AND INSPECTION

A. All field tests shall be performed at the expense of the CONTRACTOR. This testing shall include all dielectric insulators, wires, continuity testing, and

corrosion monitoring system activation as applicable. The tests shall be conducted in the presence of the ENGINEER. The CONTRACTOR shall correct, at his expense, all deficiencies in the installation observed by these tests and inspections. The CONTRACTOR shall pay for all retests made necessary by the corrections. The ENGINEER will be notified 5 days prior to performing each field test. Failure to properly notify the will invalidate all testing performed by the CONTRACTOR and will have to be repeated at the CONTRACTOR's expense.

B. Insulated Pipe Flanges

1. Test the electrical isolation effectiveness of each insulated pipe flange. This testing shall be performed by the CONTRACTOR's Corrosion Engineer and witnessed by the ENGINEER. The CONTRACTOR shall provide written notice of this testing to the a minimum of two days in advance. If the insulated pipe flange will be buried, it shall be tested for electrical isolation by the CONTRACTOR before the wax tape coating is applied and before it is connected to the pipeline. At the ENGINEER's option, the District may repeat this testing during or immediately after the installation of the insulating flange. Replace or repair any insulated pipe flange that is determined not to be electrically effective. The effectiveness of insulating flanges shall be determined using the following test techniques in the order shown until one of the criteria is achieved or as otherwise directed by the ENGINEER.

a. Electrical Potential Difference Test: Ground each side of the insulating flange (IF) spool to buried piping or electrical grounds with each having a maximum resistance to remote earth of 5-Ohms. If each side if the IF spool is mechanically connected to a minimum 50-feet of buried pipe, then the IF spool does not need to be bonded to an electrical ground for this test. Measure the pipe-to-soil potential of the pipe on each side of the IF with respect to a copper/copper sulfate reference electrode. If the difference in potentials is greater than or equal to 400 mV, the insulating flange is providing adequate electrical isolation. If this criterion is not met, perform the Direct Resistance Test to verify the effectiveness of the insulating flange.

b. Direct Resistance Test: Measure the electrical resistance across the insulated flange using a 97-Hertz square wave null balancing ohmmeter such as the Model 400 Nilsson Soil Resistance Meter and the four-wire resistance technique. A standard handheld digital multi-test meter's ohmmeter circuit (e.g. Fluke 97 or Beckman HD110) is not suitable for properly making these resistance measurements. Perform this test by connecting the meter's P1 and C1 terminals to one side of the insulating flange, using two wires, and then connecting the meter's P2 and C2

terminals to the other side of the insulating flange, using two additional wires. Use vise grips or temporary exothermic welds to make the wire connections to the flange or pipe. The criterion for a pipe filled with water is a minimum measurement of 5 Ohms. The criterion for a dry or a partially filled pipe is a minimum measurement of 100 Ohms. If none of the applicable criteria are met, perform the Inductive Ammeter Direct Resistance Test to verify the effectiveness of the insulating flange.

c. Inductive Ammeter Direct Resistance Test: Connect two separate wires via two separate connections to the pipe on both sides of the insulating flange. Use vise grips or temporary exothermic welds to make the wire connections. Use two pairs of test wires, one for current flow, one for voltage measurement. Using the first set of test wires, apply a minimum 12-volt DC electrical current across the insulating flange. Using the second set of test wires, measure the voltage across the insulating flange developed by the DC current flow. Use an inductive ammeter hoop (e.g. Swain hoop) clamped around the pipe immediately adjacent to the insulating flange to measure the change in DC current flow in the pipe through the insulated flange. Calculate the electrical resistance across the insulating flange in Ohms by dividing the change in DC Volts by the change in DC Amps (i.e. Ohm's Law). The criterion for a pipe filled with water is a minimum measurement of 5 Ohms. The criterion for a dry pipe is a minimum measurement of 100 Ohms. If either of the applicable criteria is not met, perform the NACE Insulating Flange Leakage Test, per NACE SP0286, to verify the effectiveness of the insulating flange.

d. NACE Insulating Flange Leakage Test: This test procedure shall conform to the "Leakage Test" described in the NACE Standard SP0286, Section 8, "Field Testing and Maintenance", Figure 12. The test current used shall be between 3 and 5 DC Amps. The criterion for a pipe filled with water is a maximum "electrical leakage value" of 10-percent of the test current. The criterion for a dry pipe is a maximum "electrical leakage value" of 5-percent of the test current.

e. Individual Flange Bolt Electrical Resistance Testing: For all insulated flanges to be buried and for all other insulating flanges that do not meet any of the previous minimum criteria, measure the electrical resistance of each flange bolt to both sides of the insulated flange using a Nilsson Model 400 Soil Resistance Meter and four-wire resistance technique. The measured resistance value for each flange through-bolt shall be a minimum of 1,000-Ohms, as measured from each bolt to both flanges. This criterion applies to flange through-bolts and does not apply to valve cap bolts. If lower resistance values are measured, remove, inspect, and replace all imperfect dielectric flange bolt sleeves and washers. If an

insulated flange with threaded cap bolts passes the resistance tests for all the "through-bolts" yet fails the other previous tests, remove all the threaded cap bolts, inspect and replace all imperfect dielectric flange bolt sleeve and washer materials and retest.

C. Electrical Isolation Testing Between Pipe and Steel Casing

1. Conduct testing to demonstrate that the steel casing is not in contact with new steel pipe. Correct all contacts detected between pipe and casing to eliminate all points of contact. This testing shall be performed by the CONTRACTOR's Corrosion Engineer and witnessed by the ENGINEER.

2. The CONTRACTOR shall prepare written test procedures specifying the methods and equipment that will be used. Submit the proposed test method to the ENGINEER for approval a minimum of 30 days before the first concrete placement.

3. Isolation test methods may include measurements made between pipe and reinforcement for voltage difference, electrical resistance, or other parameters as required to prove electrical isolation. In no case shall an electrical resistance measurement made with a volt-ohm multimeter be accepted as a test procedure. In the event of a question regarding the electrical isolation of the pipe, the ENGINEER shall make the final determination.

D. Electrical Continuity of Pipe with Bonded Joints

1. Conduct electrical continuity testing to demonstrate that all buried pipe joints (except insulated flanges) are either welded joints or have been electrically bonded across with bond cables as detailed in the Plans. This testing shall be performed by the CONTRACTOR's Corrosion Engineer and witnessed by the ENGINEER. The CONTRACTOR shall demonstrate to the ENGINEER's satisfaction that full electrical continuity has been achieved and shall make all required bond cable connections in the event that electrical continuity of the pipe is not achieved at the CONTRACTOR's expense.

2. Perform electrical continuity tests using the test points installed as a part of this project. Circulate current using a 12-volt electrical direct current (DC) source through the pipeline. Use two pairs of test wires, one wire of each pair for current flow and one of each pair for the voltage response measurement. Measure the voltage difference developed by the DC current flow. Calculate the electrical resistance of the pipeline section in Ohms using Ohm's Law. The pipeline shall be considered continuous when the measured longitudinal resistance of the pipeline between each

adjacent test stations is no greater than 120% than the theoretical longitudinal resistance of that section of pipeline. The theoretical resistance of the pipe section shall be calculated by the CONTRACTOR in advance of testing and will include pipe cylinder, bond cable, and fringing resistance. If tests indicate that adequate electrical continuity has not been achieved, the CONTRACTOR shall excavate to investigate and locate improperly bonded joints at his expense until electrical continuity is achieved to the satisfaction of the ENGINEER.

3. If other electrical continuity test methods are proposed, the CONTRACTOR shall prepare a written test procedure specifying the alternate method and equipment that will be used. A standard handheld digital multi-test meter's ohmmeter circuit (e.g. Fluke 87 or Beckman HD110) is not suitable for properly making these measurements. Submit in writing the alternate proposed test method to the ENGINEER for approval a minimum of 30 days before the pipe laying begins.

E. Test Stations

1. Completed Welds: Exothermic weld connections shall be inspected by the ENGINEER prior to backfilling. At the ENGINEER's direction, tests to verify the soundness of the welds shall be conducted by the CONTRACTOR. Tests for this purpose shall consist of striking the weld nugget with a 2-pound hammer while steadily pulling on the wire. Note that the wire near the weld shall not be unnecessarily cold worked during installation or testing. Remove and reweld any welds that break loose or show signs of separating, as determined by the ENGINEER.

2. Pipe Test Wire Integrity: After the pipe is buried, the pipe lead wire trenches are backfilled, and the cathodic test boxes are installed, the ENGINEER shall test each set of pipe lead wires for electrical continuity to the pipe. If more than twice the theoretical resistance of the pipe lead wire lengths is measured, the CONTRACTOR shall excavate the pipe and replace the pipe lead wires.

Wire Size	Resistance (Ohms/100 feet at 77 degrees F)
No. 4 AWG	0.026
No. 6 AWG	0.041
No. 8 AWG	0.065
No. 10 AWG	0.104
No. 12 AWG	0.165
No. 14 AWG	0.262

F. Corrosion Monitoring System Activation

1. The CONTRACTOR's Corrosion Engineer shall inspect, and evaluate the effectiveness of the corrosion monitoring system.

2. Provide a minimum of five days advance notice to the ENGINEER before the corrosion monitoring activation will be performed to allow for coordination and observance of these tests.

3. Before beginning each day of testing, calibrate portable copper sulfate reference electrodes with respect to a master reference copper sulfate reference electrode.

4. Measure native pipe-to-soil potentials (i.e. baseline pipe-to-soil potentials) at all cathodic test stations prior to commissioning the corrosion monitoring system. Measure pipe-to-soil potentials on both sides of all insulating flanges, monolithic insulators, dielectric unions, and at all CTS wires. Where two wires are attached to the same pipeline, measure and record the CP Native Potentials for both wires. If the potential measurements for the same pipeline differ by more than 2-millivolts, investigate the cause.

5. At CTSs constructed with buried copper/copper sulfate reference electrodes (i.e. stationary or permanent reference electrodes) measure pipe-to-soil potentials of the pipeline using with respect to both the stationary reference electrode and a portable copper sulfate reference electrode before the CP system is activated.

6. Measure and record all ER Probe reading to serve as a baseline measurement.

G. Furnish all test results including all pipe-to-soil potentials readings, anode current output readings, insulating flange test data, electrical continuity test data, dates, and times. Reference all data to pipeline station numbers. Submit all data along with a letter report to the ENGINEER. The letter report shall include a description of the test methods, analysis of the data, and conclusions about the corrosion monitoring or CP system's effectiveness. Submit report and data in both hard copy and electronic format. The electronic copies of the report shall be in Microsoft Word or PDF formats and all data shall be in spreadsheet format compatible with Microsoft Excel.

END OF SECTION

SECTION 31 00 00
EARTHWORK

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall provide all labor, material, and equipment and perform all operations necessary to complete all earthwork as specified, shown on the Drawings, or as directed by the ENGINEER. Earthwork includes excavation, trenching, backfill, compaction, and all related work.

B. The following specification sections are applicable:

Section	Title
31 10 00	Site Clearing
31 23 19	Dewatering

1.02 REFERENCES

A. With reference to the terms and conditions of the construction standards for excavations set forth in OSHA "Safety and Health Regulations for Construction", Chapter XVII of Title 29, CFR, Part 1926, the Contractor shall employ a competent person and, when necessary based on the regulations, a registered professional ENGINEER, to act upon all pertinent matters of the work of this section.

1.03 SUBMITTALS

A. Submittals shall be furnished in accordance with Section 01 33 00 – –Submittal Procedures.

B. Contractor shall submit certification, gradations, and source content for onsite and import materials proposed to be used in Work. Sample sizes shall be as determined by testing laboratory.

C. At least 30 days before starting construction on the sheeting and shoring, the sheeting and shoring design ENGINEER shall complete and submit to ENGINEER the Protection System Design Certificate (Figure 1-31 00 00) and the Contractor shall use the sheeting and shoring design. A separate certificate shall be submitted for each unique design. The certificate shall be signed and sealed by the registered professional ENGINEER that designed the protection system. The professional ENGINEER shall be licensed or registered in the state where the protection system is located.

PART 2 - PRODUCTS

2.01 MATERIALS

A. SUITABLE BACKFILL AND FILL

1. Pipe Embedment: Pipe Embedment material shall be reinforced Structural Concrete per the Drawings and Section 03 31 00 – Cast-in-Place Concrete.

2. Backfill: Structure backfill shall be Lean Concrete or Structural Concrete per Drawings and Section 03 31 00 – Cast-in-Place Concrete.

B. UNSUITABLE MATERIAL

1. Unsuitable material includes the following:

a. Topsoil;

b. Material including organic material;

c. Material that contains hazardous or designated waste materials.

2.02 MATERIALS TESTING

A. **Materials Testing:** Sampling and testing for quality assurance purposes will be performed by the ENGINEER on the Owner's behalf, and paid for by the Owner. Said quality assurance testing in no way relives the Contractor of the quality control requirements stated under Section 01 45 00 – Quality Control.

PART 3 - EXECUTION

3.01 EXCAVATION

A. General

1. Excavation shall include the removal of all materials of whatever type encountered, including all obstructions of any type and size that would interfere with the proper execution and completion of the work. Prior to excavation the entire construction site shall be cleared and grubbed per Section 31 10 00 – Site Clearing. The Contractor shall furnish, place and maintain excavation supports and shoring that may be required for the excavation. It is the Contractor's responsibility to ensure adequate safety during all construction work, including excavation.

2. The Contractor shall be responsible for removing or excluding water, including stormwater and groundwater, from all excavations. Water shall be removed and excluded until backfilling is complete and all field soil testing is complete. See Specification Section 31 23 19 – Dewatering.

3. Excavations shall provide adequate working space and clearances for the work to be performed therein and for installation and removal of concrete forms. In no case shall excavation faces be undercut for extended footings.

4. Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon.

5. Except where exterior surfaces are specified to be damp-proofed, monolithic concrete manholes and other concrete structures or parts thereof, which do not have footings that extend beyond the outside face of exterior walls, may be placed directly against excavation faces without the use of outer forms, provided that such faces are stable and also provided that a layer of polyethylene film is placed between the earth and the concrete.

6. **Classification of Excavated Materials**: No classification of excavated materials will be made for payment purposes. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the work, regardless of the type, character, composition, or condition thereof.

7. **Blasting**: Blasting or other use of explosives for excavation will not be permitted. Rock shall be excavated by mechanical means which are appropriate for type of rock being excavated.

B. Sheeting and Shoring

1. Except where banks are cut back on a stable slope, excavations for structures and trenches shall be supported with steel sheet piling and shoring as necessary to prevent caving or sliding.

2. Support systems shall be installed as necessary to limit the extent of excavations for deeper structures and to protect adjacent structures and facilities from damage due to excavation and subsequent construction. Contractor shall assume complete responsibility for, and shall install adequate protection systems for prevention of damage to existing facilities.

3. Sheeting, shoring and excavation support systems shall be designed by a professional ENGINEER registered in the state where the project is located.

4. Trench sheeting may be removed if the pipe strength is sufficient to carry trench loads based on trench width to the back of sheeting. Trench sheeting shall not be pulled after backfilling. Where trench sheeting is left in place, it shall not be braced against the pipe, but shall be supported in a manner which will preclude concentrated loads or horizontal thrusts on the pipe. Cross braces installed above the pipe to support sheeting may be removed after pipe embedment has been completed. Trench sheeting shall be removed unless otherwise permitted by ENGINEER. Trench sheeting will not be removed, if in the opinion of ENGINEER, removal of the sheeting will cause damage to the facility it is protecting. If left in place, the sheeting shall cut off 12 inches below finished grade. The design of the support system shall be such as to permit complete removal while maintaining safety and stability at all times.

C. Foundation Stabilization

1. Sub-grades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workers.

D. Tolerances

1. All excavation and embankments shall be graded to provide uniform surfaces to the lines and grades shown on the Drawings, or as specified, or as directed by the ENGINEER. Tolerances for finished earth line and grade elevations and thicknesses shall be as given below.

2. All excavation or compacted embankment lines, including such lines for earthwork adjacent to concrete construction, shall have a tolerance of plus or minus 0.1 foot or be governed by concrete tolerances, whichever is more restrictive.

3. All specified material thicknesses shall have a tolerance of plus 10 percent (+10%) or minus 5 percent (-5%).

3.02 EXCAVATIONS FOR STRUCTURES AND CONCRETE SLABS

A. The Contractor shall perform all excavation required to construct or furnish and install structures to the lines and grades as specified or shown on the Drawings or to such lines and grades as are directed by the ENGINEER or his representative. Except where otherwise indicated or directed by the ENGINEER or his representative, excavation for structures shall be carried to the grade of the bottom of the footing or slab. The Contractor shall prepare the foundations at structure sites by methods which will provide firm foundations for the concrete structures. The bottom and side slopes of excavation upon or against which concrete is to be placed shall be finished to the prescribed dimensions, and the surfaces so prepared shall be moistened and tamped with suitable

tools for the purpose of thoroughly compacting them and forming firm foundations upon or against which to place the concrete structures. If at any point in excavation the foundation material is excavated beyond the designed limits of the structure, the overexcavation shall be backfilled with select materials and compacted in accordance with the requirements shown on the Drawings. Any and all excess excavation or overexcavation performed by the Contractor for any purpose or reason, except as may be ordered in writing by the ENGINEER, and whether or not due to the fault of the Contractor, shall be at the expense of the Contractor. Fill and compacting of fill for such excess excavation or overexcavation shall be placed and compacted at the expense of the Contractor. Insofar as practicable, the material removed in excavation for structures shall be used for backfill and embankments; otherwise, it shall be disposed as directed.

3.03 TRENCH EXCAVATION

A. The Contractor shall perform all necessary excavation for pipelines to the required lines, grades, and depths, all in conformance with these Specifications and details shown on the Drawings, or as directed by the ENGINEER.

B. No more trench shall be opened in advance of pipe laying than is necessary to expedite the work.

C. All trench excavation shall be open cut from the surface.

D. Alignment and Grade

1. The alignment and grade or elevation of each pipeline shall be fixed and determined from offset stakes. Vertical and horizontal alignment of pipes, and the maximum joint deflection used in connection therewith, shall be in conformity with requirements of the section covering installation of pipe.

E. **Maximum Trench Widths**: Not used.

F. Minimum Trench Widths

1. Trenches shall be excavated to a minimum width which will provide adequate working space and sidewall clearances for proper pipe installation, jointing, and embedment.

2. Specified minimum sidewall clearances are not minimum average clearances but are minimum clear distances which will be required to the trench excavation or the trench protective system.

3. Cutting trench banks on slopes to reduce earth load to prevent sliding and caving shall be used only in areas where the increased trench width will not interfere with surface features or encroach on right-of-way limits.

G. Mechanical Excavation

1. The use of mechanical equipment will not be permitted in locations where its operation would cause damage to trees, buildings, culverts, or other existing property, utilities, or structures above or below ground. In all such locations, hand excavating methods shall be used.

2. Mechanical equipment used for trench excavation shall be of a type, design, and construction, and shall be so operated, that the rough trench excavation bottom elevation can be controlled, and that trench alignment is such that pipe, when accurately laid to specified alignment, will be centered in the trench with adequate sidewall clearance. Undercutting the trench sidewall to obtain sidewall clearance will not be permitted.

H. Not Used

I. Excavation Below Pipe Sub-grade

1. Except where otherwise required, pipe trenches shall be excavated below the underside of the pipe, as indicated on the drawings, to provide for the installation of embedment material.

2. Bell holes shall provide adequate clearance for tools and methods used for installing pipe. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or embedment material when the pipe is jointed.

J. **Artificial Foundations in Trenches**: Subject to the determination of the ENGINEER, if any of the following conditions are encountered in pipe trench excavation, adjustments will be made in the Contract Price in accordance with the provisions of the General Conditions for required additional work authorized or directed by the ENGINEER:

1. If the bottom of the pipe trench is in soft, unstable material, it shall be excavated below grade for the full width of the trench as directed and the below-grade excavation subsequently refilled with approved compacted materials.

2. If the pipe trench is excavated in rock, hardpan, or other similar hard and unyielding material, or has rocks or cobbles which, in the opinion of the ENGINEER, will be detrimental to the pipe, the bottom of the trench shall be overexcavated six (6) inches below grade, and said over-excavation refilled with approved compacted material.

3. The ENGINEER's assessment of unstable or unsuitable material will not be made until the material has been properly dewatered. For the purpose of the assessment, "properly dewatered" shall be defined as the groundwater level being 3 feet below the pipe invert elevation. If, after dewatering and excavation of the trench, it is determined that the pipe trench is in soft, unstable material, it shall be excavated below grade as directed by the ENGINEER and the below-grade excavation subsequently refilled with approved compacted materials. Payment for authorized removal and replacement of soft, unstable material will be made in accordance with the provisions of the General Conditions.

4. If natural foundation or subgrade material is disturbed or loosened during the excavation process or otherwise, it shall be compacted to a degree satisfactory to the ENGINEER, or where directed, it shall be removed and replaced with approved material and compacted in accordance with requirements of this Section and details shown on the Drawings, all at no additional cost to the OWNER. Any and all excess excavation or over-excavation performed by the Contractor for any purpose or reason, except as may be authorized in writing by the ENGINEER, and whether or not due to the fault of the Contractor, shall be at the expense of the Contractor. Fill and compacting of fill for such unauthorized excess excavation or over-excavation shall be placed and compacted by and at the expense of the Contractor. Insofar as practicable, material excavated shall be used for backfill; otherwise, it shall be wasted as directed. When water is encountered in the trench, it shall be removed by pumping or draining.

3.04 PIPE EMBEDMENT

A. Pipe embedment shall be reinforced Structural Concrete as shown on Drawings and per Section 03 31 00 – Cast-in-Place Concrete.

3.05 BACKFILL

A. All backfill above and around pipe embedment and structures shall be Lean Concrete or Structural Concrete as shown on drawings and per Section 03 31 00 – Cast-in-Place Concrete.

3.06 EMBANKMENT CONSTRUCTION – NOT USED

3.07 DRAINAGE MAINTENANCE

A. Trenches across roadways, driveways, walks, or other trafficways adjacent to drainage ditches or watercourses shall not be backfilled prior to completion of backfilling the trench on the upstream side of the trafficway, to prevent impounding water after the pipe has been laid. Bridges and other temporary structures required to maintain traffic across

such unfilled trenches shall be constructed and maintained by Contractor. Backfilling shall be done so that water will not accumulate in unfilled or partially filled trenches. All material deposited in roadway ditches or other watercourses crossed by the line of trench shall be removed immediately after backfilling is completed, and the original section, grades, and contours of ditches or watercourses shall be restored. Surface drainage shall not be obstructed longer than necessary.

3.08 FINAL GRADING

A. After other outside work has been finished, and backfilling completed and settled, all areas that are to be graded shall be brought to grade at the indicated elevations, slopes, and contours. All cuts, fills, and other areas which have been disturbed or damaged by construction operations shall be brought back up to original grade.

B. Use of graders or other power equipment will be permitted for final grading and dressing of slopes, provided the result is uniform and equivalent to manual methods. All surfaces shall be graded to secure effective drainage. Unless otherwise indicated, a slope of at least 1 percent shall be provided.

C. Final grades and surfaces shall be smooth, even, and free from clods and stones, weeds, brush, and other debris.

3.09 DISPOSAL OF EXCESS EXCAVATED MATERIALS

A. Broken concrete and other debris resulting from concrete removal, , debris encountered in excavation work, and other similar waste materials shall be disposed of off the site at an appropriate landfill.

B. Excess earth or rock from excavations may be left on site and either distributed evenly or piled within work limits in areas designated by the ENGINEER. In no way shall material interfere with future access along the pipeline alignment.

3.10 SETTLEMENT

A. Contractor shall be responsible for all settlement of trench backfill which may occur within the correction period stipulated in the General Conditions.

B. Contractor shall make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after notice from ENGINEER or OWNER.

FIGURE 1-31 00 00

PROTECTIVE SYSTEM
DESIGN CERTIFICATE

I, the undersigned ENGINEER, hereby certify that the protection system for

_____(trench location) has been designed by me and is in

compliance with the Contract Documents.

Name: _____ State of Registration: _____

Signature: _____ P.E. Number _____

Date: _____

_____
(Seal)

END SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The WORK shall consist of clearing, grubbing, removal and disposal of all vegetation and debris within construction area, including the limits of excavation, embankment or dike construction, construction storage areas, and CONTRACTOR's field.

1.02 SITE INSPECTION

A. Prior to moving onto the project site, the CONTRACTOR shall visit and inspect the Site conditions and review maps of the site, pipeline routes and facilities delineating the OWNER's property and right-of-way lines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PRIMARY SITE ACCESS

A. The CONTRACTOR access to the site. The right of way is shown on the Drawings.

B. **Utility Interference:** Where existing utilities interfere with the WORK of this section, the WORK shall be stopped and the ENGINEER notified of interferences before proceeding with construction.

3.02 CLEARING, GRUBBING, STRIPPING AND DEMOLITION

A. Except for those items marked on the drawings or as designated by the ENGINEER to be preserved, all construction areas shall be cleared of grass and weeds to at least a depth of six inches and cleared of structures, pavement, sidewalks, concrete or masonry debris, trees, and any other objectionable material of any kind which would interfere with the performance or completion of the WORK, create a hazard to safety, or impair the subsequent usefulness of the WORK. Trees and other natural vegetation outside the actual lines of construction shall be protected from damage during construction, as directed by the ENGINEER.

B. The CONTRACTOR shall inspect the site as to the nature, location, size, and extent of vegetative material to be removed or preserved as specified herein. Unless otherwise shown or specified, native trees larger than three inches in diameter at the base shall not be removed without the ENGINEER's approval. The removal of any trees, shrubs, fences, or other improvements outside of rights-of-way as deemed necessary by the

CONTRACTOR, shall be arranged with the OWNER, and shall be removed and replaced, at no additional cost to the OWNER.

END OF SECTION

SECTION 31 23 19
DEWATERING

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide all labor, equipment, and materials to remove and dispose of all surface water and groundwater entering excavations, trenches and other parts of the WORK.

B. Each excavation shall be kept dry until subgrade preparation is complete and continually thereafter until backfilling is complete and all field soil testing has been completed.

1.02 CONTRACTOR SUBMITTALS

A. Submittals shall be furnished in accordance with Section 01 33 00 – Submittal Procedures.

B. Prior to commencement of excavation, the CONTRACTOR shall submit a detailed plan and operation schedule for dewatering of excavations. The CONTRACTOR may be required to demonstrate the system proposed and to verify that adequate equipment, personnel, and materials are provided to dewater the excavations at all locations and times. The CONTRACTOR's dewatering plan is subject to review and approval by the ENGINEER.

1.03 QUALITY CONTROL

A. It shall be the sole responsibility of the CONTRACTOR to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence, or any other adverse effects.

B. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the CONTRACTOR.

C. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement which may develop. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the CONTRACTOR. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the CONTRACTOR.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. Dewatering, where required, may include the use of well points, sump pumps, temporary pipelines for water disposal, rock or gravel placement, and other means. Standby pumping equipment shall be maintained on the jobsite.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. The CONTRACTOR shall provide all equipment necessary for dewatering. It shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.

B. All excavations for structures or trenches which extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level to a minimum of 12-inches beneath bottom of excavations at all times.

C. Surface runoff shall be diverted and prevented from entering excavations or trenches to the greatest extent possible without casing damage to adjacent property.

D. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

E. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with compacted Granular Fill per Specification Section 31 00 00 – Earthwork

F. Flotation shall be prevented by the CONTRACTOR by maintaining a positive and continuous removal of water. The CONTRACTOR shall be fully responsible and liable for all damages which may result from failure to adequately keep excavations dewatered.

G. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sand-packed and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the CONTRACTOR shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.

H. The CONTRACTOR shall dispose of water from the work in a suitable manner without damage to adjacent property. CONTRACTOR shall obtain from the appropriate agencies and authorities, the dewatering and stormwater discharge permits required to remove and dispose of groundwater, surface water, and any other water used in the CONTRACTOR's operations. Permits shall be obtained prior to start of construction and submitted to ENGINEER for files.

END OF SECTION

SECTION 31 25 00
EROSION PROTECTION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. The work described in this specification includes the following general items of work:

1. Design, installation, maintenance, and removal of erosion protection and sediment control measures.

1.2 DEFINITIONS

A. Sediment and Erosion Control Devices: silt fences, hay bales, sandbag cofferdams, rock cofferdams, sediment ponds, sediment traps, or other devices approved by ENGINEER.

1.3 SUBMITTALS

A. Shop Drawings:

1. Erosion Protection and Sediment Control Plan (EPSCP). Conform to applicable permits and Laws and Regulations. Include, at a minimum, the following information:

a. Facilities, products, and procedures to meet the requirements of erosion protection and sediment control requirements of all applicable laws and regulations, required project permits, and requirements in these Specifications.
b. Facilities, products, and procedures for preventing the discharge of spent construction water into the Sweetwater River
c. Procedures and installation details for constructing all required erosion protection and sediment control facilities.
d. Procedures and schedule to inspect, maintain, monitor, and repair erosion protection and sediment control facilities.
e. Product data of proposed materials to be used to control erosion and sediment.
f. Drawings that clearly show erosion and sediment control measures to be used for each stage of construction.
g. Schedule of removal of sediment and erosion control devices.

1.4 REQUIREMENT

A. Provide materials and installation for erosion and sediment control in accordance with the requirements and provisions of applicable project permits, San Diego County, the State of California, and additional requirements as stated herein.

PART 2 PRODUCTS

2.1 SILT BARRIERS

A. Including hay bales, silt fences, and other similar temporary soil sediment barriers for the purpose of intercepting and detaining sediment from disturbed areas during construction.

B. Firmly anchor silt barriers into the ground.

1. Silt Fences:

a. Fabric and posts suitable for sedimentation control application.
b. UV protected fabric.

2. Temporary Rock Check Dams - Construct using clean vehicle tracking rock.

PART 3 EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datums for the construction of erosion control facilities.

3.2 SEDIMENT AND EROSION CONTROL

A. Install sediment and erosion controls prior to:

1. Performing any excavation, grading or filling operations within the site, including establishment of staging and stockpile areas.

2. Performing any concrete demolition activities.

B. Maintain and repair sediment and erosion controls during course of construction.

3.3 SILT FENCES

A. Toe-in silt fences at least 6 inches to prevent silt-laden runoff water from running beneath the fence and over the ground surface.

3.4 HAY BALES

A. Toe-in hay bales at least 6 inches, and stack and stake in place.

B. Use at least 2 stakes per bale.

C. Tie wire to stakes to provide additional stability.

3.5 REMOVAL OF TEMPORARY FACILITIES

A. Do not remove erosion control facilities without written approval from ENGINEER.

B. All erosion control facilities will be the property of CONTRACTOR.

1. Remove and dispose offsite after all Work is complete.

C. Remove and dispose of sediments collected in the sediment control systems in accordance with Section 01 50 00: Temporary Facilities and Controls.

END OF SECTION

SECTION 33 11 13.1
STEEL PIPE

PART 1 - GENERAL

1.01 SCOPE

A. This section covers designing, detailing, fabricating, delivering and installing AWWA C200 steel pipe, 6 inches in diameter and larger, together with fittings, specials, manholes, flanges, pipe supports and appurtenances, protective linings and coatings, hydrostatic shop testing, and nondestructive examination of shop welds for specials.

B. Steel pipe smaller than 6 inches in diameter, miscellaneous small piping, pipe supports, cathodic protection, hydrostatic field pressure and leakage tests, and cleaning and disinfection are covered in other sections.

C. Pipe trenching, bedding, and backfill are covered in Section 31 00 00 - Earthwork. Pipeline will be encased entirely in concrete.

D. All manufacturing of the pipe, including fabrication of steel cylinders, application of protective linings and coatings, and fabrication of fittings, specials, or appurtenances shall be performed by one manufacturing company with a minimum of five years experience manufacturing pipe of the type and size specified.

E. Steel piping shall be furnished and installed complete with all fittings, specials, jointing materials, appurtenances, and accessories indicated on the Drawings or otherwise required for proper installation and functioning of the piping.

1.02 GOVERNING STANDARDS

A. Except as modified or supplemented herein, all steel pipe, fittings, and specials shall conform to the applicable requirements of the following standards:

ANSI/AWWA Standards	Title
C200	Steel Water Pipe 6 In. and Larger
C205	Cement-Mortar Protective Lining and Coating for Steel Water Pipe – 4 inch and Larger - Shop Applied
C206	Field Welding of Steel Water Pipe
C207	Steel Pipe Flanges for Waterworks Service – Sizes 4 In. through 144 In.

C208	Dimensions for Fabricated Steel Water Pipe Fittings
C210	Liquid Epoxy Coating systems for the Interior and Exterior of Steel Water Pipeline
C219	Bolted, Sleeve-Type Couplings For Plain-End Pipe
C602	Cement-Mortar Lining of Water Pipelines in Place - 4 In. and Larger
C606	Grooved And Shouldered Joints

ANSI Standard

B18.2.1	Square and Hex Bolts and Screws

ANSI/ASME Standards

B1.1	Unified Inch Screw Threads
B18.2.2	Square and Hex Nuts
B36.10	Welded and Seamless Wrought Steel Pipe

1.03 SUBMITTALS

A. CONTRACTOR shall develop and submit to ENGINEER for approval a plan, including shop drawings of special fittings required to make the connection at Sta. 10+00. The plan shall be submitted prior to fabrication of special fittings.

B. CONTRACTOR shall develop a plan for installing liner pipe and making all required connection to existing pipe and appurtenances. Plan shall be submitted to ENGINEER prior to beginning liner pipe fabrication.

C. Submit Shop Drawings, tabulated layout schedule and line layout diagrams for review before fabrication, showing the layout and details of the pipeline and all specials required as shown on the Drawings. The line layout diagrams shall be suitable for use in distributing material along the pipeline alignment and for laying the pipe. Diagrams shall show stations; laying lengths; sequence and direction of placement; invert elevations and grades; the degree of bevel and/or pull required; piece marks; steel pipe plate thickness; the location of steel pipe specials and fabricated bends; closure sections; insulating joints; nozzles and manholes. The numbers indicated on the drawings shall correspond with those painted on the pipe. Additional information shown shall include, but not be limited to, the following:

1. Pipe inside diameter after lining.
2. ASTM class or grade of steel.
3. Yield strength and design stress of steel.
4. Total coating thickness.
5. Thickness of lining.
6. Joint details.
7. Coating materials (shop and field applied).
8. Test bulkheads.
9. Weld details.

D. Submit welding procedure specifications (WPS), procedure qualification records (PQR), and welder, welding operator and tack welder qualification test records for all shop and field welding in accordance with AWS D1.1, Section 5.

E. Submit certified copies of shop testing and inspection reports.

F. Submit Certificates of Compliance, obtained from the pipe fabricator, stating that all pipe, specials, flanges, coatings, and linings have been manufactured and tested in accordance with these Specifications. Certificates shall be submitted for the testing or manufacturing regardless of whether it was witnessed by the Engineer or not.

G. Submit Certificates of Compliance for items referenced to ASTM standards including, but not limited to, the following:

1. Steel plate for fabricated or mill pipe.
2. Steel weld fittings.
3. Gaskets.
4. Bolts, nuts and washers.
5. Submit Product Data and manufacturer's installation instructions for pipe coating products.
6. Submit pipe manufacturer's shipping and handling instructions.

H. Submit pipe manufacturer's shipping and handling instructions.

I. Submit a certified copy of mill test reports for each heat number of the steel used in the fabrication of the pipe. Mill test reports shall show the type of steel and the physical and chemical properties for each heat number of steel used in fabrication of the pipe.

J. Submit drawings of all steel pipe hangers, supports, anchorage, embeds, and all other information regarding installation of steel pipe. Submit design and details of pipe support and hold-down system to be used during concrete encasement of steel pipe.

K. Submit product data, material lists and shop drawings for manufactured products including, but not limited to, the following:

1. Mechanical couplings and shouldered couplings

2. Flanged coupling adapters

3. Coating products

4. Pipe sleeves

L. Submit a written statement from the gasket material manufacturer certifying that the gasket materials are compatible with the flanged joints specified herein and are suitable for the specified field test pressures and for use with chlorinated and chloraminated potable water.

M. Submit proposed field weld test procedures and test results.

N. Submit results of survey control for pipe layout; refer to Paragraph 3-5.03.02 of this Section.

1.04 FABRICATION, WELDING AND WELD INSPECTION REQUIREMENTS

A. General.

1. Design of details not otherwise shown, fabrication, assembly, inspection and testing of steel pipe shall be in accordance with AWWA C200. Where provisions of AWWA conflict with the provisions of the Specifications, the latter shall govern.

2. Field welding shall be performed in accordance with AWWA C206. Where provisions of AWWA conflict with the provisions of the Specifications, the latter shall govern.

B. Shop and Field Welding.

1. Use only welders, welding operators, tack welders, equipment, and welding procedures qualified in accordance with the standards specified herein.

2. Identify by name all qualified personnel. Qualification and requalification shall be at CONTRACTOR's expense.

3. As Work progresses, the ENGINEER may require additional test specimens and no welder whose work is at any time found unsatisfactory shall remain employed on the Work regardless of the quality of his earlier test welds. Each hand weld specimen shall be plainly marked with the welder's identifying symbol.

C. Welder's qualifications.

1. Each welder shall be qualified in accordance with AWS D1.1 and as defined in ANSI/AWWA C200. All qualifications shall be in accordance with all-position pipe tests as defined in Section 5 of AWS D1.1. Any welder shall be retested and requalified when the welder's work creates a reasonable doubt as to proficiency. Test, when required, shall be conducted at no additional expense to the Owner.

2. Submit qualification test records of the welder qualification where required in Specification sections. Qualification test records shall be submitted if welder is required to and has taken and passed the requalification test.

D. Examination of Shop Welds.

1. Requirements for shop hydrostatic testing are specified in Paragraph 2-13.02 of this Section.

2. Welding inspectors shall be qualified and currently certified as Certified Welding Inspectors (CWI) in accordance with AWS Standard for Qualification and Certification of Welding Inspectors (QCI). Only individuals so qualified shall be authorized to perform fabrication inspection and testing. Welding inspectors shall verify that fabrication welding is performed in accordance with the requirements of the Specifications.

3. Personnel performing radiographic tests shall be qualified and certified according to the requirements of SNT-TC-1A.

4. Perform nondestructive examination of all shop welds used to fabricate specials. Nondestructive examination of the shop welds listed below shall be performed in accordance with AWWA C200 and as specified.

a. All welds at special sections shall be examined using radiographic testing methods. In addition, welded collar plates used for nozzle and manhole attachments shall be air leakage tested.

b. All shop welds not meeting the specified requirements shall be repaired and retested until the specified requirements are met, at no additional cost to the Owner.

E. **Examination of Field Welds**: Refer to Paragraph 3-12.01 of this Section.

F. **Storage and Handling**: Pipe, fittings, specials, and appurtenances shall at all times be handled and stored in a manner that will ensure installation in sound, undamaged condition.

PART 2 - PRODUCTS

2.01 PIPE FABRICATION

A. Pipe Fabrication

1. Steel pipe shall be fabricated in accordance with AWWA C200. Steel pipe may be either fabricated pipe or mill type. In either case, all items shall be fabricated to the sizes, dimensions, and shapes indicated on the Drawings and as specified herein; Drawings indicate the nominal diameter.

2. The specified size of fabricated pipe, fittings, and specials shall be the nominal diameter stated on the contract drawings measured to the finished lining of the pipe.

3. The nominal diameter shall be the finished inside diameter to the cement mortar lining.

4. Except for seamless mill-type pipe, all piping shall be made from steel plates rolled into cylinders or sections thereof with the longitudinal seams butt-welded, or shall be spirally formed and butt-welded. There shall be not more than two longitudinal seams. Girth seams shall be butt-welded and shall be spaced not closer than 10 feet apart except in specials and fittings.

5. Steel pipe and special sections shall be lined and coated as specified herein.

6. All steel shall be fully killed and made to a fine austenitic grain size practice.

B. **Steel Coil and Plate for Fabricated Pipe**: Pipe, fittings and specials shall be fabricated from steel sheet coil or steel plate in accordance with any one of the following: ASTM A36; ASTM A570 Grade 36 or 40; or ASTM A572 Grade 42; having a minimum yield point of between 36,000 psi and 42,000 psi.

C. **Steel for Mill Pipe**: Mill pipe shall be produced from steel meeting the requirements of those ASTM Standards that are specified in AWWA C200 for mill pipe, provided that the minimum yield point of steel material is between 36,000 psi and 42,000 psi.

D. **Minimum Pipe Wall Thickness**: Steel pipe shall have the minimum wall thicknesses indicated on the Drawings.

E. **Fitting Dimensions**: The dimensions of steel pipe fittings shall be as indicated on the Drawings and as specified herein.

F. **Pipe Lengths**: Straight pipe sections shall be standard 40 foot lengths unless otherwise indicated on the Drawings or as required for making curves or field closures.

G. **Changes in Alignment**: In general, changes in horizontal and vertical alignment shall be made by asymmetrical joint assembly, beveled pipe, fabricated bends, or a combination of the above methods, as shown on the Drawings, as recommended by the pipe fabricator, and as reviewed and concurred by the ENGINEER.

H. **Long Radius Curves**: The laying of steel pipe on curved alignments by means of unsymmetrical closure of the spigot end into the bell end ("deflected joints") will be permitted in accordance with the manufacturer's recommendations and the concurrence of the ENGINEER. Long radius curves shall be achieved with either "deflected joints" (0-1.49 degrees) or with beveled bells at the joint (1.50-4.00 degrees).

I. Design of Reinforcement for Fittings and Specials

1. The pipe manufacturer shall design and detail all fabricated bends, fittings, branch connections, reducers, and special sections, which shall be reinforced, or the pipe wall thickness shall be increased, so that the combined stresses due to internal pressure (circumferential and longitudinal) and bending will not exceed 67 percent of the yield strength of the pipe material. Design shall be in accordance with AWWA M11.

2. Whether or not indicated on the Drawings, reinforcements or additional wall thickness shall be provided as required to ensure that the combined stresses do not exceed the specified maximum. Unless otherwise indicated or specified, the internal pressure shall be the specified field test pressure shown on the Drawings for the piping adjacent to the item in question, and the dead load shall be equal to the pipe full of water.

3. In addition to the above, the design of reinforcement or wall thickness shall take into consideration an external load of W pounds per linear foot, where W - feet of cover x pipe OD in feet x 120 pcf, plus live and impact loads.

4. Wall thicknesses of reducing sections shall be not less than the thicknesses required for the larger ends.

5. Hand holes may be provided at CONTRACTOR's option for convenience.

J. **Joints**: Acceptable joints of the type indicated on the Drawings and as specified herein shall be provided for all pipe installations in the locations indicated or accepted by the ENGINEER. To facilitate installation, additional field-welded or mechanically coupled joints may be provided, but shall be kept to a minimum, and their locations shall be acceptable to the ENGINEER. Field-welded joints shall not be used in pipe smaller than 27 inches, except in locations where the interior coating can be satisfactorily repaired and inspected.

K. **Markings**: Clearly stencil on the inside of each pipe section, fitting, and special:

1. Service.
2. Wall thickness.
3. Minimum yield strength of the pipe material.
4. T (for field top) of the pipe for specials and pieces other than straight pipe.
5. Outside diameter, inches.
6. Name of manufacturer.
7. Date of manufacture.
8. Piece number correlating pipe to tabulated layout schedule and line layout diagrams.
9. Amount of bevel on beveled pipe.

2.02 MATERIALS

Flanged Joints

Flanges	ANSI/AWWA C207, steel ring slip-on type, except where otherwise permitted or required.
Dimensions and Drilling	ANSI/AWWA C207, or as indicated on the Drawings.
Blind Flanges	ANSI/AWWA C207, unless otherwise indicated on the Drawings or specified; pressure ratings shall be the same as for flanges.
Gaskets	ANSI/AWWA C207, 1/8" thick, full face type. Gaskets for potable water service shall be certified as suitable for the test pressures specified, and for chlorinated and chloraminated potable water; a certificate of gasket suitability shall be submitted.
Insulated Flanges	
Flanges	As specified herein, except bolt holes shall be enlarged as needed to accept bolt

	insulating sleeves.
Insulation Kits	As specified in Section 13 11 00, CORROSION MONITORING.
Flange Bolting	
Material	ANSI/AWWA C207, galvanized.
Type	Bolt and nut; bolt-stud and two nuts permitted for 1 inch and larger.
Bolts and Bolt-Studs	
Length	Such that ends project 1/4 to 1/2 inch beyond surface of nuts.
Ends	Chamfered or rounded.
Threading	ANSI/ASME B1.1, coarse thread series, Class 2A fit. Bolt-studs may be threaded full length.
Bolt Head Dimensions	ANSI B18.2.1; regular pattern for square, heavy pattern for hexagonal.
Nuts	Hexagonal.
Dimensions	ANSI/ASME B18.2.2, heavy, semi-finished pattern.
Threading	ANSI/ASME B1.1, coarse thread series, Class 2B fit.
Washers	ASTM F436, galvanized

Mechanical Couplings

General Requirements	Mechanical couplings shall be furnished in accordance with AWWA C219, with rated pressure that exceeds the field test pressure shown on the Drawings. Couplings shall feature carbon steel end rings and fasteners, elastomeric ring gaskets suitable for chlorinated water service, and shop-applied coating conforming to AWWA C213
Insulating Type	Baker "Series 216", Dresser "Style 39", Smith-Blair "416"; without pipe stop; or equal.
Reducing Type	Baker "Series 220", Dresser "Style 62", Smith-Blair "413" and "415"; without pipe stop; or equal.
All Other Types	Baker "Series 200", Dresser "Style 38", Smith-Blair "411 Flexible Coupling"; without pipe stop; or equal.
Restrained Joints	Of the type indicated on the Drawings or as specified.
Lugs or Collars	ASTM A283, Grade B or C; or ASTM A36.
Tie Bolts	ASTM A193, Grade B7.
Threading	ANSI/ASME B1.1, Class 2A fit, coarse thread series for 7/8 inch and smaller, and 8-thread series for 1 inch larger.
Ends	Chamfered or rounded.
Nuts	Hexagonal, ASTM A194, Grade 2H or better.
Threading	As specified for tie bolts, except Class 2B fit.
Dimensions	ANSI/ASME B18.2.2, heavy, semifinished

	pattern.
Flat Washers	Hardened steel, ASTM A325.
Flanged Coupling Adapters	Dresser "Style 128", Smith-Blair "913"; or equal. Coupling adapters shall have an adequate rated pressure and be furnished with anchor studs of sufficient size and number to withstand the field test pressures shown on the Drawings.
Shouldered Couplings	In accordance with ANSI/AWWA C606; Victaulic Depend-O-Lok, FxF Type 2; or equal. Couplings furnished shall have rated pressures exceeding the field test pressures shown on the Drawings.
Small Branch Connections	
Pipe Nipples	Seamless black steel pipe, ASTM A53, Schedule 40.
Welding Fittings	
Threaded Outlets	Bonney "Thredolets", Porter "W-S Teelets", or Vogt "Weld Couplets".
Welded Outlets	Bonney "Weldolets", Porter "W-S Teelets", or Vogt "Weld Couplets".
Coatings and Linings	
Rust-Inhibitive Primer	Universal type; Ameron "Amercoat 180 Synthetic Resin Coating", Carboline "Kop-Coat 340 Gold Primer", or equal.
Rust-Preventive Compound	Houghton "Rust Veto 344", or equal.
Coal Tar Enamel	ANSI/AWWA C203.
Liquid Epoxy	ANSI/AWWA C210.
Wax Tape Wrap	AWWA C217-95, Synthetic fiber felt saturated with microcrystalline wax,

	plasticizers, and corrosion inhibitors. No. 1 wax tape as manufactured by TRENTON Corporation of Ann Arbor, Michigan, or approved equal. Primer coat of "Temcoat" manufactured by TRENTON Corporation; or approved equal. "Rock Shield" type material, "Guard Wrap" as manufactured by TRENTON Corporation; or approved equal.
Cement Mortar	ANSI/AWWA C205 and C602.
Cement	ASTM C150, Type II, low alkali.
Sand	ANSI/AWWA C205, Section 4.2.3, except sand for field-applied lining shall pass a No. 16 sieve.
Water	Water shall be free of organic materials and other impurities which might reduce the strength, durability or other quality of the cement mortar. Water shall have a pH of 7.0 to 9.0, a maximum chloride concentration of 500 mg/L (per Caltrans test method 422), and a maximum sulfate concentration of 500 mg/L (per Caltrans test method 417).
Epoxy Bonding Agent	ASTM C881, Type II, moisture insensitive and suitable for service conditions.
Latex Admixture	Euclid "Euco Flex-Con" or Sika "SikaLatex".
Medium Consistency Coal Tar	Carboline "Bitumastic Super Service Black" or Tnemec "46-465 H.B. Tnemecol".
Bituminous Filler for Wall Fittings	Plastic asphalt roof cement, asbestos-free; ASTM D4586, Type II.
Wall Penetration Seal	Thunderline Corporation "Link-Seal", insulating type with modular rubber sealing elements, nonmetallic pressure plates, and galvanized bolts and nuts.

Anchor Bolts ASTM A307.

2.03 PIPE ENDS

A. **Field Joints**: Field joints shall be as shown on the Drawings and as specified herein. Field joints for the pipeline shall be single weld or double weld bell and spigot type as shown except where flanged joints are required for installation of line valves. Butt strap joints will be permitted for making field closures only.

B. Pipe Ends for Field Welding

1. Ends of pipe, fittings, and specials for joints butt-welded in the field shall have the ends beveled for butt welding in accordance with the governing standards.

2. Ends of pipe, fittings, and specials for field-welded lap joints, as shown on the Drawings, shall have the bell expanded by pressing (not rolling) to obtain the required shape and welding tolerances.

C. **Pipe Ends for Fitting with Flanges**: Ends to be fitted with slip-on flanges shall be prepared to accommodate the flanges in accordance with the governing standards. Pipe ends shall have the longitudinal or spiral welds of the pipe cylinder ground to plate surface for a distance sufficient to receive the flange. The flange after welding shall be perpendicular to the axis of the pipe, free of warp with faces smooth and true.

D. **Pipe Ends for Mechanical Couplings**: Ends to be joined by mechanical couplings shall be plain end type in accordance with the governing standard. In addition, pipe seam welds on ends to be joined by mechanical couplings shall be ground flush to permit slipping the coupling in at least one direction to clear the pipe joint.

E. **Pipe Ends for Shouldered Couplings**: Ends to be joined by shouldered couplings shall be of the type conforming to the governing standard and as recommended by the coupling manufacturer for the size and wall thickness of the pipe, fitting, or special being coupled, and for the maximum test or working pressure to which the couplings will be subjected.

F. **Pipe Ends for Flanged Coupling Adapters**: Ends to be fitted with flanged coupling adapters shall be plain end type in accordance with the governing standard for mechanical couplings. Welds shall be ground flush to permit installation of the coupling, and holes shall be field drilled at the proper location for anchor studs.

G. **Pipe Ends for Connection to Dissimilar Pipe Materials**: Steel pipe connections to buried or submerged concrete pipe or cast iron or ductile iron pipe shall be made with insulated flanges.

2.04 SPECIALS

A. Except as modified herein, special sections shall conform to applicable sections of AWWA C200 and shall be fabricated as shown on the Drawings. Specials shall be fabricated from pipe meeting the requirements of this Section, and that has been previously hydrotested. Steel plate used for the fabrication of specials shall conform to the material specification for fabricated steel pipe or mill pipe.

2.05 SMALL BRANCH CONNECTIONS

A. Branch connections 2-1/2 inches and smaller shall be made with welding fittings with threaded outlets. Where the exact outlet size desired is in doubt, but is known to be less than 1 inch, a 1 inch outlet shall be provided and reducing bushings used as required.

B. Except as otherwise shown, branch connections sized 3 through 12 inches shall be made with pipe nipples or with welding fittings with welded outlets. Pipe nipples and welding fittings shall be welded to the pipe shell and reinforced as required to meet design and testing requirements.

C. Small branch connections shall be so located that they will not interfere with joints, supports, or other details, and shall be provided with caps or plugs to protect the threads during shipping and handling.

2.06 ACCESS MANWAYS

A. Access manways shall be provided in the locations indicated on the Drawings. Each access manway shall consist of a reinforced, flanged outlet with a gasketed, bolted-on blind flange cover with corp stop and two handles fabricated from 1-inch diameter steel rod.

B. At the option of the CONTRACTOR and subject to acceptance by the ENGINEER, reinforced or dished covers of lighter weight and equal strength may be provided.

2.07 FLANGED JOINTS

A. Flange faces shall be normal to the pipe axis. Angular deflection (layback) of the flange faces shall not exceed the allowable set forth in Section 4.3 of ANSI/AWWA C207. All flanges shall be refaced after welding to the pipe, if necessary, to prevent distortion of connecting valve bodies from excessive flange bolt tightening and to prevent leakage at the joint.

B. Pipe lengths and dimensions and drillings of flanges shall be coordinated with the lengths and flanges for valves and other equipment to be installed in the piping. All mating flanges shall have the same diameter and drilling and shall be suitable for the pressures to which they will be subjected.

C. Flanges shall be of the slip-on type, except that welding-neck or slip-on flanges welded to short lengths of pipe may be used where installation of flanges in the field is permitted or required.

2.08 MECHANICAL COUPLINGS

A. The middle ring of each mechanical coupling shall have a thickness at least equal to the wall thickness shown on the Drawings for the pipe on which the coupling is to be used. The length of each middle ring shall be not less than 10 inches for 36 inch and larger pipe and not less than 7 inches for pipe smaller than 36 inches.

B. The interior and exterior surfaces of the middle rings of all mechanical couplings shall be coated with a fusion bonded epoxy powder coating meeting the requirements of AWWA C213, that is proposed by the manufacturer and accepted by the ENGINEER. Couplings shall be furnished with low alloy steel bolts, nuts and washers.

2.09 SHOULDERED COUPLINGS

A. Shouldered couplings shall be sized for proper installation on the pipe ends provided.

B. After fabrication, all housing clamps forming the coupling shall be cleaned and primed (as specified for the pipe) by the coupling manufacturer.

2.10 RESTRAINED JOINTS

A. Restrained joints shall be flanged, welded, flanged coupling adapters with anchor studs, or harnessed, as specified or indicated on the Drawings.

B. Where indicated on the Drawings, mechanically coupled joints shall be restrained with harness bolts and lugs or collars. Joint harnesses shall conform to the details indicated on the Drawings. Lugs or collars shall be shop welded to the pipe and coated as specified for the adjacent pipe.

2.11 PROTECTIVE COATINGS AND LININGS

A. All steel pipe, fittings, specials, wall fittings, and accessories shall be lined, coated, primed and painted, or wrapped as specified herein.

1. Type of Coating and Lining

a. Surface preparation shall be in accordance with the coating or lining manufacturer's instructions. Types of protective coating and lining shall be as follows:

Pipe Exterior Surfaces	Shop Applied Liquid Epoxy per AWWA C210

Pipe Interior Surfaces, Except Pipe Liner	Cement mortar - shop applied, ANSI/AWWA C205, or cement mortar - field applied, ANSI/ AWWA C602, as required. The governing standards shall be as modified herein.
Pipe Interior Surfaces, Liner Pipe Only	Shop Applied Liquid Epoxy per AWWA C210

2. **Shop-Applied Cement Mortar Lining**: Cement mortar lining shall be shop applied. Except as modified herein, shop-applied mortar linings shall comply with ANSI/AWWA C205.

   a. Minimum Thickness of Cement-Mortar Lining: The minimum lining thickness shall be as shown in Table 1 of AWWA C205.

   b. Specials: Wire fabric reinforcement shall be used in the lining of fittings and specials in accordance with Section 4.4.5 of ANSI/AWWA C205.

   c. Holdbacks at Joints: An uncoated holdback shall be left at each pipe end as shown on the Drawings to permit assembly and welding of the pipe joints.

3. Pipe Joints

   a. Except as otherwise shown on the Drawings or modified herein, pipe at joints shall be coated as follows:

      (1) At Couplings: Shop coating as specified for each type of coupling. Field coating as specified for ends of sections.

      (2) Ends of Sections: Liquid epoxy

      (3) Machined Surfaces and Flange Faces: Rust-preventive compound

2.12 SHOP INSPECTION AND TESTING

A. All materials and work shall be inspected and tested by the pipe manufacturer in accordance with ANSI/AWWA C200. All costs in connection with such inspection and testing shall be borne by the Contractor.

B. Copies of all test reports shall be submitted as set forth in the Submittals section.

C. The Owner reserves the right to sample and test any pipe after delivery and to reject all pipe represented by any sample which fails to comply with the specified requirements.

   1. Owner's Inspection at the Shop

a. If the Owner elects to inspect any work or materials, as permitted under Section 5.1 of ANSI/AWWA C200, all costs in connection with the services of the Owner's inspector will be paid for by the Owner. Additional weld test specimens shall be furnished to the Owner's inspector for testing by an independent testing laboratory whenever, in the judgment of the Owner's inspector, a satisfactory weld is not being made. Test specimens shall also be furnished when the Owner's inspector desires. The entire cost of obtaining, inspecting, and testing of such additional specimen plates, welds, or materials will be borne by the Owner. If any specimen is found not to conform to the specified requirements, the materials represented by the specimen will be rejected. The expense of all subsequent tests due to failure of original specimens to comply with the specifications shall be the responsibility of the Contractor.

b. In addition to making or witnessing all specified tests and submitting any required reports to the Engineer and the Owner, the Owner's inspector will submit written reports to the Contractor concerning all materials rejected, noting the reason for each rejection.

c. Inspection by the Owner's inspector, or failure to provide inspections, shall not relieve the Contractor of his responsibility to provide materials and to perform the work in accordance with the Contract Documents.

2. Shop Hydrostatic Testing

a. A shop hydrostatic test shall be performed on each length of steel pipe in accordance with AWWA C200, and as specified herein. The test pressure shall be maintained for a period of sufficient length to allow thorough examination of the pipe section for defects. The test period shall be extended if requested by the Owner to complete visual inspection.

b. Defects in welds shall be repaired and all repaired sections shall be retested hydrostatically. To make repairs, the pipe shall be removed from the testing machine and areas requiring repair shall be thoroughly dried before the required repair welding is performed.

c. Test pressure: As specified in Section 5.2 of AWWA C200.

PART 3 - EXECUTION

3.01 GENERAL

A. Contractor shall notify the Owner not less than 24 hours in advance of the time of unloading or installation of pipe and appurtenances so that arrangements of inspection of the unloading or installation of the pipe and appurtenances may be made.

3.02 CARE AND HANDLING OF PIPE

A. Pipe bracing for shipping and handling (shipping struts):

B. After completion of linings and coatings, wood struts placed at right angles to each other shall be installed at each end of the pipe, and at intermediate points if necessary. The shipping struts shall be of a size sufficient to securely brace the pipe during shipping, and handling at the site. Struts shall be installed in a manner that will prevent damage to the lining, and shall have caps conforming to the curvature of the lining.

C. Prior to placing the pipe in the trench, the shipping struts shall be removed and replaced with stulls designed to meet installation requirements (installation stulls). Requirements for installation stulls are specified herein. The installation stulls shall be left in place until the bedding, backfilling, and compaction are completed satisfactorily. Stulls and bracing may be temporarily removed while the pipe is in the trench to perform field welding of pipe joints, in which case the stulls and bracing shall be reinstalled when the joint weld is finished and prior to placing backfill material.

D. Waterproof covers on ends of pipe shall remain in place and intact during storage of the pipe at the site of the Work; any covers which are damaged shall be repaired.

E. All pipe and appurtenances shall be handled in accordance with the manufacturer's recommendations and instructions and as specified herein; in case of conflict, the more stringent requirements shall apply. At least two pipe slings, equally spaced along the pipe barrel, shall be used in the handling of pipe sections 20 feet or greater in length. Care shall be exercised to prevent damage to the pipe and coating system. Steel pipe shall only be handled with wide canvas or rubber covered slings. Bare cables, chain hooks, or metal bars shall not be allowed to come in contact with the coatings.

3.03 UNFIT OR REJECTED PIPE

A. All material will be inspected for defects and conformance to the Contract requirements prior to lowering into the trench. Contractor shall repair or replace any pipe section or appurtenance that has been damaged during loading, transporting, unloading, or as a result of faulty support during transport or storage.

B. Any pipe or appurtenance, installed or not, determined by the Owner to not meet the requirements of the Contract or otherwise found unfit shall be rejected, removed from the job site, and replaced by the Contractor without additional cost to the Owner.

C. Excessive coating or lining damage, as determined by the Owner, shall be a cause for rejection of the pipe or appurtenance as unfit.

3.04 PROTECTION AND CLEANING

A. The interior of all pipe and fittings shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted. Pipe

shall not be damaged by the equipment and methods used for installation. The pipe shall be maintained in a clean condition during laying, jointing, bedding and backfilling operations.

3.05 PIPELINE INSTALLATION

A. Buried Piping – General

1. All earthwork, including any additional excavation, shall be done in accordance with Section 31 00 00, Earthwork.

2. Whenever pipe laying is stopped, the open end of the line shall be sealed with a watertight plug. All water in the trench shall be removed prior to removing the plug.

3. Pipe embedment and backfilling shall closely follow the installation and jointing of steel pipe in the trench to prevent flotation of the pipe by water and longitudinal movement caused by thermal expansion or contraction of the pipe. Not more than 160 feet of restrained joint pipe shall ever be exposed ahead of the backfilling in any section of trench. The backfill adjacent to field joints may be temporarily omitted to provide adequate space for field coating the joints. Closure welds on restrained joint pipe shall be made during the cool part of the day.

B. **Line Layout Diagrams**: Detailed line layout diagrams shall be prepared and submitted for review. The points of intersection (P.I.s) shown on the Drawings define the horizontal alignment and the centerline elevations define the vertical alignment of the pipe. Near the P.I.s and the points of change in vertical alignment, the Contractor's line layout may depart from the defined alignment if such departure produces fabricating or installation economies.

C. Placing and Bracing of Pipeline Sections

1. Pipe sections shall be installed to the horizontal and vertical alignment shown on the drawings. Departure from the required horizontal and vertical alignment shall not exceed 0.15-foot unless otherwise accepted by the Engineer.

2. In general, pipe placement should proceed in the uphill direction with the bell end of the pipe located on the uphill end. Pipelines or runs intended to be straight shall be laid straight. Maximum joint openings and deflections shall be as recommended by the pipe manufacturer. Deflections up to 4 degrees may be made by shop-mitering one end of one pipe. Deflections greater than 4 degrees shall be made by use of fabricated bends.

3. High points which allow air to collect in pipelines will not be permitted unless an air release valve is indicated on the Drawings at that location, or unless the Contractor installs an air release valve assembly at no additional cost to the Owner.

4. Pipe Stulling

a. Internal pipe stulls designed to meet installation requirements shall be installed in each pipe section before the pipe is placed in the trench. Installation stulls shall be of a size sufficient to securely brace the pipe during bedding and backfilling operations and shall have continuous head and sill timbers placed parallel to the longitudinal axis of the pipe, contoured to the pipe inside diameter. Stulls shall be installed in a manner that will prevent damage to the lining. Stulls shall be placed every 10 feet along the length of the pipe.

b. Pipe which deviates from a true circle by more than one percent (1%) shall be laid with its larger diameter vertical, or shall be re-rounded by using the installation stulls to correct the vertical diameter where permitted by the Engineer.

c. Stulls shall not be removed until after completion of all trench backfilling. Final inspection, repair, and checking of the interior lining shall be performed after the stulls have been removed.

5. Survey Control of Pipe Layout: Contractor shall survey the horizontal and vertical alignment of the pipe in place as the pipe installation progresses in order to show compliance with the requirements of Paragraph 3-5.03 above. At least one horizontal alignment and elevation reading shall be taken for each 40 feet of pipe. Results shall be submitted to the Engineer.

D. Pipeline Field Joints

1. Pipeline field joints shall be made as shown on the Drawings

2. Welded Joints: Field welding of pipeline joints shall be performed in accordance with AWWA C206, and as shown on the Drawings. Prior to assembling a bell and spigot joint, metal spacers shall be placed against the inside shoulder of the bell to provide the proper spacing between the ends of the pipe. The thickness of the spacers shall be varied as necessary to keep the pipe from laying long or short.

3. Flanged Joints: Care shall be taken in bolting flanged joints to avoid restraint on the opposite end of the piece, which would prevent pressure from being evenly and uniformly applied upon the gasket. The pipe or fitting must be free to move in any direction during installation of bolts. Bolts shall be gradually tightened in a crisscross pattern, to ensure a uniform rate of gasket compression around the entire flange.

4. Insulated Flanged Joints: Insulated flanged joints shall be installed where indicated on the Drawings or as specified in Section 13 11 00, Corrosion Monitoring.

5. Joints Using Mechanical Couplings: All pipe to be connected with mechanical couplings shall be fabricated so that the space between pipe ends within the couplings at time of initial installation will not exceed the amount recommended by the coupling manufacturer, or as shown in Table 5 of AWWA C219, subject to the concurrence of the Engineer.

3.06 PROTECTIVE COATINGS AND LININGS

A. Field Coating and Repair

1. Entry into the pipeline for application of interior linings to unlined ends shall be from open ends or through access manways, except as otherwise permitted by the ENGINEER.

2. Field joints and repair of shop-applied exterior coatings and interior linings shall conform to the following:

For Field-Welded Joints

Cement Mortar Lining	Hold back lining from the joint as shown on the Drawings. Make field joints in accordance with Section 4.7.2 of ANSI/AWWA C205, as modified herein.

For Flanged Joints

Buried Pipe	Extend cement mortar lining to ends of pipe. Apply AWWA C217 wax tape wrap to all remaining exposed flange, bolt and nut surfaces.
Pipe Exposed Inside Vaults	Extend cement mortar lining to ends of pipe. Shop prime and field paint all remaining exposed exterior pipe, flange, bolt and nut surfaces. Field painting is specified in Section 09900, PROTECTIVE COATINGS.

3.07 MODIFICATIONS TO THE GOVERNING STANDARDS

A. Field Joints and Repair of Shop-Applied Cement Mortar Lining

1. Field joints at interior joint surfaces shall be done in accordance with Section 4.7.2 of ANSI/AWWA C205, except that an epoxy bonding agent and latex admixture shall be used in conjunction with the sand and cement mortar. The addition of lime or pozzolan will not be permitted.

2. The exposed steel shall be thoroughly cleaned and all grease shall be removed. A coat of epoxy bonding agent shall be applied over the area to be lined in accordance with the manufacturer's recommendations. A soupy mixture of cement and water shall be applied over the epoxy after it becomes tacky. Cement mortar to which the latex admixture has been added shall then be packed into the area to be patched and

screeded off level with the adjacent cement mortar lining. The patched area shall be given an initial floating with a wood float, followed by a steel trowel finish.

3. Defective or damaged shop-applied cement mortar linings shall be removed, the surfaces cleaned, and the lining repaired per Section 4.4.6 of ANSI/AWWA C205, and as specified above for making field joints.

B. Field-Applied Cement Mortar Lining

1. Field-applied cement mortar linings, if used, shall comply with the requirements specified in ANSI/AWWA C602.

3.08 WALL SLEEVES

A. Unless otherwise noted, wall sleeves and wall penetration seals of the type indicated on the Drawings and as specified shall be provided where steel pipe passes through concrete or masonry walls. Where harness lugs are attached to wall sleeves, the sleeves shall be carefully aligned to permit installation of the tie rods.

3.09 PIPE SUPPORTS AND HANGERS, ENCASEMENTS, ANCHORAGE, BLOCKING AND SUPPORTS

A. Not Used.

3.10 CONNECTIONS WITH EXISTING PIPING

A. Connections between new work and existing piping shall be made with suitable fittings. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers, and as authorized by the Owner.

B. Facilities shall be provided for dewatering and for disposal of the water removed from the dewatered lines and excavations without damage to adjacent property.

C. Special care shall be taken to prevent contamination when dewatering, cutting into, and making connections with potable water piping. Trench water, mud, or other contaminating substances shall not be permitted to enter the lines. The interior of all pipe, fittings, and valves installed in such connections shall be thoroughly cleaned and then swabbed with or dipped in a 200 mg/L chlorine solution.

3.11 PROVISIONS FOR CORROSION MONITORING

A. Provisions shall be made for corrosion monitoring of underground steel pipelines as specified in Section 13 11 00, Corrosion Monitoring.

3.12 FIELD TESTS AND INSPECTIONS

A. Inspection of Field Welds

1. The Contractor shall perform testing of field welds as follows:

   a. All bell and spigot lap welds and butt strap connections shall be tested by the Contractor using a soap solution test by smearing soap solution onto the weld and applying air in the annular gap. Bubbling of the soap layer will be indicative of a defective spot that shall be corrected. At the Contractor's option, field lap welds may be inspected by magnetic particle or dye penetration methods.

   b. Contractor may perform additional non-destructive tests on field welds at its option, at no additional cost to the OWNER.

2. The Engineer will perform visual inspections of all field welds, and any other appropriate nondestructive examination which may be needed, in order to determine Contractor's compliance with the field welding requirements. Field weld test specimens shall be furnished to the Engineer for testing whenever, in the judgment of the Engineer, a satisfactory weld is not being made. Test specimens shall also be furnished when the Engineer desires. All costs for this testing will be paid by the Owner. Field welds will be randomly inspected and tested by an independent testing laboratory as directed by Engineer. Contractor shall inform Engineer before welded joints are to be backfilled so that the joint may be inspected. Contractor shall assume all costs of exposing joints that were backfilled before inspection.

3. All defective welds shall be repaired and retested by the Contractor at no additional cost to the Owner until they meet the specified requirements.

B. Testing of Dielectrically Insulated Joints

1. Refer to Section 13 11 00, Corrosion Monitoring.

C. Testing of CP Test Stations

1. Refer to Section 13 11 00, Corrosion Monitoring.

D. Pipeline Deflection Test

1. After completion of backfilling and before acceptance of the Work, all pipe larger than 30 inches in diameter shall be tested for excessive deflection by measuring the actual inside vertical diameter. Deflection measurements will be made by Engineer. Pipe with diametral deflection exceeding 2 percent of the nominal inside diameter shall be uncovered and the bedding and backfill replaced as needed to prevent excessive deflection. After replacing bedding and backfill, the pipe shall be retested.

2. Contractor shall perform corrective measures at no additional cost to the OWNER if the deflection of any pipe section exceeds the limits specified.

3. In the event the measured deflection exceeds the maximum allowable specified above, the Contractor shall correct the deflection by removing the backfill from the

respective pipe section and also for one-quarter length of both adjoining pipe sections down to at least the pipe bottom and then performing the backfill and compaction procedures in accordance with Section 022002, Earthwork to finished grade.

4. Stulls may be used to help re-round the pipe, provided that such stulls will not damage the pipe lining. Mechanical or pneumatic re-rounders will not be permitted.

E. Pipeline Field Hydrostatic

1. Refer to Section 33 11 13.4, Pipeline Pressure and Leakage Testing.

END OF SECTION

SECTION 33 11 13.4
PIPELINE PRESSURE AND LEAKAGE TESTING

PART 1 GENERAL

1.1 SCOPE

A. This section covers field hydrostatic pressure and leakage testing of piping. The term "piping" shall be used in this section to refer to piping systems, pipelines, or sections thereof.

B. Pipeline pressure and leakage testing shall be completed prior to pipeline concrete encasement.

1.2 GENERAL

A. Unless otherwise specified, testing of piping shall be completed prior to final cleaning.

B. CONTRACTOR shall notify federal, state, and local regulatory agencies to determine if any special procedures or permits are required for disposal of water used for pressure and leakage testing and to identify acceptable locations for disposal of the water. All requirements and costs associated with notifications and obtaining any discharge permit or approvals shall be responsibility of the CONTRACTOR.

C. ENGINEER or ENGINEER's representative shall be present during testing and shall be notified of the time and place of testing at least 5 days prior to commencement of the work. All work shall be performed to the satisfaction of the ENGINEER.

D. **Testing Schedule and Procedure**: A testing schedule and test procedure shall be submitted to ENGINEER for review and acceptance not less than 21 days prior to commencement of testing. The schedule shall indicate the proposed time and sequence of testing of the piping. The testing procedure shall establish the limits of the piping to be tested, the positions of all valves during testing, the locations of temporary bulkheads, and all procedures to be followed in performing the testing.

E. **Special Testing Requirements**: Special testing requirements include the following:

1. Unless otherwise acceptable to the ENGINEER, the general sequence of work for each pipeline, or valved or bulkheaded section thereof, shall be as follows:

   a. Initial flushing and cleaning of pipeline.

   b. Filling pipeline: Maximum filling velocity shall not exceed 0.25 feet per second, calculated based on fill area of pipe.

c. Hydrostatic pressure and leakage testing.

2. Unless otherwise acceptable, during testing of the pipeline, all valves shall be in the open position.

3. Unless otherwise acceptable, temporary bulkheads shall be provided during testing so that the test pressures are not applied to existing or new valves, or to existing water lines, or to any portion of water lines installed under this Contract that have already been put into service.

4. A temporary pressure gauge shall be installed at each end of the limits of the pipeline to be tested.

5. The tests shall be conducted before connections are made to existing water lines, or to any portion of water lines installed under this Contract that have already been put into service. Test joint between new piping and existing piping or any portion of water lines installed under this Contract that have already been put into service by methods that do not place entire existing system under test load, as approved by the ENGINEER.

6. Unless otherwise acceptable, upon completion of testing, connections made to existing water lines or to any portion that has been put into service of new water lines installed under this Contract, shall be visually inspected for leakage after placing the water line into service and before backfilling the connection.

F. **Water**: Water for testing shall be furnished as stipulated in Section 01 50 00 - Temporary Facilities and Control. As a conservation measure, the water shall be collected for reuse in subsequent testing. Following completion of testing, the water shall be disposed of in a manner acceptable to ENGINEER. Unless otherwise permitted, the water shall be kept out of the remainder of the piping.

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

A. All necessary connections between the piping to be tested and the water source, together with pumping equipment, water meter, pressure gauges, and all other equipment, materials, and facilities required to perform the specified tests, shall be provided. All required flanges, valves, bulkheads, bracing, blocking, and other sectionalizing devices shall also be provided. All temporary sectionalizing devices shall be removed upon completion of testing. Vents shall be provided in test bulkheads where necessary to expel air from the piping to be tested.

B. Test pressures shall be applied by means of a force pump sized to produce and maintain the required pressure without interruption during the test.

C. Permanent gauge connections shall be installed at each location where test gauges are connected to the piping during the required tests. Drilling and tapping of pipe walls will not be permitted. Upon completion of testing, each gauge connection shall be fitted with a removable plug or cap acceptable to the ENGINEER.

PART 3 EXECUTION

3.1 FILLING AND VENTING

A. Before filling the piping with water, care shall be taken to ensure that all air release valves and other venting devices are properly installed and in the open position. Hand-operated vent valves shall not be closed until an uninterrupted stream of water is flowing from each valve. The rate of filling the piping with water must not exceed the venting capacity of the installed air vent valves and devices.

3.2 BLOCKING AND BACKFILLING

A. Piping shall be adequately blocked, anchored, and supported before the test pressure is applied. Underground piping shall be tested before the joints are covered.

3.3 PRESSURE TESTING

A. After the piping to be tested has been filled with water, the test pressure shall be applied and maintained without interruption within plus or minus 5 psi of test pressure for 2 hours plus any additional time required for ENGINEER to examine all piping being tested and for CONTRACTOR to locate any defective joints and pipe materials. The test pressure shall be in accordance with the requirements specified for pipeline or plant piping.

1. Pipeline Test Pressure

   a. Piping shall be subjected to a hydrostatic test pressure of 75 psi at centerline of the pipe at the lowest point in the pipeline.

   b. The test pressure, expressed in feet [m] of water, to be applied at any point in the piping shall be equivalent to the arithmetic difference between the specified test pressure plane elevation and the elevation of the horizontal center line of the piping at the selected location. The value obtained shall be multiplied by 0.433 to obtain psi [9.806 to obtain kPa].

2. Plant Piping Test Pressure: Not used.

3.4 PLANT PIPING LEAKAGE- NOT USED

3.5 PIPELINE LEAKAGE TESTING

A. Following completion of pressure testing and acceptance by ENGINEER, the pipeline piping shall be subjected to a leakage test. The duration of the leakage test shall be 2 hours plus the additional time required for ENGINEER to make an accurate determination of leakage.

B. **Leakage Test Pressure**: The hydrostatic pressure maintained during the leakage test shall be at least 75 percent, but not more than 100 percent, of the pressure specified for pressure testing of the piping and shall be maintained within plus or minus 5 psi during the entire time that leakage measurements are being performed.

C. **Leakage Measurement**: Measurement of leakage shall not be attempted until all trapped air has been vented and a constant test pressure has been established. After the pressure has stabilized, piping leakage shall be measured with a suitable water meter installed in the pressure piping on the discharge side of the force pump. Leakage calculations shall be in accordance with AWWA M11.

D. No leakage is allowed for pipe with welded joints. If leaks are visible, repair defective pipe section and repeat leakage test.

E. Pipeline shall be flushed after testing is completed.

3.6 TEST REPORT DOCUMENTATION

A. Test date.

B. Description and identification of piping tested.

C. Test fluid.

D. Test pressure.

1. Leaks (type, location).

2. Repair/replacement performed to remedy excessive leakage.

E. Signed by CONTRACTOR and ENGINEER to represent that test has been satisfactorily completed.

END OF SECTION

SECTION 33 71 19
ELECTRICAL CONDUITS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Furnish all labor, materials, tools, equipment and services for all electrical conduits as indicated in accordance with provision of Contract Documents. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to, or necessary for, a sound, secure and complete installation

B. Conduit runs are shown on the Drawings. CONTRACTOR shall verify and adjust final vertical and horizontal locations of electrical conduit.

C. All conduit material delivered to the job site shall bear the UL label and shall be stored so as to be protected from physical damage and weather elements.

1.02 SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures

B. Manufacturer's information for each item listed below and its subcomponents. Include sufficient information to show that the materials meet the requirements provided herein, including references to specific sections and details shown on the Plans. Where more than one item or catalog number appears on a catalog cut, clearly identify the item proposed. Catalog cuts of the following items shall be submitted to the ENGINEER (or their designated representative) for approval.

- Conduit
- Identification plates
- Pull rope
- "Fire Stop" duct seal

PART 2 - PRODUCTS

2.01 MATERIALS

A. All above ground conduits and conduits transitioning from underground to above ground shall be PVC coated galvanized rigid steel and shall conform to Federal Specification WW-C581-d, ANSI rigid steel conduit Specification C80.1, NEMA RN-1 and to UL Specification UL-6. A 40 mil thickness PVC coating shall be bonded to the outside of the conduit and polyurethane coating on the inside of the conduit. Unless specifically noted, minimum conduit size shall be 3/4-inch. Conduits shall be OCAL, Robroy Plasti-bond Red, or approved equal.

B. All below ground conduits shall be Schedule 80 high impact polyvinylchloride, UL approved for direct burial or concrete encasement for cables operating at 90°C. Fittings used with PVC conduit shall be PVC solvent weld type. Standards: ANSI C33.91, NEMA TC-2, UL 651. Unless specifically noted, minimum conduit size shall be 1.5-inch. Conduits shall be Carlon Plus Rigid PVC, or approved equal.

C. Intermediate rigid metal conduit, electrical metallic tubing, non-jacked flexible metallic conduit shall not be used.

D. Conduit identification plates shall be of Type 316 stainless steel, which are fastened with Type 316 stainless steel ties at both ends of the plate. The plates shall be 3/8-inch wide and 3-1/2 inch long. The conduit numbers shall be stamped on each plate with 3/16-inch high characters. Identify all conduits with conduit identification plates at all terminations, enclosures, equipment, etc. There are only three conduits on this project. Conduits shall be numbered 1, 2, and 3. The plates shall be Panduit MMP350W38-C316 or approved equal and ties shall be Panduit MLT-S316 or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

Welding, brazing or otherwise heating of the conduit will not be allowed. Plumber's perforated hanger iron shall not be used for any purpose.

Conduit constructed in concrete which is in contact with earth or water shall be adequately separated from the earth or water by at least 4 inches of concrete. PVC conduit shall be used for underground runs. Vertical risers to equipment including the 90° bend transitioning from underground to exposed, shall be PVC coated galvanized rigid steel.

Where required for ease of pulling and as necessary to meet code, the Contractor shall supply and install junction or pull boxes even though not shown on the drawings. In all cases, however, the Contractor shall limit the number of directional changes of the conduit

to total not more than 270 degrees in any run between pull points. Bends and offsets shall be avoided where possible, but where necessary shall be made with an approved hickey or conduit bending machine. Turns shall consist of fittings or symmetrical bends.

Secure all conduits and fittings on exposed work by means of clamp backs and channels or struts. Spacing of conduit supports shall be as required by the National Electrical Code, but shall not exceed 4 ft. Run all conduits on exposed work at right angles to and/or parallel with the surrounding walls and conform exposed conduit runs to the form of the ceiling. No diagonal runs will be allowed. Where two or more conduit runs use the same pull box the conduits shall be adequately separated.

Underground conduit installation, where not within raw water pipeline concrete encasement, shall comply with the following:

- Trench bottoms shall be free from rocks, clods, and foreign material.
- Trench bottoms shall be compacted and leveled before conduit installation.
- For runs with two or more conduits, install molded plastic spacers every five feet.
- Unless otherwise indicated on the drawings, install conduits so that top of conduit will be a minimum of 24 inches below finish grade.
- Unless otherwise indicated on the drawings, encase the conduit runs in concrete for the entire length for protection. Concrete shall be three-sack, 'lean mix' and shall contain 10 lbs. of red oxide pigment per cubic yard.

The Contractor shall exercise the necessary precautions to prevent the lodging of dirt, concrete or trash in the conduit, fittings and boxes during the course of construction.

The Contractor shall be required to pull a mandrel of appropriate size, as approved by the Inspector, through each conduit run (both new and existing segments) upon completion of the conduit run and prior to acceptance of any conduit or the installation of any conductors.

Contractor shall install a pull rope in each empty conduit run. Rope shall be the polypropylene type at least 3/16 inches in diameter.

After installation of conductors, all conduit ends shall be sealed with 'Fire Stop' duct seal.

END OF SECTION

SECTION 33 71 20
ELECTRICAL JUNCTION AND PULL BOXES

PART 1 - GENERAL

1.01 DESCRIPTION

Furnish all labor, materials, tools, equipment and services for all electrical junction and pull boxes as indicated in accordance with provisions of the Contract Documents. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

1.02 SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures

B. Manufacturer's information for each item listed below and its subcomponents. Include sufficient information to show that the materials meet the requirements provided herein, including references to specific sections and details shown on the Plans. Where more than one item or catalog number appears on a catalog cut, clearly identify the item proposed. Catalog cuts of the following items shall be submitted to the ENGINEER (or their designated representative) for approval.

- Precast junction and pull boxes

PART 2 - PRODUCTS

2.01 PRECAST JUNCTION AND PULL BOXES

Precast concrete junction and pull boxes shall be provided as shown on the drawings and shall be Brooks products, Christy, Associated Concrete products, 'Quikset' or approved equal.

A. Junction and pull boxes shall be rated for incidental traffic.

B. Concrete sections for the bottom, center and top shall be provided for junction and pull boxes shall be open bottom.

C. Cover shall be rectangular, concrete, bolt down, and rated for incidental traffic loading. The covers shall be marked "ELECTRICAL".

PART 3 - EXECUTION

3.01 INSTALLATION

Junction and pull boxes shall be located to provide ample clearance. The location of all boxes shown is approximate. The exact location shall be verified on the job to avoid conflict with other work or existing facilities. Boxes shall be accurately placed and independently and securely supported.

Junction and pull boxes shall be installed in excavations as shown on the drawings and as required by CONTRACTOR for a complete installation. Junction and pull box installation shall conform to the following requirements:

1. Boxes shall be placed on six inches, minimum, of crushed rock or compacted sand.

2. Boxes shall be installed 1-1/2 inch above final grade.

END OF SECTION