LOS OSOS WASTEWATER PROJECT
COLLECTION SYSTEM AREAS A & D
LOS OSOS, CA
CONTRACT NO. 300448.08.01.AD

VOLUME 1A

LOS OSOS WASTEWATER PROJECT
COLLECTION SYSTEM AREAS A & D
LOS OSOS, CA
CONTRACT NO. 300448.08.01.AD

Volume 1A

Divisions 0, 1, 2, 3, 5, 9, 11, 15, and 16

Volume 1B

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Division 0 Bidding and Contract Requirements

County of San Luis Obispo
Los Osos Wastewater Collection System

ADVERTISEMENT FOR BIDS

County of San Luis Obispo
Department of Public Works and Transportation
1050 Monterey Street
Room 207, County Government Center
San Luis Obispo, CA 93408

Separate sealed Bids for the construction of the

LOS OSOS WASTEWATER PROJECT
COLLECTION SYSTEM AREAS A & D
LOS OSOS, CA
CONTRACT NO. 300448.08.01.AD

The Los Osos Wastewater Project (LOWWP) will provide wastewater collection, conveyance, treatment, and recycled water reuse for the community of Los Osos that is currently unsewered and utilizes septic tanks. The LOWWP consists of area construction divided into four geographical areas (Area A, Area B, Area C, and Area D), Pump Station construction, Midtown site restoration, water recycling facility, and roadway improvement, including storm drainage facilities. This Contract consists of work in Areas A and D.

Areas A and D Work includes, but is not limited to, the following:

1. Wastewater collection system consisting of approximately 111,020 linear feet of gravity mains ranging in size from 8-inch to 18-inch diameter, 10,183 linear feet of sewer force mains ranging in size from 2-inch to 14-inch diameter, 305 manholes, 3,038 service laterals and 35,424 linear foot of fiber optic conduit.
2. Recycled water system consisting of 8,088 linear feet of 6- and 4-inch diameter recycled effluent water force mains.
3. Wetwells and ancillary items, consisting of 11 Pocket Pump Stations, 4 Duplex Submersible Stations, and 1 Triplex Submersible Station.

Bids will be received by the County of San Luis Obispo at the at the office of the Clerk of the Board of Supervisors of the County of San Luis Obispo at 1055 Monterey Street, Room D-120, San Luis Obispo, CA 93408, until 3:00 p.m. (Local Time) Thursday, May 10, 2012, and then at said office publicly opened and read aloud.

The Bidding Documents may be examined at the following locations:

Office of the Clerk of the Board of Supervisors of the County of San Luis Obispo at 1055 Monterey Street, Room D-120, San Luis Obispo, CA 93408

Department of Public Works and Transportation, at 1050 Monterey Street, Room 207, County Government Center, San Luis Obispo, CA 93408 (hereafter, also the "Public Works Department" or "Department")

Copies of the Bidding Documents may be obtained at the County of San Luis Obispo Department of Public Works and Transportation located at 1050 Monterey Street, Room 207, County Government Center, San Luis Obispo, CA 93408 upon payment of $144.25 (tax included) for each set (non-refundable).

Copies of full size Contract Plans may be purchased separately from:

ASAP Reprographics
3121 South Higuera Street
San Luis Obispo, CA 93401.
(805) 543-3144

Questions concerning these documents should be directed to:

http://www.slocounty.ca.gov/PW/Design_Division/Projects_Out_To_Bid.htm

Bidders are notified that financing for this Project is provided pursuant to the Consolidated Farm and Rural Development Act (7 U.S.C. Section 1921 et seq.) and that as allowed in Public Contract Code Section 22300, this Contract does not provide for substitution of securities for any monies withheld by the Owner to ensure performance under this Contract. Bidders are further notified that this Contract does not permit retainage to be placed in escrow nor to be invested for the benefit of the Contractor.

Bidders are notified that financing for this Project is provided in part by Clean Water State Revolving Funds through an agreement with the State Water Resources Control Board. The contents of the Contract Documents do not necessarily reflect the views and policies of the State Water Resources Control Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use, (Gov. Code § 7550, 40 CFR § 31 .20.).

Prospective Bidders shall be licensed Contractors in the State of California and shall be skilled and regularly engaged in the general class or type of work called for under the Contract. Each Bidder shall have a Class A California Contractor's license.

This Contract is funded in whole or in part using funds from the American Recovery and Reinvestment Act (ARRA). Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed at 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for this Project may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this Project.

Section 1606 of the ARRA requires compliance with the Davis-Bacon and Related Acts and adherence to the current U.S. Department of Labor Wage Decision. The Contractor must comply with the minimum rates for wages for laborers and mechanics as determined by the Secretary of Labor in accordance with the provisions of the Davis-Bacon and Related Acts. The Contract provisions and related matters set forth in 29 CFR Part 5- Section 5.5 are hereby made a part of this Contract. Attention is called to the fact that not less than the minimum salaries and wages set forth in the Contract Documents must be paid on this Project. The Wage Decision, including modification, must be posted by the Contractor on the Site.

Bidders are notified that the higher of either the Davis-Bacon or the California State prevailing wage rate shall apply.

Copies of the Prevailing Wage Schedules may be obtained from the U.S Department of Labor, www.wdol.gov/dba.aspx#0.

Each Bid shall be made in accordance with the Bidding Documents, and no Bid will be received unless it is made on Bid forms included in the Bidding Documents. Each Bid must be accompanied by cash, certified check, or cashier's check or Bidder's Bond made payable to the County of San Luis Obispo for an amount equal to at least ten percent (10%) of the total amount of the Bid.

While the General Conditions herein (Section 00700) are similar to the EJCDC C-700 Standard General Conditions (2007 Edition) in many respects, the General Conditions also differ from said EJCDC document in many respects in order to conform with Federal, State, and County requirements. A copy of the differences between the General Conditions herein and said EJCDC document is available upon request.

Owner reserves the right to reject any or all Bids, and to waive discrepancies, irregularities, informalities or any other errors in the Bids or bidding, if to do so seems to best serve the public interest, so long as the error does not constitute a material error.

By order of the Board of Supervisors of the County of San Luis Obispo

_____	_____
(Date)	Deputy Clerk of the Board of Supervisors

SECTION 00110

SIGNATURES AND STAMPS

The Contract Documents for Los Osos Wastewater Project, Collection System Areas A & D, Contract No 300448.08.01.AD, presented herein have been prepared by or under the direction of the following registered engineers:

PREPARED BY:
(For Division 0)

DESIGN ENGINEER — DATE 3/21/12

REGISTERED PROFESSIONAL ENGINEER
JEFF B. WERST
C 47971
EXP 12-31-13
CIVIL
STATE OF CALIFORNIA

RECOMMENDED FOR APPROVAL AND ADVERSTING BY:

PROJECT MANAGER — DATE 3/20/12

REGISTERED PROFESSIONAL ENGINEER
JOHN ISAAC WADDELL
No. 56946
Exp. 9/30/12
CIVIL
STATE OF CALIFORNIA

DEPUTY DIRECTOR OF PUBLIC WORKS — DATE 3/21/12

APPROVED BY:

PUBLIC WORKS DIRECTOR — DATE 3/22/2012

END OF SECTION

SECTION 00200

INSTRUCTIONS TO BIDDERS

ARTICLE 1 - INTRODUCTION

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. While the General Conditions herein (Section 00700) are similar to the EJCDC C-700 Standard General Conditions (2007 Edition) in many respects, the General Conditions also differ from said EJCDC document in many respects in order to conform with Federal, State, and County requirements. A copy of the differences between the General Conditions herein and said EJCDC document is available upon request.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the purchase price, stated in the Advertisement for Bids may be obtained from the Public Works Department.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Designer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Designer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

2.04 Bidding Documents are available for download from the following website:

http://www.slocounty.ca.gov/PW/Design_Division/PROJECTs_Out_To_BID.htm

ARTICLE 3 - BLANK

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

4.01 Subsurface and Physical Conditions

A. The General Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site, if any, that Designer has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities), if any, that Designer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.01.A, if any, will be made available by Owner to any Bidder for download from the following website:

http://www.slocounty.ca.gov/PW/Design_Division/Projects_Out_To_Bid.htm

Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Designer by owners of such Underground Facilities, including Owner, or others, unless otherwise specified in the Drawings and Specifications.

4.03 Hazardous Environmental Condition

A. The General Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Designer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.03.A, if any, will be made available by Owner to any Bidder. for download on the following website:

http://www.slocounty.ca.gov/PW/Design_Division/Projects_Out_To_Bid.htm.

Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to locating of excavation and utility.

4.06 Additional Owner Provided Information

A. Reference is made to the General Conditions for the identification of the general nature of other work, if any, that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of available documents (other than portions thereof related to price) for such other work.

B. Paragraph 6.13.C of the General Conditions states that if an Owner Safety program exists it will be noted in the Specifications.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. Become familiar with and satisfy Bidder as to all Federal, State, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in Paragraph 4.06 of the General Conditions;

E. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all

additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. Promptly give Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Owner is acceptable to Bidder; and

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Owner written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Owner are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 A pre-Bid conference will be held at 10:00 a.m. local time on Thursday, April 19, 2012 at the City/County Library Community Room at 995 Palm Street, San Luis Obispo, CA 93401. Representatives of Owner, Engineer, and Designer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Owner will transmit to all prospective Bidders of record such Addenda as Owner considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

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

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Owner in writing. at the following website:

http://www.slocounty.ca.gov/PW/Design_Division/Projects_Out_To_Bid.htm.

Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda faxed or emailed to all parties recorded by Owner as having received the Bidding Documents and made available on the following website:

http://www.slocounty.ca.gov/PW/Design_Division/Projects_Out_To_Bid.htm.

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

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

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 10 percent of Bidder's maximum Bid price and in the form of a certified check or bank money order or a Bid bond (Section 00430) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required Contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required Contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders will be retained by Owner until the award of the Contract to the Successful Bidder.

ARTICLE 9 - CONTRACT TIMES

9.01 The dates by which the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as described in Paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by Owner and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or "or-equal" item. Request for clarification of materials and equipment considered "or-equal" prior to the Effective Date of Agreement must be received by the Owner at the office of the County Clerk, 1055 Monterey Street, D-120, San Luis Obispo, CA 93408, no later than 4:00 p.m. on Monday, April 30, 2012. No item of material or equipment will be considered by Owner as a substitute unless written

request for approval has been submitted by Bidder and has been received by Owner at the office of the County Clerk, 1055 Monterey Street, D-120, San Luis Obispo, CA 93408, no later than 4:00 p.m. on Wednesday, April 25 , 2012. Each such request shall conform to the requirements of Paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Owner's decision of approval or disapproval of a proposed item will be final. If Owner approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

ARTICLE 12 - BLANK

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Owner.

13.02 All blanks on the Bid Form shall be completed in ink and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid Item listed therein.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be provided on the Bid Form.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be provided on the Bid Form.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

13.06 A Bid by an individual shall show the Bidder's name and business address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture must be provided on the Bid Form.

13.08 All names shall be printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers and dates of which shall be filled in on the Bid Form.

13.10 The postal and email addresses and telephone number for communications regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state or locality where the Project is located or Bidder shall covenant in writing to obtain such qualification prior to award of the Contract and attach such covenant to the Bid Form. Bidder's state contractor license number shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 *Unit Price*

A. Bidders shall submit a Bid for each unit basis item of work a unit price and a total for the item, or for each lump sum item a total for the item for each item of Work listed in the Bid schedule.

B. The total of all bid prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

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

ARTICLE 15 - SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and the Bid bond form. The unbound copy of the Bid Form is to be completed and submitted with all of the attachments outlined in Article 7 of the Bid Form.

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope plainly marked with the Project title, the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid. A mailed Bid shall be addressed to Owner at the address in Article 1.01 of the Bid Form.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn prior to the date and time for opening of bids by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If within 5 days after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid or negotiated, that Bidder will be disqualified from further bidding on the Work. This provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder's errors in judgment in preparing the Bid, or to carelessness in inspecting the site of Work or in reading the Drawings and Specifications.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Bids and alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. Owner also reserves the right to reject any or all bids, and to waive discrepancies, irregularities, informalities, or any other error in the bids or bidding, if to do so seems to best serve the public interest.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.04 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is the lowest price.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by properly executed bonds pursuant to the forms set forth in Section 00610 and 00615. Said bond forms are not Contract Documents, and are attached for reference purposes only.

When the Successful Bidder delivers the executed Agreement to Owner, it shall also be accompanied by certificates of insurance for all of the insurance which Contractor is required to purchase and maintain in accordance with Article 5 of the General Conditions.

ARTICLE 21 - SIGNING OF AGREEMENT

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

21.02 This Contract is expected to be funded in part with funds provided by the United States Department of Agriculture, Rural Utilities Service (RUS) and the State Water Resources Control Board. Refer to the General Conditions for Federal Requirements.

21.03 Concurrence by RUS in the Contract is required before the Contract is effective.

ARTICLE 22 - SALES AND USE TAXES

22.01 Contractor shall pay all California sales, use and other taxes as specified in Paragraph 6.10 of the General Conditions.

ARTICLE 23- WORKERS' COMPENSATION REQUIREMENTS

23.01 As required by Section 1860 of the California Labor Code and in accordance with the provisions of Section 3700 of the Labor Code, every Contractor will be required to secure the payment of workers' compensation to its employees.

23.02 In accordance with Section 1861 of the California Labor Code, the Contractor shall furnish the Owner with a statement as follows: "I am aware of the provisions of 3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."

ARTICLE 24 – SUBCONTRACTOR LISTING LAW

24.01 In accordance with Section 4104 of the California Public Contract Code, each Bidder, in his or her Bid, shall set forth the name and the location of the place of business of each Subcontractor who will perform Work or labor or render service to the prime Contractor in or about the construction of the Work or improvement, or a Subcontractor licensed by the State of California who, under subcontract to the prime Contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the Drawings and Specifications, in an amount in excess of one-half of one percent of the prime Contractor's total Bid.

24.02 In accordance with Section 4107 of the California Public Contract Code, no Contractor whose Bid is accepted shall without consent of the Owner either: (a) substitute a person as a Subcontractor in place of the Subcontractor listed in the original Bid; or (b) permit a subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original Subcontractor listed in the original Bid; or (c) sublet or

subcontract any portion of the Work in excess of one-half of one percent of the prime Contractor's total Bid as to which his or her original Bid did not designate a Subcontractor.

24.03 Penalties for failure to comply with the foregoing sections of the California Public Contract Code are set forth in Sections 4106, 4110, and 4111 of the Public Contract Code. A prime Contractor violating this law violates his or her Contract and the awarding authority may exercise the option, in its own discretion, of (1) canceling his or her contract or (2) assessing the prime Contractor a penalty in an amount of not more than 10 percent of the amount of the subcontract involved, and this penalty shall be deposited in the fund out of which the prime Contract is awarded. In any proceedings under this section the prime Contractor shall be entitled to a public hearing and to 5 day's notice of the time and place thereof.

ARTICLE 25 – RURAL UTILITIES SERVICE REQUIREMENTS

25.01 Bidders are advised that funding for this Project is being provided in whole or in part by the United States Department of Agriculture, Rural Utilities Service which will review and approve the Contract award, Contract Agreement, partial and final payments, and Contract Change Orders.

25.02 Payment and retainage will comply with the Contract Agreement Paragraph 6.02 "Progress Payments; Retainage." Bidders are notified that this Contract does not permit retainage to be placed in escrow nor to be invested for the benefit of the Contractor.

25.03 Bidders are notified that financing for this Project is provided pursuant to the Consolidated Farm and Rural Development Act (7 U.S.C. Section 1921 et seq.), and that as allowed in Public Contract Code Section 22300, this Contract does not provide for substitution of securities for any monies withheld by the Owner to ensure performance under the Contract.

25.04 Bidders are notified of the requirement for affirmative action to ensure equal employment opportunity (Executive Order No. 11246) as set forth in the Equal Opportunity Requirements found in paragraph 18.10 of the General Conditions.

ARTICLE 26 – AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

26.01 This Contract is funded in whole or in part using funds from the American Recovery and Reinvestment Act (ARRA). Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed at 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for this Project may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this Project.

26.02 Section 1606 of the ARRA requires compliance with the Davis-Bacon and Related Acts and adherence to the current U.S. Department of Labor Wage Decision. The Contractor must comply with the minimum rates for wages for laborers and mechanics as

determined by the Secretary of Labor in accordance with the provisions of the Davis-Bacon and Related Acts. The Contract provisions and related matters set forth in 29 CFR Part 5- Section 5.5 are hereby made a part of this Contract. Attention is called to the fact that not less than the minimum salaries and wages set forth in the Contract Documents must be paid on this Project. The Wage Decision, including modification, must be posted by the Contractor at the Site.

26.03 This is a Public Works Project subject to the rate of prevailing wages as established by the California Department of Industrial Relations, Bidders are notified that the higher of either the Davis-Bacon or the State prevailing wage rate shall apply.

ARTICLE 27 – STATE WATER RESOURCES CONTROL BOARD REQUIREMENTS

27.01 This Contract is funded in part by the Clean Water State Revolving Fund through an agreement with the State Water Resources Control Board, The contents of the Contract Documents do not necessarily reflect the views and policies of the State Water Resources Control Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use, (Gov. Code § 7550, 40 CFR § 31 .20.)

27.02 Bidders are hereby notified of the requirement for good faith efforts to ensure Disadvantaged Business Enterprises have the opportunity to participate on this Contract (40 CFR part 33) as set forth in the Disadvantaged Business Enterprises Program Requirements found in Paragraph 18.06 of the General Conditions.

27.03 Bidders are hereby notified of the requirement to comply with the provisions of the Fair Employment and Housing Act (Gov. Code §12990 (a-I) et seq.) as set forth in Paragraph 18.15 of the General Conditions.

27.04 Bidders are hereby notified of the prohibition of subcontracting with debarred entities set forth in Paragraph 18.16 of the General Conditions.

ARTICLE 28 – ESCROW BID DOCUMENTS

Bidders are hereby notified of the requirements to submit Escrow Bid Documents as set forth in the General Requirements

ARTICLE 29 – BID PROTESTS

Any Bid protest must be submitted in writing to the Department of Public Works, Room 207,County Government Center, 976 Osos Street, San Luis Obispo, CA 93408; Attention: Design Engineer before 5 p.m. of the 7th business day following Bid opening.

The initial protest document shall contain a complete statement of the basis for the protest and all evidence and documents supporting the protest available to the protesting party. The protest shall refer to the specific portion of the document which forms the basis for the protest. The protest shall include the name, address and telephone number of the person representing the protesting party. The party filing the protest shall concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the outcome of the protest. Such parties shall include all

other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest. The County Board of Supervisors will issue a decision on the protest.

The procedure and time limits set forth in this paragraph are mandatory and are the Bidder's sole and exclusive remedy in the event of Bid protest and failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings.

END OF SECTION

SECTION 00300

WAGE REQUIREMENTS

Notice is hereby given that, pursuant to 1773 of the Labor Code of the State of California, the Owner has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holidays and overtime work for each craft, classification, or type of worker required to execute the Contract. A copy of said prevailing rate of per diem wages is on file in the principal office of the Owner, to which reference is hereby made for further particulars. Said prevailing rate of per diem wages will be made available to any interested party upon request, and a copy thereof shall be posted at each Project Site by the Contractor.

Statutory Penalty for Failure to Pay Minimum Wages: In accordance with 1775 of the California Labor Code, the Contractor shall as a penalty to the State of political subdivision on whose behalf a Contract is made or awarded, forfeit fifty dollars ($50.00) for each calendar day or portion thereof, for each worker paid less than the stipulated prevailing rate for any public work done under the Contract by the Contractor or by any Subcontractor under the Contractor.

Statutory Penalty for Unauthorized Overtime Work: In accordance with 1813 of the California Labor Code, the Contractor shall as a penalty to the State or political subdivision on whose behalf the Contract is made or awarded, forfeit twenty-five dollars ($25.00) for each worker employed in the execution of the Contract by the Contractor or by any Subcontractor for each calendar day during which said worker is required or permitted to work more than eight hours in any one calendar day and forty hours in any one calendar week in violation of 1810-1815 of the California Labor Code.

Apprenticeship Requirements: Contractor agrees to comply with 1777.5, 1777.6 and 1777.7 of the California Labor Code relating to the employment of apprentices. The responsibility for compliance with these provisions is fixed with the prime contractor for all apprenticeship occupations. Under these sections of the law, Contractors and Subcontractors must employ apprentices in apprenticeship occupations, where journeymen in the craft are employed on the public work, in a ratio of not less than one apprentice hour for each five journeymen hours (unless an exemption is granted in accordance with 1777.5) and Contractors and Subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public work solely on the ground of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in 3077 of the Labor Code. Only apprentices, as defined in 3077, which provides that an apprentice must be at least 16 years of age, who are in training under apprenticeship standards and who have signed written apprentice agreements will be employed on public works in apprenticeship occupations.

Payroll Records: Contractor shall keep accurate payroll records on forms provided by the Division of Labor Standards Enforcement, or alternatively, the Contractor shall keep accurate payroll records containing the same information. Said information shall include, but not be limited to, a record of the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and actual per diem wages paid to each journeyman, apprentice, or worker employed by the Contractor. Such record shall be made available for inspection at all reasonable hours, and a copy shall be made available to employee or his authorized representative, the Division of Labor Standards Enforcement, and the Division

of Apprenticeship Standards in compliance with California Labor Code, Section 1776. Upon written notice from the Owner or the Division of Labor Standards Enforcement, the Contractor shall, within ten (10) days, file with the Owner a certified copy of the payroll records. The Contractor shall cause an identical clause to be included in every subcontract for the Work.

END OF SECTION

SECTION 00410

BID FORM

LOS OSOS WASTEWATER PROJECT
COLLECTION SYSTEM AREAS A & D
LOS OSOS, CA
CONTRACT NO. 300448.08.01.AD

ARTICLE 1- BID RECIPIENT

1.01 This Bid is submitted to: Office of the County Clerk
1055 Monterey Street, Room D-120
San Luis Obispo, CA 93408

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

ARTICLE 2- BIDDERS ACKNOWLEDGEMENTS

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

ARTICLE 3- BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Federal, State and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site, if any, and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities), if any, which have been identified in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 4.06 of the General Conditions as containing reliable "technical data."

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, if any, when applicable; and (3) Bidder's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that any further examinations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site, if any, that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Owner is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

J. Bidder will submit written evidence of its authority to do business in the State or other jurisdiction where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4- BIDDER'S CERTIFICATION

4.01 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process.

2. "fraudulent practice" means an intentional misrepresentation of facts made to (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5- BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the prices indicated in the Bid Schedule:

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	BID UNIT PRICE	BID PRICE
1	MOBILIZATION	1	LUMP SUM	LUMP SUM	
2	SHEETING, SHORING, AND BRACING	1	LUMP SUM	LUMP SUM	
3	DEWATERING	1	LUMP SUM	LUMP SUM	
4	SITE PREPARATION	1	LUMP SUM	LUMP SUM	
5	HOT MIX ASPHALT PAVEMENT	13690	TON		
6	AGGREGATE BASE	12613	CUBIC YARD		
7	PCSG/PTSG	9240	SQUARE YARD		
8	TRAFFIC CONTROL	1	LUMP SUM	LUMP SUM	
9	GRAVITY SEWER 0 – 8 FEET DEEP	44032	LINEAR FEET		
10	GRAVITY SEWER 8 – 15 FEET DEEP	62993	LINEAR FEET		
11	GRAVITY SEWER OVER 15 FEET DEEP	3995	LINEAR FEET		
12	GRAVITY SEWER MANHOLES UP TO 8 FEET DEEP	305	EACH		
13	GRAVITY SEWER MANHOLES OVER 8 FEET DEEP	513	FEET OF DEPTH		
14	SEWER LATERALS	3038	EACH		
15	SEWER FORCE MAIN OVER 4” DIAMETER	10183	LINEAR FEET		
16	RECYCLED FORCE MAIN OVER 4” DIAMETER	8088	LINEAR FEET		
17	SEWER OR RECYCLED FORCE MAIN 4” DIAMETER AND LESS	6364	LINEAR FEET		
18	POCKET PUMP STATION SITEWORK AND WETWELLS UP TO 12 FEET DEEP	11	EACH		
19	POCKET PUMP STATION WETWELLS OVER 12 FEET DEEP	17	FEET OF DEPTH		
20	DUPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELLS UP TO 14 FEET DEEP	4	EACH		
21	DUPLEX SUBMERSIBLE LIFT STATION WETWELLS OVER 14 FEET DEEP	6	FEET OF DEPTH		
22	TRIPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELL	1	EACH		

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	BID UNIT PRICE	BID PRICE
23	FIBEROPTIC AND ELECTRIC CONDUITS/DUCTS	35424	LINEAR FEET		
24	MISCELLANEOUS CONCRETE	500	CUBIC YARD		
25	ALLOWANCE: HMA PRICE INDEX FLUCTUATION ADJUSTMENT	1	ALLOWANCE	ALLOWANCE	$100,000.00
CONTINGENCY ALLOWANCES					
26	ALLOWANCE: UNFORESEEN UNDERGROUND FACILITIES	1	ALLOWANCE	ALLOWANCE	$575,000.00
27	ALLOWANCE: REMEDIAL WORK ON EXISTING SEWER PIPE NOT REQUIRED IN CONTRACT DOCUMENTS	1	ALLOWANCE	ALLOWANCE	$30,000.00
28	ALLOWANCE: SUPPORT SERVICES FOR RIGHT OF WAY ENCROACHMENTS NOT REQUIRED IN CONTRACT DOCUMENTS	1	ALLOWANCE	ALLOWANCE	$35,000.00
29	ALLOWANCE: HMA PRICE INDEX FLUCTUATION ADJUSTMENT	1	ALLOWANCE	ALLOWANCE	$100,000.00
				TOTAL BID	

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

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

ARTICLE 6- TIME OF COMPLETION

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

6.02 Bidder accepts the provisions of the Agreement as to liquidated damage.

ARTICLE 7- ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid and must be signed and submitted with the Bid:

A. Section 00420 – Non-Collusion Affidavit

B. Required Bid security in the form of a Bid Bond (Section 00430) or Certified Check (circle type of security provided)

C. Section 00440 – If Bid amount exceeds $10,000, signed Compliance Statement/Certifications of Nonsegregated Facilities RD 400-6). Refer to specific equal opportunity requirements set forth in the General Conditions.

D. Section 00450 – If Bid amount exceeds $25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion- Lower Tiered Covered Transactions (AD-1048)

E. Section 00460 – If Bid amount exceeds $100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grant, and Loans. Refer to paragraph 18.11 of the General Conditions;

F. Section 00470 – Workers Compensation Certification

G. Section 00480 – List of Subcontractors

H. Section 00485 – Bidders List

I. Section 00490 – Good Faith Effort Documentation Summary Form

J. Section 00495 – Disadvantaged Business Enterprise Contactor - Subcontractor Certification

ARTICLE 8- DEFINED TERMS

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

ARTICLE 9 – CALIFORNIA CONTRACTOR'S LICENSE INFORMATION

9.01 The undersigned Bidder is licensed in accordance with Chapter 9, Division 3 of the California Business and Professions Code and section 3300 of the California Public Contract Code, and the laws of California.

Bidders Valid California Contractor's License No. _____ Class _____

Expiration Date: _____

Bidder has contracted under this license number for _____ years.

ARTICLE 10- BID SUBMITTAL

10.01 This Bid is submitted by: _____

The undersigned hereby states that all representation made herein are made under the penalty of perjury.

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Attest: _____
(Signature of Corporate Secretary)

Date of Qualification to do business in California is ____________.

A Joint Venture

Name of Joint Venturer: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of second joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business address: _____

_____

Business Phone No. (_____)_____

Business FAX No. (_____)_____

Business E-Mail Address

_____

Employer's Tax ID No. _____

DUNS No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

_____

_____

9.02 Bid submitted on _____, 20___.

END OF SECTION

SECTION 00420

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

(Public Contract Code Section 7106)

State of California
County of County of San Luis Obispo

_____, 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 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.

By _____

Subscribed and sworn to before me on _____
(date)

_____
(Notary Public)

(SEAL)

END OF SECTION

BID BOND

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

BIDDER *(Name and Address)*:

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

OWNER *(Name and Address)*:

BID
Bid Due Date:
Description *(Project Name and Include Location)*:

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

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

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

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

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

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

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

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

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

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

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

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

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

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

END OF SECTION

SECTION 00440

COMPLIANCE STATEMENT

This statement relates to a proposed contract
with _____

_____
(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor. I represent that:

1. I **[ ]** have, **[ ]** have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, I **[ ]** have, **[ ]** have not, filed all compliance reports that I have been required to file in connection with the contract or subcontract.

If the proposed contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. I **[ ]** have, **[ ]** have not, previously had contracts subject to the written affirmative action program requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, I **[ ]** have, **[ ]** have not, developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS, or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas,

parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

RD 400-6 (Rev. 2-98)

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS
FOR
CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually)

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date**:**_____ _____

Signature of Bidder or Prospective Contractor

_____

Address (including Zip Code)

END OF SECTION

SECTION 00450

CERTIFICATION REGARDING DEBARMENT

U.S. DEPARTMENT OF AGRICULTURE

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions.

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON NEXT PAGE)

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

_____

Organization Name PR/Award Number or Project Name

_____

Name(s) and Title(s) of Authorized Representative(s)

_____

Signature(s) Date

Form AD-1048 (1/92)

Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principles. Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly entered into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Form AD-1048 (1/92)

END OF SECTION

SECTION 00460

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

RD Instruction 1940-Q
Exhibit A-1

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard From – LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____ _____
(Signature) (Date)

_____
(Name)

_____
(Title)

(08-21-91) PN 171

END OF SECTION

SECTION 00470

CONTRACTOR'S CERTIFICATION REGARDING WORKERS' COMPENSATION INSURANCE

State of California

County of San Luis Obispo

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

_____
(Name of Bidder)

_____
(Signature)

_____
(Name)

_____
(Title)

_____
(Date)

END OF SECTION

SECTION 00480

LIST OF SUBCONTRACTORS

In compliance with the provisions of Sections 4100-4113 of the Public Contract Code of the State of California, and any amendments thereto, the undersigned bidder sets forth the following:

a. The name and location of the place of business of each subcontractor who will perform work or labor, or render service to the undersigned Prime Contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the Prime Contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the undersigned Prime Contractor's total bid or in the case of bids for the construction of streets and highways, including bridges, in excess of one-half of one percent or ten thousand dollars ($10,000), whichever is greater.*
b. The portion of the work which will be done by each such subcontractor. Only one subcontractor shall be listed for each such portion.

*When there is a failure to list a subcontractor, as required, the law provides that the Contractor agrees to do the work with his or her own forces. In such case, bidder must be authorized to perform said work. Any bid not complying with the provisions hereof may be rejected.

Work to be Performed	License Number	Percent of Total Contract	Subcontractor's Name and Address
1.			
2.			
3.			
4.			
5.			
6.			
7.			

Work to be Performed	License Number	Percent of Total Contract	Subcontractor's Name and Address
8.			
9.			
10.			
11.			
12.			

(ATTACH ADDITIONAL NUMBERED PAGES IF NEEDED)

_____
(Name of Bidder)

_____
(Signature)

_____
(Date)

END OF SECTION

SECTION 00485

BIIDDERS LIST

In compliance with the provisions of 40 CFR 33, the undersigned bidder sets forth that the following lists all subcontractors, subconsultants, and suppliers who supplied bids or quoted on the Project.

Name, Address, Contact Name & Phone Number of Firm	Description of Work Items	Approximate $ amount	DBE	MBE	WBE
1.			☐	☐	☐
2.			☐	☐	☐
3.			☐	☐	☐
4.			☐	☐	☐
5.			☐	☐	☐
6.			☐	☐	☐
7.			☐	☐	☐
8.			☐	☐	☐
9.			☐	☐	☐

Name, Address, & Phone Number of Firm	Description of Work Items	Approximate $ amount	DBE	MBE	WBE
10.			☐	☐	☐
11.			☐	☐	☐
12.			☐	☐	☐
13.			☐	☐	☐
14.			☐	☐	☐
15.			☐	☐	☐
16.			☐	☐	☐
17.			☐	☐	☐
18.			☐	☐	☐
19.			☐	☐	☐
20.			☐	☐	☐

Name, Address, & Phone Number of Firm	Description of Work Items	Approximate $ amount	DBE	MBE	WBE
21.			☐	☐	☐
22.			☐	☐	☐
23.			☐	☐	☐
24.			☐	☐	☐
25.			☐	☐	☐
26.			☐	☐	☐
27.			☐	☐	☐

(ATTACH ADDITIONAL NUMBERED PAGES IF NEEDED)

_____
(Name of Bidder)

_____
(Signature)

_____
(Date)

END OF SECTION

SECTION 00490

GOOD FAITH EFFORT DOCUMENTATION SUMMARY FORM

In compliance with the provisions of 40 CFR 33, the undersigned Bidder sets forth the following as documentation that a Good Faith Effort was made to assure that Disadvantaged Business Enterprise businesses were used when possible as sources of supplies, equipment, construction, and services (refer to Paragraph 18.06 of the General Conditions):

1. List the names of each publication in which a request for DBE participation for this Project was placed (attach copies of advertisements or proofs of publication):

   _____

   _____

   _____

   _____

   _____

2. List the names of DBEs that Contractor sent written notices soliciting bids for this Project (attach copies of solicitations, telephone records, fax confirmations, etc.):

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

   _____

3. Did Bidder establish delivery schedules, when economically feasible, in a way that encourages and facilitates participation by DBEs in the competitive process?

☐ Yes ☐ No

Provide explanation below:

_____

_____

_____

_____

_____

4. Did Bidder divide the Work, when economically feasible, into small tasks or quantities to permit maximum participation of DBEs?

☐ Yes ☐ No

List of the items of Work made available to DBE firms, including any breaking down of the Bid items into economically feasible units to facilitate DBE participation.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

6. Brief description of services or assistance utilized by Contractor from the Small Business Administration and the Minority Business Development Agency?

_____

_____

_____

_____

_____

7. Did Bidder include provisions in advertisements and solicitations requiring each Subcontractor to employ the good faith efforts described in 40 CFR 33.301?

☐ Yes ☐ No

If no, provide explanation below:

_____

_____

_____

_____

_____

All information supporting the Good Faith Effort must be submitted with the Bid.

_____
(Name of Bidder)

_____
(Signature)

_____
(Date)

END OF SECTION

SECTION 00495

DISADVANTAGED BUSINESS ENTERPRISE
CONTRACTOR SUBCONTRACTOR CERTIFICATION

Firm Name:	Phone:
Address:	
Principal Service or Product:	Bid Amount $

PLEASE INDICATE PERCENTAGE OF OWNERSHIP BELOW

☐ DBE _____% Ownership	
☐ Prime Contractor	☐ Supplier of Material/Service
☐ Subcontractor	
☐ Sole Ownership	☐ Corporation
☐ Partnership	☐ Joint Venture
Certified by:	Title:

(Original signature and date required)

Name:	Date:

NOTE: Contractors can no longer self-certify. They must be certified by EPA, Small Business Administration (SBA), Department of Transportation (DOT) or by State, Local, Tribal or private entities whose certification criteria match EPA's.

Proof of Certification must be provided. A copy of the contractor certification must be submitted with the Bid.

END OF SECTION

SECTION 00500

AGREEMENT

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

THIS AGREEMENT is by and between the County of San Luis Obispo ("Owner") and

_____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

The Los Osos Wastewater Project, Collection System Areas A and D includes, but is not limited to, the following:

1. Wastewater collection system consisting of approximately 111,020 linear feet of gravity mains ranging in size from 8-inch to 18-inch diameter, 10,183 linear feet of sewer force mains ranging in size from 2-inch to 14-inch diameter, 305 manholes, 3,038 service laterals and 35,424 linear foot of fiber optic conduit.
2. Recycled water system consisting of 8,088 linear feet of 6- and 4-inch diameter recycled effluent water force mains.
3. Wetwells and ancillary items, relating to 11 Pocket Pump Stations, 4 Duplex Submersible Lift Stations, and 1 Triplex Submersible Lift Station.

ARTICLE 2 – THE PROJECT

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

LOS OSOS WASTEWATER PROJECT
COLLECTION SYSTEM AREAS A & D
LOS OSOS, CA
CONTRACT NO. 300448.08.01.AD

ARTICLE 3 – DESIGNER AND ENGINEER

3.01 The Project has been designed by CDM Smith (Designer).

3.02 The Owner has entered into a separate agreement for construction management services with HDR Engineering, Inc. (Engineer), which is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

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

4.02 *Deadlines for Substantial Completion, Final Completion, and Intermediate Milestones*

A. The Work will be substantially completed within 694 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 754 days after the date when the Contract Times commence to run.

B. Contractor acknowledges that it must coordinate its Work with other work at the Site. Contractor shall be responsible for coordinating the performance of its Work with the performance of other work at the Site. To facilitate work under a separate contract for the Area Pump Stations, the following intermediate milestones shall be completed by the Contractor:

1. Contractor shall complete all of its Work relating to all of the pocket pump station, duplex submersible lift station, and triplex submersible lift station Sites no later than August 31, 2013 for each and every such Site shown in the Drawings.

2. Contractor may coordinate with the Area Pump Station contractor to continue to use completed pump or lift station wetwells and piping until April 30, 2014 for the purpose of facilitating the conveyance of water from Contractor's trenches to any permissible disposal locations chosen by Contractor.. Any such use of such wetwells and/or piping shall constitute a means and method voluntarily chosen by the Contractor, and not a requirement of the Contract Documents; provided, however, that any such use of the wetwells and/or piping by Contractor shall be limited to the purpose set forth above, shall be in a manner consistent with the Contract Documents, and shall be in coordination with the Area Pump Station contractor. Contractor shall terminate and complete all such usage of all pocket pump station, duplex submersible lift station, and triplex submersible lift station Sites, including but not limited to the cleaning, and testing of all wetwells and piping, no later than April 30, 2014, and shall completely vacate such Sites, including all demobilization, no later than April 30, 2014.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02.A above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated

damages for delay (but not as a penalty), Contractor shall pay Owner $3500.00 for each day that expires after the time specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $2000.00 for each day that expires after the time specified in Paragraph 4.02.A above for completion and readiness for final payment until the Work is completed and ready for final payment.

B. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the intermediate milestone for the Work specified in Paragraph 4.02.B.1 is not completed within the time required in Paragraph 4.02.B.1. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if such Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $2000.00 for each day that expires after the times specified in Paragraph 4.02.B.1 above until such Work is completed.

C. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the intermediate milestone specified in Paragraph 4.02.B.2 is not completed within the time required in Paragraph 4.02.B.2. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if those conditions are not satisfied on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) in satisfying the conditions specified in Paragraph 4.02.B.2, Contractor shall pay Owner $2000.00 for each day that expires after the time specified in Paragraph 4.02.B.2 above until all the conditions described in Paragraph 4.02.B.2 are completely satisfied.

D. Nothing in this Paragraph 4.03 diminishes or affects Contractor's liability to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's failure to satisfy any of the time deadlines set forth above.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

A. For all Work, at the prices stated in Contractor's Bid, as set forth below:

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	BID UNIT PRICE	BID PRICE
1	MOBILIZATION	1	LUMP SUM	LUMP SUM	
2	SHEETING, SHORING, AND BRACING	1	LUMP SUM	LUMP SUM	
3	DEWATERING	1	LUMP SUM	LUMP SUM	
4	SITE PREPARATION	1	LUMP SUM	LUMP SUM	
5	HOT MIX ASPHALT PAVEMENT	13690	TON		
6	AGGREGATE BASE	12613	CUBIC YARD		
7	PCSG/PTSG	9240	SQUARE YARD		
8	TRAFFIC CONTROL	1	LUMP SUM	LUMP SUM	
9	GRAVITY SEWER 0 – 8 FEET DEEP	44032	LINEAR FEET		
10	GRAVITY SEWER 8 – 15 FEET DEEP	62993	LINEAR FEET		
11	GRAVITY SEWER OVER 15 FEET DEEP	3995	LINEAR FEET		
12	GRAVITY SEWER MANHOLES UP TO 8 FEET DEEP	305	EACH		
13	GRAVITY SEWER MANHOLES OVER 8 FEET DEEP	513	FEET OF DEPTH		
14	SEWER LATERALS	3038	EACH		
15	SEWER FORCE MAIN OVER 4" DIAMETER	10183	LINEAR FEET		
16	RECYCLED FORCE MAIN OVER 4" DIAMETER	8088	LINEAR FEET		
17	SEWER OR RECYCLED FORCE MAIN 4" DIAMETER AND LESS	6364	LINEAR FEET		
18	POCKET PUMP STATION SITEWORK AND WETWELLS UP TO 12 FEET DEEP	11	EACH		
19	POCKET PUMP STATION WETWELLS OVER 12 FEET DEEP	17	FEET OF DEPTH		
20	DUPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELLS UP TO 14 FEET DEEP	4	EACH		
21	DUPLEX SUBMERSIBLE LIFT STATION WETWELLS OVER 14 FEET DEEP	6	FEET OF DEPTH		
22	TRIPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELL	1	EACH		
23	FIBEROPTIC AND ELECTRIC CONDUITS/DUCTS	35424	LINEAR FEET		
24	MISCELLANEOUS CONCRETE	500	CUBIC YARD		
25	ALLOWANCE: HMA PRICE INDEX FLUCTUATION ADJUSTMENT	1	ALLOWANCE	ALLOWANCE	$100,000.00
CONTIGENCY ALLOWANCES					
26	ALLOWANCE: UNFORESEEN UNDERGROUND FACILITIES	1	ALLOWANCE	ALLOWANCE	$575,000.00
27	ALLOWANCE: REMEDIAL WORK ON EXISTING SEWER PIPE NOT REQUIRED IN CONTRACT DOCUMENTS	1	ALLOWANCE	ALLOWANCE	$30,000.00
28	ALLOWANCE: SUPPORT SERVICES FOR RIGHT OF WAY ENCROACHMENTS NOT REQUIRED IN CONTRACT DOCUMENTS	1	ALLOWANCE	ALLOWANCE	$35,000.00
29	ALLOWANCE: HMA PRICE INDEX FLUCTUATION ADJUSTMENT	1	ALLOWANCE	ALLOWANCE	$100,000.00
				TOTAL CONTRACT PRICE	

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

All other Work required by the Contract Documents shall be considered incidental to the Work and considered as included in the Contract Price.

ARTICLE 5 – PAYMENT PROCEDURES

5.01 *Submittal and Processing of Payments*

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

5.02 *Progress Payments; Retainage*

A. Within thirty (30) days of Engineer's receipt of a proper Application for Payment under Article 14 of the General Conditions, Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.

a. 95 percent of Work completed (with the balance being retainage); and

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Within 60 days of Substantial Completion of all Work under the Contract Documents, Owner shall pay to Contractor an amount sufficient to reduce the retainage withheld on Work properly completed to zero percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 150 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion. In the event of any disputes between the Owner and Contractor, the Owner may also withhold an additional amount not to exceed 150 percent of the disputed amount. Nothing in this paragraph shall require the Owner to pay any amounts which the Owner refuses to pay pursuant to Paragraph 14.02.D. of the General Conditions (or any other provision in the Contract Documents authorizing the withholding or reduction of any payment to the Contractor).

5.03 *Final Payment*

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

ARTICLE 6 – INTEREST

6.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest, if applicable, as provided in the Contract Documents.

ARTICLE 7 – CONTRACTOR'S REPRESENTATIONS

7.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site, if any, and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph 4.02 of the General Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 4.06 of the General Conditions as containing reliable "technical data."

E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, if any, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Owner is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 8 – CONTRACT DOCUMENTS

8.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement.

2. General Conditions.

3. Specifications as listed in the table of contents of the Project Manual.

4. Drawings as listed in the table of contents of the Project Manual

5. Addenda (numbers _____ to _____, inclusive).

6. Exhibits to this Agreement (enumerated as follows):

a. List of Subcontractors;

b. Compliance Statement;

c. Certification Regarding Debarment;

d. Contractor's Certification Regarding Worker's Compensation Insurance;

e. Certification for Contracts, Grants, and Loans;

f. *Good Faith Effort Documentation Summary Form;*

g. Disadvantaged Business Enterprise Contactor - Subcontractor Certification

7. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

a. Notice to Proceed (pages _____ to _____, inclusive).

b. Work Change Directives.

c. Change Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

E. Contractor agrees that the Payment Bond and Performance Bond attached to this Agreement are for reference purposes only, and shall not be considered a part of this Agreement or any other Contract Document. Contractor further agrees that said bonds are separate obligations of the Contractor and its surety, and that any attorney's fee provision contained in any payment bond or performance bond shall not apply to any legal action between Contractor and Owner to enforce any provision of the Contract Documents.

ARTICLE 9 – MISCELLANEOUS

9.01 *Terms*

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

9.02 *Assignment of Contract*

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

9.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

9.06 *Attorneys Fees*

A. No provisions of the Contract Documents provide either the Contractor or the Owner the right to be awarded any attorney's fees and/or costs under Civil Code section 1717 in any legal action brought by either party to enforce any provision of the Contract Documents against the other party. The parties agree that any references to attorney's fees in language describing indemnification obligations do not constitute a contractual provision that would provide either the Contractor or the Owner the right to be awarded any attorney's fees and/or costs under Civil Code section 1717 in any legal action brought by either party to enforce any provision of the Contract Documents against the other party. Any other language in the Contract Documents providing for a recovery of attorney's fees shall be strictly construed as not including the recovery of any attorney's fees incurred by either Contractor or Owner in any legal action brought by either party to enforce any provision of the Contract Documents against the other party.

B. The parties agree that the Contract Documents contain no provisions that would allow either the Contractor or the Owner to be awarded attorney's fees and/or costs under Civil Code section 1717. Nothing in this Paragraph 10.06. affects any right by Contractor or Owner to recover attorney's fees or costs by operation of any law other than Civil Code section 1717.

C. In the event of any conflict between language in this Paragraph 10.06 and any other language in the Contract Documents, the language in Paragraph 10.06 shall prevail.

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

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:

County of San Luis Obispo

By: _____

Title: Chairperson of the Board of Supervisors

Attest: _____

Title: Clerk of the Board of Supervisors

Address for giving notices:

_____

_____

_____

APPROVAL RECOMMENDED

PAAVO OGREN

By: Paavo Ogren

Director of Public Works

Date: 3/22/2012

APPROVED AS TO FORM AND LEGAL EFFECT:

WARREN R. JENSEN

County Counsel

By: Patricia L. Traxler

Date: 3/22/12

CONTRACTOR

_____

By: _____

Title: _____

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____

Title: _____

Address for giving notices:

_____

_____

_____

License No.: _____
(Where applicable)

NOTE TO USER: Use in those states or other jurisdictions where applicable or required.

Agent for service of process:

_____

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

This attachment is to the Agreement made and entered into on _____, by and between the County of San Luis Obispo hereinafter "Owner", and _____ hereinafter called "Contractor." This Contract is for that Work described in the Contract Documents entitled:

LOS OSOS WASTEWATER PROJECT
COLLECTION SYSTEM AREAS A & D
LOS OSOS, CA
CONTRACT NO. 300448.08.01.AD

This Contract shall not be effective unless and until approved by a delegated representative of USDA Rural Development.

CONSTRUCTION LENDER

USDA Rural Development
430 G Street, Agency 4169
Davis, CA 95616-4169

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

U.S. Department of Agriculture
RURAL DEVELOPMENT:

BY:_____

TITLE:_____

DATE:_____

END OF SECTION

SECTION 00510

NOTICE OF AWARD

Date: _____

Project: Los Osos Wastewater Project	
Owner: County of San Luis Obispo	Contract No.: 300448.08.01.AD
Contract: Collection System Areas A & D	
Bidder:	
Bidder's Address: *[send Notice of Award Certified Mail, Return Receipt Requested]*	

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____.

The Contract Price of your Contract is _____ Dollars ($_____).

6 copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

___ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award:

1. Deliver to the Owner 6 fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] and certificates of insurance as specified in the Instructions to Bidders (Article 20), and General Conditions (Paragraph 5.01).
3. Other conditions precedent:
   _____

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

County of San Luis Obispo
Owner

By: _____
Authorized Signature

_____
Title

Copy: File & Engineer

END OF SECTION

SECTION 00550

NOTICE TO PROCEED

Date: _____

Project: Los Osos Wastewater Project	
Owner: County of San Luis Obispo	Owner's Contract No.: 300448.08.01.AD
Contract: Collection System Areas A & D	
Contractor:	
Contractor's Address: *[send Certified Mail, Return Receipt Requested]*	

You are notified that the Contract Times under the above Contract will commence to run on_____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____.

Also, before you may start any Work at the Site, you must:

_____ *[add other requirements]*.

_____	County of San Luis Obispo Owner
_____	Given by: Authorized Signature
_____	_____ Title
_____	_____ Date

Copy to Engineer & File

END OF SECTION

SECTION 00600

ADDITIONAL INSURED ENDORSEMENT

POLICY NUMBER(S): _____

NAMED INSURED: _____

THIS ENDORSEMENT CHANGES THE POLICY. READ IT CAREFULLY.

This endorsement modifies insurance provided under this policy:

In consideration of the premium charged and notwithstanding any inconsistent statement in the policy to which this endorsement is attached or in any endorsement which now or later attaches to the policy, the Company agrees as follows:

SCHEDULE OF ADDITIONAL INSUREDS:

County of San Luis Obispo, its officials, board members, departments, agencies, directors, agents, employees, volunteers and representatives

Camp Dresser & McKee, Inc., and its officers, directors, members, partners, employees, agents, consultants, and subcontractors

HDR Engineering, Inc., and its officers, directors, members, partners, employees, agents, consultants, and subcontractors

WHO IS AN INSURED: Section is amended to include as an insured the persons or organizations shown in the Schedule of additional insureds above, but only with respect to liability arising out of "your work" for that insured by or for you.

The Insurance afforded by this policy shall be primary insurance as respects any claim, loss or liability arising out of the Named Insured's operations. Any other insurance maintained by the Additional Insured(s) shall be excess and non-contributory with the insurance provided hereunder. The insurer hereby waives any rights of subrogation against any Additional Insured. Any deductible or self-insured retention due under this policy may be paid or satisfied by any Additional Insured should the Named Insured fail to do so.

By my signature on this endorsement, I warrant that I have authority to bind the insurance company and do so bind the company to this endorsement:

Insurance Company Authorized Representative: Name, Title and Signature:	Date Signed:

END OF SECTION

SECTION 00610

PERFORMANCE BOND

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

CONTRACTOR (*Name and Address*):

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

OWNER (*Name and Address*):
County of San Luis Obispo
1055 Monterey Street
San Luis Obispo, CA 93408

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

BOND
Bond Number:
Premium $
Date (*Not earlier than Effective Date of Agreement*):
Penal Amount:

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

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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

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

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

2. Surety's obligation under this Bond shall arise after:
   - 2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   - 2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   - 2.3 Owner has agreed to pay the Balance of the Contract Price to:
     1. Surety in accordance with the terms of the Contract; or
     2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

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

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

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

5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and

5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

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

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

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

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

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

11. If an action is brought to enforce the liability on the Bond, the Surety will pay reasonable attorney's fees, to be fixed by the court.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

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

END OF SECTION

SECTION 00615

PAYMENT BOND

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

CONTRACTOR (*Name and Address*):

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

OWNER (*Name and Address*):
County of San Luis Obispo
1055 Monterey Street, San Luis Obispo, CA 93408

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

BOND
Bond Number:
Premium: $
Date (*Not earlier than Effective Date of Agreement*):
Penal Amount:

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

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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

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

14. With respect to Owner, this obligation shall be null and void if Contractor:
    14.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
    14.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety

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

16. Surety shall have no obligation to Claimants under this Bond until:
    The Contractor or a subcontractor fails to pay any of the following:
    (1) A person authorized under Civil Code Section 3181 (Civil Code Section 9100 effective July 1. 2012) to assert a claim against a payment bond.
    (2) Amounts due under the Unemployment Insurance Code with respect to work or labor performed pursuant to the public works contract.
    (3) Amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the contractor and subcontractors under Section 13020 of the Unemployment Insurance Code with respect to the work and labor.

17. Not used

18. Reserved.

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

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

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

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

23. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of periods of limitation established by applicable provisions of the California Civil Code. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

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

25. When this Bond has been furnished to comply with a statutory requirement in the location where the

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

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

27. The Bond shall be conditioned for the payment in full of the claims of all claimants and shall inure to the benefit of any person authorized under Civil Code Section 3181 (Civil Code Section 9100 effective July 1. 2012) to assert a claim against a payment bond so as to give a right of action to that person or that person's assigns in an action to enforce the liability on the bond.

28. If an action is brought to enforce the liability on the Bond, the Surety will pay a reasonable attorney's fee, to be fixed by the court.

29. Definitions
    - 29.1 Claimant: An individual or entity identified in California a Civil Code Sections 3110, 3111 or 3112 (Civil Code Section 9100 effective July 1. 2012) or in Section 4107.7 of the Public Contract Code.
    - 29.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

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

END OF SECTION

SECTION 00625

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: Los Osos Wastewater Project	
Owner: County of San Luis Obispo	Owner's Contract No.: 300448.08.01.AD
Contract: Collection System Areas A & D	

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

_____

_____

_____

_____

_____
Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

_____

_____

_____

Contractor's Amended Responsibilities:

_____

_____

_____

_____

The following documents are attached to and made part of this Certificate:

_____

_____

_____

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

END OF SECTION

SECTION 700

STANDARD GENERAL CONDITIONS

SECTION 700

STANDARD GENERAL CONDITIONS

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters or in all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters or in all capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms. The use of the term "Paragraph" with initial capital letters is used to connote a sub-article of one of the 21 articles herein, and includes all of the paragraphs falling under that sub-article (including sub-articles that are subsidiary to that sub-article).

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agency*— The Project is financed in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 19212 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices, therefore, the Agency for these documents is USDA Rural Development. The Agency is USDA Rural Development.

3. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

4. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

   The Application for Payment form to be used on this Project is found in Section 00820. The Agency must approve all Applications for Payment before payment is made.

5. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

6. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

7. *Bidder*—The individual or entity who submits a Bid directly to Owner.

8. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

9. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

10. *Bilateral Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

    The Change Order form to be used for a Bilateral Change Order is found in Section 00830. Agency approval is required before Change Orders are effective.

11. *Change Order*—A document in the form of either a Bilateral Change Order or Unilateral Change Order that authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

    The Change Order form to be used for this Project is found in Section 00830. Agency approval is required before Change Orders are effective.

12. *Claim*—A demand or assertion by Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim. A condition precedent to Contractor's right to make a Claim is Contractor's strict compliance with the requirements set forth in Paragraph 10.05.

13. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

14. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

15. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.02 in the case of Allowances and Paragraph 11.03 in the case of Unit Price Work).

16. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

17. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

18. *Cost of the Work*—See Paragraph 11.01 for definition.

19. *Designer*— The individual or entity named as such in the Agreement.

20. *Drawings*—That part of the Contract Documents prepared or approved by Designer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

21. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

22. *Engineer*—The individual or entity named as such in the Agreement.

23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

24. *General Requirements*—Sections of Division 1 of the Specifications.

25. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, military munitions (including unexploded ordnance), or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

26. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

27. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction, or purporting to have jurisdiction, including but not limited to the Law and Regulations listed in Appendix G.

28. *Liens*—Charges, security interests, stop notices, or encumbrances upon Project funds, real property, or personal property.

29. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

30. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement to the successful Bidder, if Owner decides to proceed with the Work. The Notice of Award alone shall not create remedies for any Work performed under the Agreement or Contract Documents. Until Contractor receives a Notice to Proceed from Owner, Contractor shall not proceed with the Work and has no remedy against Owner for performing any Work related to the Project before receiving that notice.

31. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

32. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

    The Owner is the County of San Luis Obispo.

33. *PCBs*—Polychlorinated biphenyls.

34. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

35. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

36. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

37. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

38. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

39. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

40. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

41. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

42. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

43. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

44. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

45. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

46. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

47. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer: (1) the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended ; (2) a temporary certificate of occupancy or equivalent inspector sign-off has been issued by the governing authority (3) all systems included in the Work are operational, as designed, installed and tested; and (4) Contractor has submitted a written certification that all remaining Work shall be completed within a specified number of days approved by the Engineer following the Date of Substantial Completion. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

48. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

49. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

50. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

51. *Unilateral Change Order*—A document signed by the Owner that authorizes an adjustment to the Contract Price and/or Contract Times. Whenever an adjustment in Contract Price and/or Contract Times is warranted under the Contract Documents, but the Owner and Contractor cannot agree to the amount of adjustment, if any, that should be allowed to the Contract Price and/or Contract Times the Owner may issue a Unilateral Change Order stating the adjustment, if any, that is being made to the Contract Price and/or Contract Times. If any unilateral adjustment to the Contract Price and/or Contract Times is not acceptable to Contractor for any reason,

including any argument that an adjustment to the Contract Price and/or Contract Times was not warranted by the Contract Documents, the Contractor's exclusive remedy is to follow the Claim process set forth in Paragraph 10.05. A Unilateral Change Order may be jointly signed by the Engineer, but the Engineer's signature is not required.

The Change Order form to be used for a Unilateral Change Order is found in Section 00830. Notwithstanding anything to the contrary set forth in Section 00830, neither the approval nor signature of the Contractor is required in order for a Unilateral Change Order to be effective. Agency approval is required before Change Orders are effective.

52. *Unit Price Work*—Work to be paid for on the basis of unit prices.

53. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

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

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority

to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

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

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

   a. does not conform to the Contract Documents; or

   b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

   c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

G. *Employ:*

1. The word "employ" when used in the context of Contractor's hiring or use of a Subcontractor is not intended to suggest that the relationship between Contractor and Subcontractor is an employer-employee relationship.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds and certificates of insurance as Contractor may be required to furnish.

B. *Blank*

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to 4 printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence as set forth in the Notice to Proceed. In no event will Contractor have any remedies for Work performed on the Project until the Notice to Proceed is given to Contractor.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 14 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents. The Progress Schedule, using Primavera P6 software, shall (1) provide a graphic representation of all activities and events that will occur during the performance of the Work; (2) identify each phase of construction and occupancy; and (3) set forth milestone dates that are significant to ensure the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents.;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

4. a preliminary Staking Request Schedule for the initial thirty (30) days of Work.

B. *Recycling Plan*: Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit Recycling Plan to Owner for timely review, as specified in the Contact Documents.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, Designer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

1. Generally, Contractor shall communicate with Engineer, or Engineer's designated representative under Paragraph 9.03, as Engineer shall specify, concerning matters affecting Engineer or Owner. In the event that Contractor believes he/she cannot physically locate or deliver necessary communications to Engineer, or Engineer's designated representative, as specific circumstances require those communications to be received by Engineer, Contractor may transmit those communications to Owner with a copy to Engineer, or Engineer's designated representative, and shall include in the communication an explanation why Contractor is sending the communication to Owner as well as Engineer, or Engineer's representatives.

2.07 *Initial Acceptance of Schedules*

A. Contractor shall be responsible for arranging a meeting to be held at least 5 days before submission of the first Application for Payment, where Contractor, Engineer, Owner, and others as appropriate, shall review for acceptability to Engineer and Owner the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until Contractor submits schedules that are accepted by Engineer and Owner in writing. Such acceptance shall only mean that the schedule satisfies the acceptability standard set forth below, and shall not constitute any type of approval or ratification by Engineer or Owner as to any means or methods of Work chosen by Contractor (which Contractor shall be solely responsible for).

1. The Progress Schedule will be acceptable to Engineer and Owner if it provides an orderly progression of the Work to completion within the Contract Times, in compliance with the requirements of Paragraph 2.05.A.1. If not accepted, the Progress Schedule shall be promptly revised by Contractor in accordance with the recommendations of Owner and Engineer and resubmitted for acceptance. Upon review and acceptance by Owner and Engineer, the Progress Schedule shall be

deemed to be part of the Contract Documents and attached to the Agreement. Such acceptance must be in a writing signed by Owner and Engineer that expressly states that the Progress Schedule is deemed part of the Contract Documents and an attachment to the Agreement. Such acceptance will not impose on Engineer or Owner any responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer and Owner if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer and Owner as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

4. Contractor's Staking Request Schedule will be acceptable to Engineer and Owner if it correlates with the Progress Schedule.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

   Contractor shall be responsible for verifying at the Site the accuracy of all grades, elevations, dimensions, locations and field measurements in any Drawings, Specifications, or any other Contract Documents. In all cases of the interconnection of its Work with existing or other Work, Contractor shall verify at the site all dimensions relating to such existing or other Work. Any additional work caused by Contractor's failure to verify all such grades, elevations, dimensions, locations, or field measurements shall be promptly rectified by Contractor without any increase in Contract Price or Contract Times. Nothing in this paragraph is intended to require the Contractor to assume responsibility for the completeness and accuracy of any Drawings, Specifications, or other Contract Documents. This paragraph simply sets forth Contractor's obligation to verify data before incurring costs or delays that could have been mitigated by such verification.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer.

D. Contractor shall keep at the Work site a copy of the Plans and Specifications to which Engineer shall have access at all times.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, Designer, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Designer, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, either before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for Contractor's failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof, or should have had such knowledge if it had acted in accordance with the provisions of the Contract Documents.

B. Resolving Discrepancies:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

   a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

C. *Order of Precedence of Contract Documents:*

1. In the event of conflict between any of the Contract Documents, the provision placing a more stringent requirement on the Contractor shall prevail. The Contractor shall provide the better quality or greater quantity of Work and/or materials unless otherwise directed by Owner in writing. In the event none of the Contract Documents place a more stringent requirement or greater burden on the Contractor, the controlling provision shall be that which is found in the document with higher precedence. Nothing herein shall relieve the Contractor of its obligation to notify the Owner of any inconsistencies in the documents.

2. In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following order of precedence:

   a. Change Orders and Work Change Directives issued after execution of the Agreement in reverse chronological order (i.e. most recent first);

   b. The Owner-Contractor Agreement, including all attachments and Addenda with later Addenda having priority over earlier Addenda;

   c. General Conditions

   d. Specifications

   e. Drawings (Figures govern over scaled dimensions, Detail drawings govern over general drawings, Addenda/Change Order drawings govern over Contract Documents, Contract Drawings govern over Standard Plans);

   f. Bidding Requirements;

   g. Reference Specifications; and

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change

Order or a Work Change Directive. Any amendment to adjust either the Contract Times or the Contract Price shall be effective only if and when it is in writing and executed as a written Change Order.

Any amendment to adjust either the Contract Times or the Contract Price shall be effective only if and when it is in writing and executed as a written Change Order.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

No supplementation, variations, or deviations in the Work arising from any of the methods set forth in Paragraph 3.04.B shall, per se, adjust the Contract Price or Contract Times.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Designer or its consultants; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Designer and specific written verification or adaptation by Designer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Specifications, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. *Blank*

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

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

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor believes it is entitled to an adjustment in Contract Price and/or Contract Time, or any other relief, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor's exclusive remedy is set forth in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings*

1. In the preparation of Drawings and Specifications, Designer relied upon the following reports of exploration and tests of subsurface conditions at the Site:

   a. Geotechnical Report, Los Osos Wastewater Project; Los Osos Community Services District; San Luis Obispo County, California; March 9, 2004

   b. Addendum and Update to Geotechnical Report, Los Osos Wastewater Project; San Luis Obispo County, California; October 24, 2011

   c. Shallow Groundwater Water Quality Sampling and Analysis, Los Osos, California; February 2, 2012

   Copies of reports itemized in this Paragraph 4.02.A that are not included with Bidding Documents may be examined at the Department of Public Works and Transportation at 1050 Monterey Street, Room 207, County Government Center, San Luis Obispo, CA 93408, during regular business hours. These reports are not part of the Contract Documents, and other than as provided in Paragraph 4.02.B

below, Contractor is not entitled to rely upon any information in said reports, or any other information or data utilized by Designer in the preparation of the Drawings and Specifications.

Such reports shall not excuse Contractor from the duty to independently evaluate and satisfy themselves as to the Site conditions and limitations under which the Work is to be performed, including, without limitation, (1) the location, condition, layout, and nature of the Site and surrounding areas; (2) generally prevailing climatic conditions; (3) anticipated labor, supply, and costs; (4) availability and cost of materials, tools, equipment; and (5) other similar issues. Further, Owner assumes no responsibility or liability for the physical condition or safety of the Site or any improvement located on the Site. Except as set forth in Article 4, Contractor shall be solely responsible for providing a safe place for the performance of the Work. Owner shall not be required to make adjustments in either the Contract Price or Contract Times arising from a failure by Contractor or any Subcontractor to make a proper independent evaluation as to any Site conditions or limitations required in this Contract.

Any indicated elevation of any groundwater is simply that which existed on the date when soil boring data was determined. It is Contractor's responsibility to determine and allow for the elevation of groundwater that exists on the date(s) the Contractor is performing any Work related thereto. A difference in elevation between groundwater shown in soil boring data and groundwater actually encountered during Work will not be considered as a basis for an increase in Contract Price and/or Contract Time.

Any additional subsurface exploration shall be done by Contractor at its own expense.

2. No drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the Site are known to Owner or Designer.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports, but such reports are not Contract Documents. Such "technical data" is limited factual data included in the "Appendices" and "Attachments" that are attached to the end of the reports listed above in Paragraph 4.02.A. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner, Designer, or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor discovers, or could reasonably have discovered, that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall immediately, and in any event not more than 24 hours thereafter, and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Contractor believes it is entitled to an adjustment in Contract Price and/or Contract Time, or any other relief, Contractor's exclusive remedy is set forth in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Designer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Specifications:

1. Neither Owner nor Engineer nor Designer shall be responsible for the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data;

b. locating all Underground Facilities shown or indicated in the Contract Documents;

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, immediately, or as soon as feasible, after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such

Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment may be made to the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have discovered, or have been expected to be aware of or to have anticipated. If Contractor believes it is entitled to an adjustment in Contract Price and/or Contract Time, or any other relief, Contractor's exclusive remedy is set forth in Paragraph 10.05.

3. Notwithstanding the foregoing, nothing in this Contract requires Owner to show or indicate in the Contract Documents any Underground Facility that constitutes a service lateral or related appurtenance whenever the presence of such Underground Facility at the Site can be reasonably inferred from the presence of other visible facilities, such as buildings, meter and/or junction boxes, on or adjacent to the Site. Contractor is deemed to be aware of, and to have anticipated, any such Underground Facility.

4. The location of existing service lateral or related appurtenance are not shown on the Drawings. Where underground main distribution conduits such as water, gas, sewer, electric power, telephone, or cable television are shown on the Drawings, Contractor shall assume that every property parcel will be served by a service lateral or related appurtenance for each type of utility.

4.05 *Lines and Grades*

A. Stakes or marks will be set by Engineer in accordance with the “Construction Staking Guidelines,” set forth in Appendix H of these Contract Documents. . The Contractor is responsible for assuring that all Work complies with the Contract Documents, and nothing in this Paragraph 4.05 or Appendix H diminishes or effects the Contractor’s responsibility for providing Work that is in full compliance with the Contract Documents.

B. When Contractor requires stakes or marks to be set, Contractor shall notify Engineer of the requirements in writing no less than 5 days in advance of starting operations that require their use. In the event that a staking operation is estimated to take more than 1 day to complete, add 1 day to the minimum 5 days advance notice.

C. If any vegetation needs to be cleared or grubbed, as determined by Engineer, before stakes or marks can be set, then Contractor shall clear the obstructing vegetation for the proper placement of stakes or marks prior to submittal of a staking request. Engineer

and Contractor shall agree on the extent of vegetation removal necessary to prepare the Site for the setting of stakes or marks. Vegetation removal for the preparation of the Site for the setting of stakes or marks shall be considered as included in the various items of work involved and no additional compensation will be allowed therefor. Contractor will not be entitled to any compensation for any perceived delay, nor entitled to an extension of time for any perceived delay without due cause for the period between when the Site is deemed cleared by Engineer and when the stakes or marks are set for use by Contractor.

D. Stakes and marks set by Engineer shall be carefully preserved by Contractor. If the stakes or marks are destroyed or damaged, the stakes and marks will be replaced or restored at Engineer's earliest convenience. Contractor will be charged for each stake or mark replaced or restored which in the judgment of Engineer had been carelessly or willfully destroyed or damaged by Contractor's operations. As indicated in the "Construction Staking Guidelines," restaking charges will be based on the current costs of survey personnel plus overhead. This charge will be deducted from any moneys due or to become due Contractor.

E. Pursuant to Section 8771(b) of the California Business and Professions Code, existing survey monuments that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide survey control that are within or adjacent to Contractor's operations, shall be located and referenced by or under the direction of a California Professional Land Surveyor or California Registered Civil Engineer authorized to practice land surveying prior to the time when any streets, highways, other rights-of-way, or easements are improved, constructed, reconstructed, maintained, resurfaced, or relocated. It is the Contractor's responsibility to arrange and pay for a diligent and thorough search for survey monuments within the Site. Such work shall be performed by or under the direction of a California Professional Land Surveyor or a California Registered Civil Engineer authorized to practice land surveying prior to the beginning of any Work that could disturb or destroy a survey monument. Contractor shall provide Engineer a list of all such monuments and reference documents. In the event that any existing survey monuments are disturbed in any way by Contractor's operations, the Contractor shall be responsible for resetting monuments in accordance with Section 8771(b) of the California Business and Professions Code, and a corner record or record of survey shall be prepared and filed with the County Surveyor prior to filing of the Notice of Completion for the Project. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in locating existing survey monuments by or under the direction of a California Professional Land Surveyor or California Registered Civil Engineer authorized to practice land surveying, resetting any disturbed survey monument and preparing and filing a corner record or record of survey, shall be considered as included in the Contract Price and no additional compensation will be allowed therefor.

4.06 *Hazardous Environmental Condition at Site*

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

Absence of such reports and drawings shall not excuse Contractor from the duty to independently evaluate and satisfy themselves as to the Site conditions and limitations under which the Work is to be performed, including the existence of Hazardous Environmental Conditions that a reasonable contractor would have discovered either from a reasonable evaluation of external Site conditions, or upon the further investigation a reasonable contractor would have performed based upon information obtained from such external Site evaluation or other sources.

B. *Blank*

C. Contractor must act reasonably and shall not be excused for carelessly failing to discover and locate any Hazardous Environmental Condition(s) at the Site that may present a substantial danger to persons or property exposed thereto in connection with the Work at the Site. Contractor is liable for any damages caused by any Hazardous Environmental Condition(s) that Contractor knew of, or by the exercise of reasonable efforts should have known of. Within 24 hours of the time when Contractor discovers any such Hazardous Environmental Condition(s), Contractor shall follow the procedures set forth in Paragraph 4.06.D.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor written notice regarding any special instructions or conditions on how to proceed with the Work in the affected area.

E. *Blank*

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Contractor believes it is entitled to an adjustment in Contract Price and/or Contract Time, or any other relief, Contractor's exclusive remedy is set forth in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner’s own forces or others in accordance with Article 7.

G. *Blank*

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and

charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

4.07 *Public Contract Code Section 7104*

The provisions of Article 4 shall be interpreted and implemented in a manner consistent with Public Contract Code section 7104. Pursuant to Public Contract Code section 7104:

A. Contractor shall promptly, and in any event not more than 24 hours thereafter, and before the following conditions are disturbed, notify Owner and Engineer in writing of any:

1. Material that Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

2. Subsurface or latent physical conditions at the Site differing from those indicated by information about the Site made available to Bidders prior to the deadline for submitting Bids.

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.

B. Upon receiving Contractor's notification, Engineer, as Owner's authorized representative, shall promptly investigate the conditions on behalf of Owner and report the results of its investigation to Owner. If Owner finds that the conditions do materially differ, or do involve hazardous waste, and that the conditions cause an adjustment in Contract Price and/or Contract Time for performance of any part of the Work under the terms of the Contract, a Change Order shall be processed under the procedures described in the Contract.

C. In the event that a dispute arises between Owner and Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in Contractor's cost of, or time required for, performance of any part of the Work under the terms of the Contract, Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. In such event, Contractor retains the right to submit a Claim therefor pursuant to the provisions of Article 10.

D. The provisions of this Paragraph 4.07 are not intended to override or replace any other language of this Contract, including other language in Article 4, but simply supplements

such other language. All of the other provisions of this Contract (including Article 4) remain in full force and effect, including those provisions relating to the same topics covered in this Paragraph 4.6.J., so long as each such provision does not violate Public Contract Code section 7104. If any court finds any provision(s) of this Contract to be in violation of section 7104, such provision(s) are hereby deemed severed and removed from this Contract without affecting the validity of any of the remaining provisions of this Contract.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. All performance bonds shall remain in effect until Contractor performs all obligations under the Contract Documents including, but not limited to, insurance, indemnity and warranty obligations, which survive completion of the Work. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations. All bonds shall be executed by a California "admitted surety insurer," as defined in California Code of Civil Procedure Section 995.120 and listed by the California Insurance Commissioner pursuant to Insurance Code Section 12070. Bonds issued by a California admitted surety listed in the latest versions of the U.S. Department of Treasury Circular 570 shall be deemed to be accepted unless specifically rejected by Owner. Bonds from a California admitted surety insurer not listed in Treasury Circular 570 must be accompanied by all of the documents enumerated in California Code of Civil Procedure Section 995.660(a). The attorney-in-fact who executes the required bonds on behalf of the surety shall affix thereto a certified and current copy of the power of attorney. The signatures shall be acknowledged by a Notary Public.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02. No further payments shall be deemed due or will be made under the Contract until a new surety(ies) qualifies and is accepted by Owner.

D. If the Contractor or a Subcontractor disputes the correctness or validity or enforceability of any stop notice either may file with Owner a bond, on a form provided or approved by Owner executed by one or more California admitted surety insurers, in an amount equal to one hundred and twenty-five percent (125%) of the claim stated in the stop notice conditioned for the payment of any sum which the stop notice claimant may recover on the claim together with its costs of suit in the action. Upon Engineer's acceptance of such bond, Owner shall not withhold money from the Contractor on

account of the stop notice. The surety(ies) upon the stop notice release bond shall be different than, and jointly and severally liable to the stop notice claimant with, the payment bond surety(ies).

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in Contract Documents.

B. Insurance shall be placed with insurers with an A.M. Best Guide, or similar rating service guide, rating of no less than **A-: XV.**

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain. Upon Owner's request, Contractor shall provide complete copies of Contractor's and Subcontractors' insurance policies (including, but not limited to, the declarations page, form list and riders), endorsements or certificates required under the Contractor Documents and invoices for premiums.

B. *Blank*

C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

F. Each certificate and endorsement is to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificate(s) and endorsement(s) must be in a form approved by Owner. All deductibles and self-insured retentions must be identified in the certificates. Any deductible or self-insured retention in excess of **$25,000** must be declared to and approved in writing by Owner prior to execution of the Agreement. The deductibles and retentions shall be considered a form of self-insurance.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

7. Claims for bodily injury or property damage arising out of completed operations under the Contract, whether such operations are by the Contractor, its Subcontractors, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable; and

8. Claims for third party liability and remediation costs stemming from pollution incidents that result from the operations of Contractor, its Subcontractors, Sub-subcontractors and suppliers.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner, Designer, and Engineer, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and

the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in these General Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

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

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

   a. Such insurance shall remain in effect for ten (10) years after final payment.

   b. Contractor shall furnish Owner and each other additional insured evidence satisfactory to Owner and any such additional insured of continuation of such insurance as a condition to final payment and thereafter upon the annual renewal of such coverage until the time within which such coverage must be maintained expires.

C. Contractor shall provide insurance in the types, and limits set forth below, with companies lawfully licensed and authorized to do business in the State of California, or otherwise under such forms and limits and with such companies approved by Owner, following Owner's examination of the company's financial, reinsurance, claims procedures and other data requested by the Owner. The Contractor's liability insurance required by Paragraph 5.04 of the General Conditions shall provide coverage with scope and limits not less than the following or greater when required by Laws and Regulations:

1. *Minimum Scope of Coverages*

   a. *Workers' Compensation and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:* Contractor shall comply with the applicable sections of the California Labor Code concerning workers' compensation for injuries on the job. Compliance is accomplished in one of the following manners:

      i) Provide copy of permissive self-insurance certificate approved by the State of California; or

ii) Secure and maintain in force a policy of workers' compensation insurance with State and applicable Federal statutory limits (e.g. Longshoremen's, if applicable) and Employer's Liability Insurance with a minimal limit of **$1,000,000** per accident; or

iii) Provide a "waiver" form certifying that no employees subject to the California Labor Code's Workers' Compensation provision will be used in performance of this Contract.

In addition, all Worker's Compensation policies shall contain a waiver of subrogation in favor of the County of San Luis Obispo, its officials, board members, departments, agencies, directors, agents, employees, volunteers and representatives.

b. *Commercial General Liability under Paragraphs 5.04.A.3 through A.5 of the General Conditions:* Coverage shall be written on an Insurance Services Office (ISO) Commercial General Liability "occurrence" form CG 00 01 (10/01 or later edition) or equivalent form approved by Owner for coverage on an occurrence basis. The insurance shall cover liability, including, but not limited to, that arising from premises operations, stop gap liability, independent contractors, product liability and completed operations, personal injury, advertising injury, and liability assumed under an insured contract, and shall eliminate the exclusion with respect to property under the care, custody and control of Contractor. The policy shall be endorsed to provide the Aggregate per Project Endorsement ISO form CG 25 03 (11/85). Coverage shall contain no contractors' limitation or other endorsement limiting the scope of coverage for liability arising from pollution, explosion, collapse, or underground (x, c, u) property damage. Contractor shall maintain and provide Products/Completed Operations coverage to be maintained continuously for a minimum of ten (10) years after final payment. The policy shall be scheduled as underlying insurance to the Umbrella or Excess Policy required herein.

c. *Business Automobile Liability under Paragraph 5.04.A.6 of the General Conditions*. Coverage shall include owned, hired, leased and non-owned vehicles, whether scheduled or not, written on Insurance Services Office (ISO) form CA 00 01 (12/93 or later edition) or a substitute form providing equivalent coverage. If necessary, the policy shall be endorsed to provide contractual liability coverage. The policy shall be scheduled as underlying insurance to the Umbrella or Excess Policy required herein.

d. *Excess or Umbrella Liability Insurance:* Coverage shall be at least as broad as any underlying coverage and shall be "following form" to the underlying coverage. Coverage shall be provided on a "pay on behalf" basis, with defense costs payable in addition to policy limits. There shall be no cross liability exclusion and no contractor's limitation endorsement. The policy shall have starting and ending dates concurrent with the underlying coverages. The Named Insured may determine the layering of primary and excess liability insurance provided that if such layering differs from that described here, the actual coverage program meets the minimum total required limits and complies with

all other requirements listed in Paragraph 5.04. Contractor's excess or umbrella liability coverage shall be maintained continuously for a minimum of ten (10) years after final payment.

e. *Contractor's Pollution Liability Insurance:* Coverage shall be provided on a form acceptable to Owner for liability caused by pollution conditions arising out of the operations of Contractor. Coverage shall apply to bodily injury, property damage (including loss of use of damaged property or of property that has not been physically injured), cleanup costs, and defense (including costs and expenses incurred in the investigation, defense, or settlement of claims). All activities contemplated in this Contract shall be specifically scheduled on the policy as "covered operations." The policy shall provide coverage for the hauling of waste from the Project Site to the final disposal location, including non-owned disposal sites. Coverage shall be included on behalf of the insured for covered claims arising out of the actions of independent contractors. If the insured is using Subcontractors, the policy must include work performed "by or on behalf" of the insured. The policy shall specifically provide for a duty to defend on the part of the insurer. Such insurance shall include coverage for all operations, including completed operations and professional services. Such insurance shall not contain any exclusion for asbestos or lead. Contractor's pollution liability coverage shall be maintained continuously for a minimum of three (3) years after final payment.

2. *Minimum Limits of Insurance*. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

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

i.	State:	Statutory
ii.	Applicable Federal (e.g., Longshoreman's):	Statutory
iii.	Employer's Liability:	**$1,000,000** per accident for bodily injury or disease and **$1,000,000** per employee for bodily injury or disease**.**

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

i.	General Aggregate:	**$4,000.000**
ii.	Products – Completed Operations Aggregate:	**$4,000,000**
iii.	Personal and Advertising	**$2,000,000**

Injury:

iv. Each Occurrence (Bodily Injury and Property Damage): **$2,000,000**

v. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable: **$2,000,000**

vi. Excess or Umbrella Liability:

- General Aggregate: **$10,000,000**
- Each Occurrence: **$10,000,000**

c. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

i. Bodily Injury:

- Each Person: **$1,000,000**
- Each Accident: **$1,000,000**

ii. Property Damage:

- Each Accident **$1,000,000**

[or]

i. Combined Single Limit **$1,000,000**

d. The Contractual Liability coverage required by Paragraph 5.04.B.3 of the General Conditions shall provide coverage for not less than the following amounts:

i. Bodily Injury:

- Each Person: **$2,000,000**
- Each Accident: **$2,000,000**

ii. Property Damage:

- Each Accident: **$2,000,000**
- Annual Aggregate: **$4,000,000**

e. Contractor's Pollution Liability Insurance:

i. Each Occurrence: **$2,000,000**

ii. General Aggregate: **$4,000,000**

3. *Additional Insured Endorsements*. The Contractor shall cause the insurance required by the Contract Documents (except professional liability and worker's compensation) to include the County of San Luis Obispo, its officials, board members, departments, agencies, directors, agents, employees, volunteers and representatives as additional insureds. The Engineer and Designer and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each shall also be included as additional insureds.

   None of the insurance coverage required by Article 5 shall contain any special limitations on the scope of protection afforded to any additional insureds. All policies shall contain a waiver of subrogation in favor of the additional insureds. Coverage for such additional insureds does not extend to liability to the extent prohibited by Insurance Code Section 11580.4. All additional insured endorsements shall be on the form of endorsement found in Section 00600 **and** shall state:

   "The Insurance afforded by this policy shall be primary insurance as respects any claim, loss or liability arising out of the Named Insured's operations. Any other insurance maintained by the Additional Insured(s) shall be excess and non-contributory with the insurance provided hereunder. The insurer hereby waives any rights of subrogation against any Additional Insured. Any deductible or self-insured retention due under this policy may be paid or satisfied by any Additional Insured should the Named Insured fail to do so."

D. *Deductibles and Self-Insured Retention*. Contractor and its Subcontractors shall pay all deductibles or self-insured retentions under each policy of insurance they are required to maintain under the Contract Documents. Their policies shall not contain a provision that requires that only the named insured may pay the deductible or self-insured retention. The additional insureds under each policy shall have the right, but not the obligation, to pay any deductible or self-insured retention should the Contractor or any Subcontractor fail to do so. In the event the Owner pays any deductible or self-insured retention, Owner shall be entitled to reimbursement by Contractor.

E. *Acceptance of Coverage*. All insurance policies, certificates, endorsements and binders shall be subject to the approval of Owner as to form and content. The insurance requirements are subject to amendment or waiver only if approved in writing by Owner.

F. *Contractor's Failure to Provide Required Insurance*. Failure to maintain required insurance at all times shall constitute a default and material breach. In such event, Contractor shall immediately notify Owner and cease all performance under this Contract until further directed by the Owner. In the absence of satisfactory insurance coverage, Owner may, at its discretion and sole option: (a) procure insurance with collection rights for premiums and costs against Contractor by way of set-off or recoupment from sums due Contractor; (b) immediately terminate or suspend Contractor's performance of the Contract; (c) pay Contractor's premiums for renewal of Contractor's coverage; or (d) self-insure the risk, with all damages and costs incurred, by judgment, settlement or otherwise, including attorney's fees and costs, being collectible from Contractor, by way of set-off or recoupment from any sums due Contractor. Upon demand, Contractor shall repay Owner for all sums that Owner paid to obtain, renew, reinstate or replace the insurance, or Owner may offset the cost against any monies that the Owner may owe Contractor.

G. *Reassessment of Contractor's Insurance Requirements.* At any time during the duration of this Contract, the Owner may require that Contractor obtain, pay for, and maintain more or less insurance depending on the Owner's assessment of any one or more of the following factors: (1) the Owner's risk of liability or exposure arising out of, or in any way connected with, Contractor's services under this Contract; (2) the nature or number of accidents, claims, or lawsuits arising out of, or in any way connected with, Contractor's services under this Contract; or (3) the availability, or affordability, or both, of increased liability insurance coverage. The Owner reserves the right to utilize a wrap insurance program for the Work of the Project. In the event the Owner implements a wrap program, Owner shall be entitled to reduce/credit the Contract Price in an amount equal to the premium for Contractor's insurance and its Subcontractors' insurance. Contractor agrees and will require its Subcontractors to cooperate with Owner in determining the amount of the credit due Owner and will provide Owner with true and correct copies of all existing and recent insurance policies and invoices for premiums.

5.05 *Blank*

5.06 *Blank*

5.07 *Blank*

5.08 *Blank*

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

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

5.10 *Blank*

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor

shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner, Designer, or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. Contractor shall be responsible for making sure that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent, who shall be the individual designated by Contractor under Paragraph 2.06.B, and who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

The resident superintendent shall be present at the Site of the Work at all times while Work is actually in progress on the Contract. When Work is not in progress and during periods when Work is suspended, arrangements acceptable to Engineer shall be made for any work which may be required under the Contract Documents.

C. Whenever the resident superintendent is not present on any particular part of the work where it may be desired to give direction, orders will be given by Engineer which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.

Any order given by Engineer, not otherwise required by the Contract Documents to be in writing, will on request of Contractor, be given or confirmed by the Engineer in writing.

D. Contractor shall be skilled in the type of work required by the Contract Documents and shall be licensed in accordance with applicable law. Contractor shall perform at least 50 percent of the dollar value of the Work using personnel on its own payroll.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

Contractor shall remove any person performing Work upon written request by Engineer if the Engineer has reason to believe that such worker has behaved in a manner that demonstrates incompetence or other unsuitable behavior. Notwithstanding the forgoing, nothing in the Contract Documents imposes any obligation, responsibilities, or liabilities on Engineer and/or Owner for any incompetence or unsuitable behavior of any persons employed by Contractor (or any Subcontractor or Supplier), or any other persons allowed on the Site by a Contractor, Subcontractor or Supplier.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Engineer's written consent (which will not be unreasonably withheld)

given after prior written notice to Engineer. Eight hours labor constitutes a legal day's work in the state of California under California Labor Code section 1810.

C. This is a federally financed public works project subject to all applicable Federal and State Laws and Regulations governing public works projects, including but not limiting to any and all labor Laws and Regulations requiring the payment of prevailing wages. Contractor shall comply with all applicable Federal and State labor and prevailing wage Laws and Regulations, and shall comply with all labor and wage requirements referenced in sections 00200 and 00300 of the Contract Documents. Contractor shall also comply with the labor standard provisions set forth in Article 21.

6.03 *Services, Materials, and Equipment*

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

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

D. All warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. Contractor is responsible for making sure that all such warranties and guaranties are transferable to, and enforceable by, Owner. Contractor agrees to assign to Owner at the time of final completion of the Work any and all manufacturer's warranties and guarantees relating to materials and labor used in the Work and Contractor further agrees to perform the Work in such a manner as to preserve any and all manufacturer's warranties and guarantees.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

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

3. If Contractor desires to make a major change in the method of operations after commencing construction, or if the schedule fails to reflect the actual progress, Contractor shall submit to Engineer a revised Progress Schedule as soon as possible and prior to beginning revised operations.

4. Contractor shall submit to Engineer an updated Progress Schedule within 5 days of the Engineer's written request.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

3) it has a proven record of performance and availability of responsive service.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

   a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

   b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

   c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

   d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

      1) shall certify that the proposed substitute item will:

         a) perform adequately the functions and achieve the results called for by the general design,

         b) be similar in substance to that specified, and

         c) be suited to the same use as that specified;

      2) will state:

         a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

         b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

         c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

      3) will identify:

         a) all variations of the proposed substitute item from that specified, and

         b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation*

1. *During Bidding.* The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute or materials and equipment approved by the Owner and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed substitute or "or-equal" item. Request for Owner's clarification of materials and equipment considered "or-equal" prior to the Effective Date of the Agreement must be received by the Owner at least 10 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Owner as a substitute unless written request for approval has been submitted by Bidder and has been received by Owner at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of Paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Owner's decision of approval or disapproval of a proposed item will be final. If Owner approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

2. *After Effective Date of Agreement.* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by

Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. No later than 14 days after the Effective Date of the Agreement by Contractor and Owner, Contractor shall furnish Owner and Engineer, in writing, with the names of all persons or entities proposed as manufacturers of the products identified in the Specifications (including those who are to furnish materials or equipment fabricated to a special design) and, where applicable, the name of the installing Subcontractor. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

Contractor is solely responsible for which Subcontractor, Supplier, or any other individual or entity it uses to furnish or perform any of the Work, and Owner's failure to object to any such Subcontractor, Supplier, or other individual or entity does not in any way relieve Contractor of this responsibility. No act or omission by Owner or Engineer shall be construed as an acceptance or approval of any such Subcontractor, Supplier, or individual or entity. No act or omission by Owner or Engineer shall be construed as a waiver of any right of Owner or Engineer to reject defective Work. Every Subcontractor shall be skilled in the type of work required by the Contract Documents and shall be licensed in accordance with applicable law.

B. Contractor shall comply with the Subcontractor Listing Laws set forth in California Public Contract Code sections 4100-4114. If Owner consents to Contractors request for substitution of a Subcontractor pursuant to Public Contract Code section 4107, such consent shall not be deemed an approval or acceptance of a Subcontractor, but merely Owner's determination that such consent is authorized under the statute.

Pursuant to Public Contract Code section 4114, Owner's functions under Public Contract Code sections 4107 and 4110 are delegated to the County's Director of Public Works (or his designee). Contractor shall provide all data in support of any Subcontractor substitution request. Owner will be allowed a reasonable time within which to evaluate such request, and may require Contractor to furnish additional data regarding the requested substitution. All data provided by Contractor regarding the requested substitution shall be at Contractor's sole expense. Whether or not Owner approves the requested substitution proposed by Contractor, Contractor shall reimburse Owner for the reasonable charges of Owner for Owner's time and expense in evaluating the requested substitution. Regardless of whether or not Owner approves a requested substitution, Contractor shall not be entitled to any additional Contract Time or any

increase in Contract Price for any time delays relating to a resolution of a Subcontractor substitution request so long as Owner did not unreasonably delay the processing of the request.

If Owner's decision on a Subcontractor substitution request is challenged in court, under no circumstances shall Contractor be entitled to any additional Contract Time or any increase in Contract Price if Owner's decision was to consent to a Subcontractor substitution requested by Contractor. Furthermore, Contractor shall indemnify Owner from all claims and/or court actions challenging the Owner's approval of any Subcontractor substitution requested by Contractor, regardless of whether the claim or action seeks legal or equitable relief, so that any and all costs or damages incurred by Owner relating to said claims and/or actions shall be paid by Contractor. If an Owner's decision to deny a Subcontractor substitution requested by Contractor is overruled by a court, Contractor shall not be entitled to any additional Contract Time or any increase in Contract Price for any associated time delays unless the court expressly finds that (1) Owner acted in an arbitrary and capricious manner and (2) Owner's conduct caused an unnecessary delay.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. *Blank*

H. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

I. Contractor shall not award work valued at more than fifty (50%) of the Contract Price to Subcontractor(s).

J. All subcontracts shall be in writing and shall specifically provide that Owner is an intended third-party beneficiary of said subcontract.

K. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to a signed written agreement between Contractor and Subcontractor or Supplier which specifically binds Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Each and every agreement between Contractor and any Subcontractor or Supplier shall provide for Contractor's assignment of the agreement to Owner, at Owner's option, in the event of a termination by Owner under Paragraphs 15.02 or 15.03. By executing the Agreement that is part of these Contract Documents, Contractor hereby assigns to Owner each agreement entered into by Contractor and any Subcontractor or Supplier, subject to the following two conditions subsequent: (1) Owner exercises its right to terminate Contractor’s services pursuant to Paragraphs 15.02 or 15.03; and (2) Owner notifies in writing the Contractor and the Subcontractor/Supplier of the particular agreement that (a) Owner is exercising its right under this paragraph to accept an assignment of that particular agreement, and (b) the date upon which the assignment is being accepted by Owner. Under this paragraph, Owner has the right to only accept those assignments which Owner believes is in its best interest. Only those particular agreements expressly and specifically accepted by Owner pursuant to this paragraph shall be deemed assigned to Owner.

L. Upon the request of Owner or Engineer, Contractor shall provide Engineer a copy of any requested subcontract within five (5) days of the request.

6.07 *Patent Fees and Royalties*

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

B. *Blank*

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner, Designer, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the

Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

D. Neither the approval of any material or equipment proposed by Contractor under Paragraph 6.05.A, nor the approval of any substitute means, method, technique, sequence, or procedure of construction approved under Paragraph 6.05.B. shall constitute an "invention, design, process, product, or device specified in the Contract Documents" under this Paragraph 6.07. Contractor shall pay all license fees and royalties and assume all costs incident to the use of any such material, equipment, means, method, technique, sequence, or procedure of construction approved under Paragraph 6.05.A. or 6.05.B. which is the subject of any patent rights or copyrights held by others.

6.08 *Permits*

A. Unless otherwise provided in the Specifications, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Contractor shall pay all charges of utility owners for connections to the Work, and Owner shall pay all charges of such utility owners for costs related to providing post construction service to the Work. All such payment of fee, charges, permits, and licenses by Contractor under this Paragraph 6.08 shall be considered as included in the prices paid for the various Contract items of Work and no additional payment will be made therefor.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. Contractor shall indemnify and hold harmless Owner, Engineer, Designer, the State Water Resources Control Board, and the California Infrastructure and Economic Development Bank and each of their respective trustees, officers, directors, members, partners, employees, agents, and consultants from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any agency or body against Owner relating to such Work performed by Contractor contrary to Laws and Regulations (including, without limitation, the Federal Comprehensive Environmental Response, Compensation and

Liability Act, the Resource Conservation and Recovery Act, the California Hazardous Substance Account Act, the Federal Water Pollution Control Act, the Clean Air Act, the California Hazardous Waste Control Law and California Water Code Section 13304). The duty to defend shall apply notwithstanding any alleged or actual concurrent negligence (active or passive) or partial fault on the part of any person or entity indemnified hereunder.

C. Any new Laws or Regulations adopted after the time of opening of Bids that cause an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of any such adjustment, Contractor may submit a Claim as provided in Paragraph 10.05. Similarly, if Contractor disagrees with a unilateral adjustment in Contract Price or Contract Times made by Owner, Contractor may submit a Claim as provided in Paragraph 10.05.

D. The date upon which a new Law or Regulation is adopted shall be determined by the date it was formally adopted by the governing body or officer authorized to adopt the Law or Regulation, and not by its effective date. (For example, California Senate Bill 189 (SB189, Stats 2010, c. 697), which was approved by the Governor of September 30, 2010, but contains provisions which are not effective until July 1, 2012, would not be considered a new Law or Regulation, even if the opening of Bids is before July 1, 2012.) Contractor shall not be entitled to any adjustment in Contract Price or Contract Time when the new Law or Regulation is an Order specifically directed towards Contractor that relates to Contractor's past or present conduct, or other circumstances within Contractor's control or responsibility.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner, Engineer, Designer, the State Water Resources Control Board, the California Infrastructure and Economic Development Bank, and each of their respective trustees, officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work. The duty to defend shall apply notwithstanding any alleged or actual concurrent negligence (active or passive) or partial fault on the part of any person or entity indemnified hereunder.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. This requirement shall apply continuously, including days when Work is suspended, and shall not be limited to normal working hours. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work, including but not limited to members of the public using any adjoining road or right of way;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, fences, wall, signs, buildings, all highway facilities and Underground Facilities, and any other improvements or facilities within or adjacent to the Work not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

1. Contractor shall maintain at its office or other well-known place at the Project Site, the appropriate items for giving first aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons (including employees) who may be injured on the Project Site.

2. No review or inspections by Owner or Engineer shall relieve Contractor of its responsibilities under this Paragraph 6.13.

3. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to Engineer and Owner. In addition, Contractor must promptly report in writing to Engineer all accidents whatsoever arising out of, or in connection with, the performance of the Work whether on, or adjacent to the Site, giving full details and statements of witnesses. Nothing in this paragraph shall excuse Contractor from reporting any accident, damage, injuries, or fatalities to any other person, entity, or agency as may be required by Laws or Regulations.

4. For all excavations in excess of five (5) feet, Contractor shall, pursuant to Labor Code Section 6705, submit in advance of any excavation hereunder a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from caving ground. No such excavation shall be made until said detailed plan is submitted by Contractor and accepted by Engineer. If such plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer. Nothing in this paragraph shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders of the California Division of Occupational Safety and Health. Nothing in this paragraph shall be construed as imposing any liability upon Owner or Engineer.

5. Contractor shall comply with applicable occupational safety and health standards, rules, regulations, and orders. The Occupational Safety and Health Standards Board is the only agency authorized in the State to adopt and enforce occupational safety and health standards (Labor Code § 142 et seq.). Contractor is the controlling employer and must ensure hazardous conditions are corrected (Labor Code § 6400).

6. Contractor shall submit to Engineer copies of its Injury and Illness Prevention Program and permits required by Cal/OSHA.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Specifications identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall notify Owner and Engineer in writing of the specific requirements of Contractor's safety program and Owner's and Engineer's employees and representatives shall comply therewith while at the Site, so long as said requirements do not unreasonably interfere with Owner's and Engineer's functions at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be the responsibility of Contractor and shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or Designer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the Work involved in protecting person or property or repairing property, as specified in the Contract Documents shall be considered as included in the prices paid for the various contract items of Work and no additional compensation will be allowed therefor.

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with all applicable Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall immediately notify Engineer of emergency. Contractor shall also provide Engineer written notice as soon as feasible, and in no instance later than the end of the next business day after the day on which the alleged emergency occurred, if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

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

1. *Shop Drawings:*

a. Submit 5 copies.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

   a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

   b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

   c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

   d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

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

4. The practice of submitting incomplete or unchecked Shop Drawings for Engineer to correct or finish will not be acceptable; and Shop Drawings which, in the opinion of Engineer, clearly indicate that they have not been checked by Contractor will be considered as not complying with the intent of the Contract Documents and will be returned to Contractor for resubmission in the proper form.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident

thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

4. After the Shop Drawings have been reviewed by Engineer, two sets of submittals will be returned to Contractor appropriately stamped. If major changes or corrections are necessary, the Shop Drawings may be rejected and one set will be returned to Contractor with such changes or corrections indicated.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

   If Contractor makes any changes to resubmitted Shop Drawings other than those changes indicated by Engineer, Contractor shall provide Engineer written notice of such changes. This notice shall be both a written communication separate from the Shop Drawings; and, in addition, by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Engineer and/or Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements.

6.19 *Contractor's General Warranty and Correction Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be performed and installed in accordance and conformance with the Contract Documents, will be of good

quality and new, and will not be defective. Owner and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on the Contractor's warranty and guarantee made hereunder or in any separate warranties by Contractor, its Subcontractors and Suppliers.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, improper maintenance, or improper operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

This warranty is not limited by the provisions of Paragraph 13.07 herein, relating to Contractor's correction period. The provisions of this Paragraph 6.19 shall survive Contractor's completion of the Work or termination of the Contractor's performance of the Work. Contractor's surety shall be liable for breaches of this warranty and the correction obligations described in this Paragraph 6.19 and in Paragraph 13.07.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, lack of inspection, test, or approval by Engineer or others; or

7. any correction of defective Work by Owner.

D. In addition to the Contractor's general warranty provided in Paragraphs 6.19.A and 6.19.B, Contractor hereby agrees to make, at its own expense, all repairs or replacements necessitated by defective Work, including defects in material or workmanship, supplied under terms of this Contract, which become evident within one year after the date of final acceptance of the Work, or such longer period of time as may be prescribed by the terms of any applicable special guarantee or warranty periods specified in the Contract Documents. After being deemed substantially complete by Engineer and Owner, Contractor shall also warranty its work against trench settlement

for a period of three years after the date of final acceptance by Owner, or such longer period of time as may be prescribed by the terms of any applicable special guarantee or warranty periods specified in the Contract Documents.

E. Contractor shall make all repairs and replacements promptly upon receipt of written notice for same from Owner. If Contractor fails to make the repairs and replacements in a timely manner, Owner may do the work, and Contractor and its surety shall be liable for the cost thereof.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall defend, indemnify and hold harmless Owner, Designer, Engineer, the State Water Resources Control Board, and the California Infrastructure and Economic Development Bank, and each of their respective trustees, officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable. The duty to defend shall apply notwithstanding any alleged or actual concurrent negligence (active or passive) or partial fault on the part of any person or entity indemnified hereunder.

B. In any and all claims against Owner, Designer, Engineer, the State Water Resources Control Board, or the California Infrastructure and Economic Development Bank, or any of their trustees, officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of any of the following acts or omissions of Engineer or Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

D. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Designer and Designer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of any of the following acts or omissions of Designer or Designer's officers, directors, members, partners, employees, agents, consultants and subcontractors:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

6.22 *Daily Reports*

A. Contractor shall complete a daily report on forms provided by Engineer (and approved by Owner) that sets forth the daily progress and status of the Work. The daily report is due at the conclusion of each work day, and shall be signed and submitted by Contractor to Engineer no later than the close of the next working day. Failure to submit the completed daily report by the close of the next working day shall constitute a breach of this Contract. Reports by Subcontractors or others shall be submitted through Contractor.

B. Acceptance of the daily report by the Engineer does not constitute any agreement or acquiescence by Engineer or Owner that the information contained therein is accurate or complete. If the Engineer requests the Contractor to resubmit the daily report with more complete or accurate information, the Contractor shall respond to such requests within 24 hours by resubmitting a revised daily report. The daily report shall set forth the daily progress and status for each component of the Work requested by the Engineer, and shall inform the Engineer of any events, issues or circumstances which Contractor believes may lead Contractor to seek an adjustment in Contract Price or Contract Time. The daily report shall also include applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and other services and expenditures when authorized. In addition to any other information requested by the Engineer on the form, the report shall also:

1. Show names of workers, classifications, and hours worked.

2. Describe and list quantities of materials used.

3. Show type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable (and noting periods of time when said equipment is out of service, if applicable).

4. Describe other services and expenditures in such detail as the Engineer or Owner may require.

6.23 *Payroll Record of Wages Paid*

A. Contractor shall submit, weekly, a copy of certified payroll records, including those of Subcontractors. Payroll records shall include:

1. each employees showing the full name; address; social security number; work classification; straight time and overtime hours worked each day and week; actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed in connection with the Work; pay rate; itemized deductions made; check number issued; and

2. apprentices and the apprentice-to-journeyman ratio.

B. Each certified payroll shall be accompanied by a statement of compliance, on a form acceptable to the Engineer, signed by the employer or the employer's agent indicating

that the payrolls are correct and complete and that the wage rates contained therein are not less than those required by the Contract.

C. The payroll records shall be available for inspection at all reasonable hours at Contractor's principal office upon the basis set forth in Section 1776 of the Labor Code, and Contractor shall comply fully with all of the provisions thereof and of any rules adopted pursuant thereto.

D. In the event of noncompliance with the requirements of such section after 10 days written notice specifying in what respects compliance is required Contractor shall forfeit as a penalty to Owner, $25.00 for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due.

E. Contractor and each Subcontractor shall preserve their payroll records for a period of 3 years from the date of final payment.

6.24 *Disadvantaged Business Enterprises Utilization Report*

A. Contractor shall submit, with each progress payment request, a DBE Utilization Report on a form furnished by the Engineer (and approved by Owner).

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such

utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. Unless otherwise provided in the Contract Documents, Contractor shall be responsible for coordinating the performance of its Work with the performance of other work on the Project at the Site.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

Only those contracts between Owner and an independent contractor hired by Owner to perform specific work pursuant to Owner's specifications shall constitute a "direct contract" of Owner under Paragraph 7.01.A. Any contract relating to any facilities owned by a utility, regardless of whether Owner is contracting with the utility company or some other individual or entity authorized to perform work relating to said facilities, does not constitute a "direct contract" of Owner under Paragraph 7.01.A.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

7.04 *Claims Between Contractors*

A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, or Engineer, then Contractor shall (at no cost to Owner or Engineer) either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.

B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner or Engineer to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any Claim, Contractor shall not institute any action, legal or equitable, against Owner or Engineer or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner or Engineer on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing the Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Paragraph 10.05. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner and Engineer for any delay, disruption, interference, or hindrance caused by any other contractor.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall furnish the data required of Owner under the Contract Documents in a timely manner.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 4.01. Paragraph 4.02 refers to Owner's identifying and making available to Contractor

copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Blank*

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and

qualified professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

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

9.03 *Project Representative*

A. An employee of Engineer shall act as a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants shall include the authority to transmit instructions, receive information, and perform other acts Engineer is authorized to perform under the Contract Documents. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Specifications.

Other duties, responsibilities, and limitations of authority of the Resident Project Representative are located in the written agreement between Engineer and Owner for this specific Project (which agreement may be amended by Engineer and Owner from time to time).

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly If Contractor believes that a Field Order should instead have been issued as a Change Order because that Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, Contractor's exclusive remedy is set forth in Paragraph 10.05. A notice stating the general nature of such a Claim for adjustment to the Contract Times or Contract Price,

as a result of the issuance of a Field Order, shall be submitted by Contractor, under Paragraph 10.05.B, before Contractor performs any portion of the Field Order work for which Contractor believes an adjustment to the Contract Time or Contract Price should be made, unless an emergency comparable to conditions under Paragraph 6.16 requires the performance of the Field Order before such a notice can be submitted by Contractor.

B. Contractor shall acknowledge in writing the receipt of all Field Orders. Contractor's acknowledgement of receipt does not preclude Contractor from submitting a Claim pursuant to Paragraphs 9.04 and 10.05. The lack of any such acknowledgement does not affect Contractor's obligation to comply with the Field Order.

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Any questions by Contractor arising prior to the date final payment is due relating to the acceptability of the Work,

and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 7 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on any such questions referred by Contractor. If Contractor believes that any such decision entitles it to an adjustment in the Contract Price or Contract Times or both, Contractor's exclusive remedy is set forth in Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B. If no written decision is issued by Engineer within 30 days of Contractor's written question(s), a written decision shall be deemed to have been issued on said 30th day by Engineer that resolves every such question raised by Contractor in a manner that would be the most unfavorable to Contractor's position, such that the decision would not entitle Contractor to any adjustment in Contract Price and/or Contract Time.

C. Engineer's written decision on any questions referred by Contractor will be final and binding on Contractor, subject to the provisions of Paragraph 10.05.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. *Blank*

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

9.11 *Lines and Grades*

A. Engineer's duties with respect to providing stakes and marks are set forth in Paragraph 4.05.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided in the Change Order or Work Change Directive).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made by Contractor as provided in Paragraph 10.05.

C. If, after issuance of a Work Change Directive, the Owner and Contractor do not agree on the appropriate adjustment in Contract Price and/or Contract Times, if any, that should be allowed as a result of the Work Change Directive, the Owner may issue a Unilateral Change Order stating the adjustment, if any, that is being made to the Contract Price and/or Contract Times as a result of the Work Change Directive. If Contractor believes it is entitled to any further adjustment in Contract Price and/or Contract Time, or any other relief, as a result of the Work Change Directive, Contractor's exclusive remedy is set forth in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

B. A Change Order that adjusts the Contract Price, or the Contract Time, or both, shall be accomplished only by a written and executed Change Order. Accordingly, no course of conduct or dealings between the parties, no expressed or implied acceptance of alterations or additions to the Work, and no assertion that Owner has been unjustly enriched by any alterations or additions to the Work shall be the basis for an increase in any amount due under the Contract Documents or in any time period provided for in the Contract Documents, unless executed as a Change Order under this Paragraph 10.03. A Bilateral Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but no limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Price and the Contract Times.

C. Whenever an adjustment in Contract Price and/or Contract Times is warranted under the Contract Documents, but the Owner and Contractor cannot agree to the amount of adjustment, if any, that should be allowed to the Contract Price and/or Contract Times, the Owner may issue a Unilateral Change Order stating the adjustment, if any, that is being made to the Contract Price and/or Contract Times. If any unilateral adjustment to the Contract Price and/or Contract Times is not acceptable to Contractor for any reason, including any argument that an adjustment to the Contract Price and/or Contract Times was not warranted by the Contract Documents, the Contractor's exclusive remedy is to follow the Claim process set forth in Paragraph 10.05. A Unilateral Change Order may be jointly signed by the Engineer, but the Engineer's signature is not required. Unless otherwise obligated under applicable law, the Owner is not obligated to issue a Unilateral Change Order.

D. In the event a Change Order increases the Contract Price, Contractor shall include the Work covered by such Change Order in applications for payments as if such Work were originally part of the Agreement.

10.04 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), and such notice has not been consented to in advance by the surety, the giving of any such notice will be Contractor’s responsibility. It shall be Contractor’s responsibility to ensure that the amount of each applicable bond is adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Mandatory Procedure and Condition Precedent.*

1. Any demand or assertion by Contractor seeking an adjustment of Contract Price and/or Contract Times, or other relief, for any reason whatsoever, must be in strict compliance with the requirements of this Paragraph 10.05. For purposes of this Paragraph 10.05, any and all work relating to any such demand or assertion shall be

referred to as “Disputed Work”, regardless of whether the basis of the demand or assertion arises from an interpretation of the Contract Documents, an action or inaction of Contractor, Engineer or Owner, or any other event, issue, or circumstance. In order for any such demand or assertion to qualify as a “Claim”, it must strictly comply with the provisions of this Paragraph 10.05. Contractor shall bear all costs incurred in complying with the provisions of this Paragraph 10.05.

2. The requirements set forth in this Paragraph 10.05 are mandatory, and Contractor shall strictly comply with these requirements. Strict compliance with these requirements is a condition precedent to Contractor’s ability to exercise any rights or remedies that may otherwise be available to Contractor under the Contract Documents or any applicable Laws or Regulations relating to the Claim. No action or inaction by Contractor, Owner, and/or Engineer to try to resolve any Claim(s) through agreement (including Change Order), mediation, settlement, or any other means shall excuse Contractor from strictly complying with the requirements of this Paragraph 10.05. Notwithstanding any other language in the Contract Documents that permits Contractor to submit a Claim under Paragraph 10.05 in the event Contractor, Engineer, and/or Owner are unable to reach an agreement on any particular issue, Contractor shall strictly comply with requirements of this Paragraph 10.05, and shall not delay compliance with any requirements herein on the grounds that Contractor, Engineer, and/or Owner were trying to reach an agreement on any issue relating to the Claim.

3. Contractor’s strict compliance with the requirements of this Paragraph 10.05 serves the important purpose of facilitating the Owner’s management of its budget for not only this Contract, but also for other contracts relating to the sewer collection system. This Contract is but one of numerous prime contracts for the construction of the sewer collection system, and Contractor’s strict compliance with this Paragraph 10.05 provides the Owner with the prompt notice of potential and actual Claims needed for budget management purposes. This Paragraph 10.05 also serves the important public purpose of providing the Owner a means of verifying the basis for the expenditure and/or reduction of the public funds or resources sought by a Claim. Another purpose of the requirements in this Paragraph 10.05 is to promptly provide Engineer and Owner with information that may enable Owner and Contractor to resolve Contractor’s Claim through a Bilateral Change Order.

4. Contractor’s compliance with the provisions of this Paragraph 10.05 shall not excuse Contractor’s failure to comply with any other provisions of the Contract Documents, including but not limited to, any provisions relating to Contractor’s obligation to provide any notice, documentation, inspections, Site access, or any other requirements relating to any event, issue, or circumstance (including, but not limited to, any documentation required by Paragraph 11.01.D). Contractor’s compliance with the provisions of this Paragraph 10.05 shall not excuse Contractor’s failure to provide notice of any event, issue, or circumstance, or to perform any other duties expressed or implied in Contract Documents, at the time Contractor reasonably should have been aware of the event, issue, or circumstance. Nothing in this Paragraph 10.05 shall extend any time deadlines provided in any other provisions in the Contract Documents.

5. Pursuant to the Claim requirements set forth in this Paragraph 10.05, the Contractor's submittal of an Initial Notice of Potential Claim, Supplemental Notice of Potential Claim, and updated Supplemental Notices of Potential Claim will provide the Contractor and Engineer multiple opportunities to meet and confer regarding a potential Claim before it becomes a final Claim. In addition to the important public purpose of providing a means of verifying the basis for the expenditure and/or reduction of public resources sought by a Claim, the notice and reporting requirements imposed upon Contractor under this Paragraph 10.05 promote regular, periodic communications of updated information regarding a potential claim before it becomes a final claim so that final claims can be processed more efficiently. Such communication may also help facilitate resolution of the potential Claim. If Contractor or Engineer request an informal conference to discuss a potential Claim, such a conference may be held at a mutually convenient time. Once a Notice of Final Claim is filed, Paragraph 10.05.E. shall govern the scheduling of any informal conference to meet and confer for settlement of the Claim. No action or inaction by Contractor, Engineer, and/or Owner relating to any conference to discuss a potential or final Claim shall excuse Contractor from strictly complying with the requirements of this Paragraph 10.05.

6. For Claims less than or equal to $375,000, Paragraphs 10.05 and 10.06 shall be interpreted in a manner consistent with Public Contract Code sections 20104 and 20104.2. The substance of Public Contract Code sections 20104 and 20104.2 have been incorporated into Paragraphs 10.05 and 10.06 in a manner that is consistent with the notice requirements provided in the Contract Documents.

B. Initial Notice of Potential Claim.

Promptly upon becoming aware of any event, issue, or circumstance which Contractor believes provides a basis for an adjustment of Contract Price and/or Contract Times, or other relief, Contractor shall provide a signed written Initial Notice of Potential Claim to Engineer and Owner. The Initial Notice of Potential Claim shall be submitted before commencing any Disputed Work, or within 7 days of the event, issue, or circumstance from which the Claim arises, whichever is earlier.

The Initial Notice of Potential Claim shall clearly state the Contractor's grounds for seeking an adjustment in Contract Price and/or Contract Times or other relief, the nature and circumstances of the Disputed Work, the relief or adjustment sought by Contractor, and a cost proposal for the Disputed Work. The Initial Notice of Potential Claim shall be submitted on a form furnished by the Engineer (and approved by Owner) and shall be certified under penalty of perjury with reference to the California False Claims Act, Government Code Sections 12650-12655. Contractor shall assign an exclusive identification number for each potential Claim, determined by chronological sequencing, based on the date of the potential Claim. The nature and circumstances involved in the dispute shall remain consistent throughout the processing of the Claim.

The exclusive identification number for each Claim shall be used on the following corresponding documents:

1. Initial Notice of Potential Claim.

2. Supplemental Notice of Potential Claim.

3. Notice of Final Claim.

4. Contractor's written statement of Claims under Paragraph 14.07.A.2.

After reviewing Contractor's initial notice, Engineer may provide a written response thereto or may decide to delay providing a response until Contractor provides further information regarding the potential Claim pursuant to the provisions of this Paragraph 10.05. No response by Engineer that could be interpreted as suggesting that Contractor is entitled to an increase Contract Price or Contract Time is binding upon Owner unless Owner has co-signed the response.

C. *Supplemental Notice of Potential Claim:* Within 15 days of submitting the Initial Notice of Potential Claim, Contractor shall provide a signed Supplemental Notice of Potential Claim to Engineer and Owner that provides the following information:

1. The complete nature and circumstances of the dispute which caused the potential Claim.

2. The contract provisions that provide the basis of the potential Claim.

3. The requested adjustment of Contract Price, if any, and the estimated cost of the potential Claim, including an itemized breakdown of individual costs and how each estimate was determined.

4. The requested adjustment of Contract Time, if any, and a time impact analysis of the Progress Schedule that illustrates the effect on the scheduled completion date due to schedule changes or disruptions.

The information provided by Contractor shall provide Contractor's complete reasoning for additional compensation or adjustments and shall be as complete as reasonably possible.

The Supplemental Notice of Potential Claim shall be submitted on a form furnished by Engineer (and approved by Owner) and shall be certified under penalty of perjury with reference to the California False Claims Act, Government Code Sections 12650-12655. If at any time the estimated cost of the potential Claim or effect on the Progress Schedule changes, Contractor shall update information in items 3 and 4 above as soon as the change is recognized and submit this information to Engineer.

If the Disputed Work is not completed within 30 days, then Contractor shall, every 30 days until the Disputed Work ceases, submit to Engineer and Owner an updated Supplemental Notice of Potential Claim that shall update and quantify all of the information required in the Supplemental Notice of Potential Claim. Contractor's failure to so quantify costs and schedule impacts every 30 days shall result in a waiver of the Claim for that 30-day period. Any supplemental notice or updated notice that states that the requested adjustment of Contract Price and/or Contract Time will be provided or determined at a later date, or that any damages, costs, schedule impacts,

and/or any other analysis will be provided or determined at a later date, shall be deemed to be not in compliance with this Paragraph 10.05, and shall result in Contractor waiving its Claim.

After reviewing the Contractor's Supplemental Notice of Potential Claim or updated Supplemental Notice of Potential Claim, Engineer may provide a written response thereto or may decide to delay providing a response until Contractor provides further information regarding the potential Claim pursuant to the provisions of this Paragraph 10.05. No response by Engineer that could be interpreted as suggesting that Contractor is entitled to an increase Contract Price or Contract Time is binding upon the Owner unless Owner has co-signed the response.

D. Notice of Final Claim.

As soon as reasonably practical upon completion of the Disputed Work, and no later than 30 days after completion of the Disputed Work, Contractor shall provide to Engineer and Owner a Notice of Final Claim containing a full and final documentation of the Claim that provides the following information:

1. A detailed factual narration of events fully describing the nature and circumstances that caused the dispute, including, but not limited to, necessary dates, locations, and items of Work affected by the dispute.

2. The specific provisions of the Contract that support the Claim and a statement of the reasons these provisions support and provide a basis for entitlement of the Claim.

3. When additional monetary compensation is requested, the exact amount requested calculated in conformance with the Contract Documents and shall include an itemized breakdown of individual costs. These costs shall be segregated into the following cost categories:

    a. Labor – A listing of individuals, classifications, regular hours and overtime hours worked, dates worked, hourly labor rates, and other pertinent information related to the requested reimbursement of labor costs.

    b. Materials – Invoices, purchase orders, location of materials either stored or incorporated into the work, dates materials were transported to the project or incorporated into the work, and other pertinent information related to the requested reimbursement of material costs.

    c. Equipment – Listing of detailed description (make, model, and serial number), hours of use, dates of use, and equipment rates. Equipment rates shall be at the applicable State rental rate as listed in the Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates," in effect when the Disputed Work was performed.

    d. Other categories as specified by Contractor or Engineer.

4. When an adjustment of Contract Time is requested the following information shall be provided:

    a. The chronology of the specific dates for which Contract Time is being requested.

    b. The specific reasons for entitlement to a Contract Time adjustment.

    c. The specific provisions of the Contract that provide the basis for the requested Contract Time adjustment.

    d. A detailed time impact analysis of the Progress Schedule. The time impact analysis shall show the effect of changes or disruptions on the scheduled completion date to demonstrate entitlement to a Contract Time adjustment.

5. The listing, identification, and production of copies of all documents Contractor believes support its Claim and the date, time, circumstances, details and substance of any oral communications that Contractor believes support the Claim.

   The Notice of Final Claim shall be submitted on a form furnished by Engineer (and approved by Owner) and shall be certified under penalty of perjury with reference to the California False Claims Act, Government Code Sections 12650-12655.

   Contractor shall include all pertinent information, references, arguments, and data supporting its Claim in the Notice of Final Claim. Information submitted subsequent to the Notice of Final Claim will not be considered. No Notice of Final Claim will be considered that does not have the same nature and circumstances, and basis of Claim as those specified on the Initial and Supplemental Notices of Potential Claim.

E. *Response to Notice of Final Claim.*

1. *Engineer's Authority to Respond to Claim*. Engineer will evaluate the information and documentation presented in the Notice of Final Claim and provide a written response to Contractor. Engineer may issue a written response denying the Claim, but Owner's signature is required on any response granting any part of the Claim.

   A Claim may be granted in whole or in part only by a written response that contains a signature of an authorized officer or employee of Owner acknowledging Owner's approval of the response. A response unsigned by Owner that grants in whole or in part any part of a Claim is invalid and not binding on the Owner. In the event a valid written decision is not provided to Contractor within the time prescribed in this Paragraph 10.05, the Claim shall be deemed denied on the last day a written response was due. The date upon which the Claim is approved or denied pursuant to the provisions of this Paragraph 10.05, shall constitute the date of the final decision on the Claim under the provisions of this Paragraph 10.05. The date of the final decision on a Claim can only be changed by a subsequent writing signed by Engineer and Owner that expressly states that the date of the final decision on the Claim has been changed to a new specific date.

2. *For Claims of less than $50,000*. For Claims of less than fifty thousand dollars ($50,000), the Engineer shall respond in writing to the Notice of Final Claim within 45 days of receipt thereof, or may request, in writing, within 30 days of said receipt, any additional documentation relating to the Claim or any defenses to the Claim the Owner may have against the Contractor. Contractor shall comply with the request within the reasonable time deadlines provided by Engineer in the request. If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the Owner and the Contractor. The written response to the Notice of Final Claim shall be submitted to the Contractor within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

3. *For Claims Over $50,000 and Less Than or Equal to $375,000*. For Claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the Engineer shall respond in writing to the Notice of Final Claim within 60 days of receipt thereof, or may request, in writing, within 30 days of said receipt, any additional documentation relating to the Claim or any defenses to the Claim the Owner may have against the Contractor. Contractor shall comply with the request within the reasonable time deadlines provided by Engineer in the request. If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the Owner and the Contractor. The written response to the Notice of Final Claim shall be submitted to the Contractor within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

4. *For Claims Less Than or Equal to $375,000*. For Claims less than or equal to $375,000, if the Contractor disputes the written response to the Claim, or if a written response is not submitted within the time prescribed above, the Contractor may so notify the Engineer and Owner, in writing, either within 15 days of receipt of the written response or within 15 days of the Engineer'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 such a timely demand by Contractor, the Engineer and Owner shall schedule a meet and confer conference within 30 days for settlement of the dispute. Within 30 days after such conference, a final written response to the Claim shall be issued which will serve as the new final decision on the Claim. Pursuant to Public Contract Code section 20104.6, the Owner shall not fail to pay money as to any portion of a Claim which is undisputed, except as otherwise provided in the Contract Documents.

5. *For Claims Greater Than $375,000*. For Claims over three hundred seventy-five thousand dollars ($375,000), the Engineer shall respond in writing to the Notice of Final Claim within 60 days of receipt thereof Claim, or may request, in writing, within 45 days of said receipt, any additional information or documentation relating to the Claim or any defenses to the Claim the Owner may have against the

Contractor. Contractor shall comply with the request within the reasonable time deadline provided by Engineer in the request. If any additional information is thereafter requested by Engineer, it shall likewise be provided by Contractor within the reasonable time deadline provided by Engineer in such follow-up request. The written response to the Notice of Final Claim shall be submitted to the Contractor within 30 days after receipt of such further information and documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or documentation, whichever is greater. Contractor may request an informal conference to meet and confer for settlement of the issues in dispute, but Contractor shall have no right to demand such a conference. Neither the requesting of any such conference by Contractor, Engineer or Owner, nor the holding of such conference shall affect the date of the final decision on the Claim. No written communications of Engineer and/or Owner sent to Contractor after any such conference will change the date of the final decision on the Claim unless the writing expressly states that the date of the final decision is being changed to a new specific date.

F. *Contractor's Continuing Obligations.*

1. At all times during the processing of Contractor's potential or final Claim, Contractor shall diligently proceed with the performance of the Disputed Work and other Work, unless otherwise specified or directed by Engineer.

2. Contractor shall provide Owner and Engineer the opportunity to examine the Site of the Disputed Work as soon as reasonably possible, and in no event later than 5 days from the date of the Initial Notice of Potential Claim. Throughout the processing of Contractor's potential or final Claim, Contractor shall provide Owner and Engineer a reasonable opportunity to examine the Site of the Disputed Work within 5 days of the date of Owner's or Engineer's written request therefor.

3. Contractor shall promptly respond to any requests for further information or documentation regarding Contractor's potential or final Claim. If Contractor fails to provide an adequate written response to Engineer or Owner within 15 days of Engineer's or Owner's written request for such further documentation or information, Contractor shall be deemed to have waived its Claim. If the further documentation or information requested by Owner or Engineer would, in the opinion of the Engineer, reasonably take the Contractor more than 15 days to comply with, the written request shall provide the Contractor a specific response deadline that is commensurate to a reasonable response time.

4. Throughout the performance of the Disputed Work, Contractor shall maintain records that provide a clear distinction between the incurred direct costs of Disputed Work and other Work. Contractor shall allow Owner and Engineer access to Contractor's Project records deemed necessary by Owner or Engineer to evaluate the potential or final Claim within 15 days of the date of Owner or Engineer's written request. Contractor's failure to comply with the provision of this Paragraph 10.05 shall constitute a waiver of the Contractor's Claim.

5. All Subcontractor and Supplier claims of any type shall be brought only through Contractor pursuant to the provisions of this Paragraph 10.05. Under no circumstances shall any Subcontractor or Supplier make any direct claim against Owner.

6. Except where provided by law, or elsewhere in these Contract Documents (if applicable), OWNER SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES, AND CONTRACTOR SHALL NOT INCLUDE THEM IN ITS CLAIMS. Contractor shall be limited in its recovery on any Claim(s) to the adjustments allowed in Articles 11 and 12 of the Contract Documents.

7. During each step in the processing of Contractor's Claim, each notice shall be accompanied by Contractor's written statement that the adjustment or relief claimed is the entire adjustment or relief to which the claimant believes it is entitled as a result of the event, issue, or circumstance giving rise to the Claim.

8. Contractor shall be responsible for providing written evidence of the date any of the notices referenced in paragraphs 10.05.B through 10.05.C above were provided to Engineer and Owner, and shall provide Engineer and Owner a copy of such written evidence within 5 days of a request thereof. Such evidence shall be either a written receipt of actual delivery from U.S. Postal Service or other reputable delivery service, or by the recipient's written acknowledgement of receipt.

9. The rights of Owner and Engineer to request further records, documents, or information from Contractor regarding a Claim are for the sole benefit of Owner and Engineer, and may be exercised at their sole discretion. Any failure by Owner and/or Engineer to exercise their rights does not provide the Contractor any excuse for not providing all of the records, documents, and other information it is requested to provide under Paragraph 10.05 or any other provision of the Contract Documents.

10. Under no circumstances may Contractor submit an Initial Notice of Potential Claim, Supplemental Notice of Potential Claim, or Final Notice of Potential Claim after the date of final payment.

G. *Exclusive Remedy.*

1. The administration of a Claim as provided in this Paragraph 10.05, including Contractor's performance of its duties and obligations specified in this Paragraph 10.05 is Contractor's sole and exclusive remedy for disputes of all types pertaining to the payment of money, extension of time, the adjustment or interpretation of the Contract Documents terms or other contractual or tort relief arising from Contract Documents. This exclusive remedy and the limitation of liability (expressed herein and elsewhere throughout the Contract Documents) apply notwithstanding the completion, termination, suspension, cancellation, breach, or rescission of the Work or Contract Documents, the negligence or strict liability of Owner, its

representatives, consultants, or agents, or the transfer of Work or the Project to Owner for any reason whatsoever.

2. Contractor waives and covenants not to raise any claims of waiver, estoppel, release, bar, or any other type of excuse for non-compliance with these Paragraph 10.05 requirements. Compliance with the procedures described in this Paragraph 10.05 is a condition precedent to the right to file a Government Code Claim, commence litigation, or commence any other legal action. Claim(s) or issue(s) not raised in a timely Claim submitted under this Paragraph 10.05 may not be asserted in any subsequent Government Code Claim, litigation, or legal action. Owner shall not be deemed to waive any provision under this Paragraph 10.05, if at Owner's sole discretion, a claim is administered in a manner not in accordance with this Paragraph 10.05.

10.06 *Other Requirements Relating to Claims*

A. *Government Code Claim Requirements:*

For all Claims not resolved as a result of the Paragraph 10.05 procedures, Contractor must submit each Claim in a Government Code Section 910 form of claim for final investigation and consideration of its settlement prior to initiation of any litigation on any such Claim, as required by Government Code Section 945.4. Pursuant to Government Code Section 930.2, the one-year period in Government Code Section 911.2 is hereby reduced to 150 days. This time deadline is measured from the accrual date of each separate cause of action.

B. *Tolling.*

1. For each unresolved Claim properly processed by Contractor in accordance with Paragraph 10.05, the running of the period of time within which a Government Code claim must be submitted shall be tolled during the time the Contractor is processing the Claim in compliance with Paragraph 10.05. Under no circumstances shall the time for submitting a Government Code Claim be extended beyond 150 days of the date of the final decision on the Claim under Paragraph 10.05. Contractor waives the right to pursue or submit any Claims not processed in accordance with Paragraph 10.05.

2. Other than as expressly provided in Paragraph 10.06.B.1., the time deadline for filing a Government Code claim shall not be tolled by any action or inaction by Contractor, Engineer or Owner, including but not limited to any action or inaction to try to resolve the Claim through negotiation, mediation, settlement, agreement (including Change Order), or by any other means, other than by a separate written tolling agreement expressly approved as to form (on the face of the agreement) by the County Counsel's Office of Owner.

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

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the extra work. When the value of any extra work covered by a Change Order is determined on the basis of Cost of the Work, or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. The cost of labor for the workers, under schedules of job classifications agreed upon by Owner and Contractor (including foreman when authorized in writing by Engineer), used in the actual and direct performance of the extra work. The cost of labor, whether the employer is Contractor, Subcontractor, or other forces, will be the sum of the following:

   a. The actual wages paid (including basic hourly wage, health and welfare, pension, vacation, training, and other State and Federal recognized fringe benefit payments)

   b. The employer labor surcharge, as set forth in the Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates which is in effect on the date upon which the extra work is accomplished and which is part of this Contract, constituting full compensation for worker's compensation insurance, social security contributions, Medicare, federal unemployment insurance, state unemployment insurance, and state training taxes; and

   c. Subsistence and travel allowances paid to the workers.

2. Cost of all materials necessarily furnished and incorporated in the extra work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

   The cost of materials will be the cost to the purchaser, whether Contractor, Subcontractor, or other forces, from the supplier thereof, except as the following are applicable:

   a. If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to the purchaser, the

cost of those materials shall be deemed to be the price paid to the actual supplier plus the actual costs, if any, incurred in the handling of the materials.

b. If the materials are obtained from a supply or source owned wholly or in part by the purchaser, the cost of those materials shall not exceed the price paid by the purchaser for similar materials furnished from that source on contract items or the current wholesale price for those materials delivered to the Project Site, whichever price is lower.

c. If the cost of the materials is, in the opinion of Engineer, excessive, then the cost of the material shall be deemed to be the lowest current wholesale price at which the materials were available in the quantities concerned delivered to the Project Site, less any discounts as provided in this paragraph.

d. If Contractor does not furnish satisfactory evidence of the cost of the materials from the actual supplier thereof within 60 days after the date of delivery of the material or within 15 days after acceptance of the Contract, whichever occurs first, the Owner reserves the right to establish the cost of the materials at the lowest current wholesale prices at which the materials were available in the quantities concerned delivered to the location of the Work, less any discounts as provided in this paragraph.

e. The Owner reserves the right to furnish materials for the extra work and no request for Change Order or Claim will be allowed by Contractor for costs and profit on such materials.

3. Costs of special work or services are defined as that work characterized by extraordinary complexity, sophistication, innovation, or a combination of the foregoing attributes which are unique to the construction industry. When Engineer and Contractor, by agreement, determine that a special service on an item of extra work cannot be performed by Contractor's forces or those of any of its Subcontractors, that service or extra work item may be performed by a specialist. Payment for special services work will be subject to the following:

a. Invoices for the service or item of extra work on the basis of the current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with the established practice of the special service industry to provide a complete itemization;

b. In those instances wherein Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the Project Site, the charges for that portion of the extra work performed in the facility may, by agreement, be accepted as a special service and accordingly, the invoices for the work may be accepted without detailed itemization; and

c. All invoices for special services will be adjusted by deducting all cash or trade discounts offered or available, whether or not the discount may have been taken.

An allowance 15 percent will be added to invoices for special services, in lieu of the percentages provided in Paragraph 12.01.C.

4. Equipment: Cost of equipment necessarily used in the performance of the extra work will be paid at the rental rates listed for that equipment in the Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of this Contract, regardless of ownership and any rental or other agreement, if they may exist, for the use of that equipment entered into by Contractor, except that for those pieces of equipment with a rental rate of $10.00 per hour or less as listed in the Labor Surcharge And Equipment Rental Rates publication and which are rented from a local equipment agency, other than Contractor owned, Contractor will be paid at the hourly rate shown on the rental agency invoice or agreement for the time used on the extra work as provided in this paragraph. If a minimum equipment rental amount is required by the local equipment rental agency, the actual amount charged will be paid to Contractor. If it is deemed necessary by Engineer to use equipment not listed in the Labor Surcharge And Equipment Rental Rates publication, a suitable rental rate for that equipment will be established by Contractor. If the rental rate established by Contractor is $10.00 per hour or less, the provisions above concerning rental of equipment from a local equipment agency shall apply. Payment for equipment shall be subject to the following:

   a. The rental rates shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals.

   b. Operators of rented equipment will be paid for as provided in Paragraph 11.01.A.1.

   c. All equipment shall, in the opinion of Engineer, be in good working condition and suitable for the purpose for which the equipment is to be used.

   d. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

   e. Individual pieces of equipment or tools not listed in the Labor Surcharge and Equipment Rental Rate publication and having a replacement value of $500 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.

   f. Rental time will not be allowed while equipment is inoperative due to breakdowns.

5. Equipment at the Work Site: The rental time to be paid for equipment on the Site at the time required to perform the extra work will be the time the equipment is in productive operation on the extra work being performed and, in addition, will include the time required to move the equipment to the location of the extra work

and return it to the original location (or to another location requiring no more time than that required to return it to its original location); except that moving time will not be paid if the equipment is used at the site of the extra work on other than the extra work. Loading and transporting cost will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the site of the extra work on other than extra work. The rental time of equipment on the Site operated to perform the extra work will be computed subject to the following:

a. Hourly rates are paid in 1/2-hour increments

b. Daily rates are paid in 1/2-day increments.

c. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.01.A.4;

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

6. Cost of premiums for all Bonds and for all insurance whether or not Contractor is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by Paragraph 11.01.C.

7. Costs associated with the preparation or submittal of any requests for Change Orders (whether or not ultimately authorized), cost estimates, Claims.

8. Contractor's expenses associated with anticipated lost profits or lost revenue, lost income or earnings, lost interest or earnings or unpaid retention.

9. Costs of special consultants or attorneys, whether or not in the direct employ of Contractor, employed for services specifically related to the submittal or resolution of a Claim, dispute, or other matter relating to the acceptability of the Work.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor shall submit to Engineer a daily extra work report, on a form acceptable to Engineer, which provides an itemized cost breakdown together with supporting data, at the end of the week.

11.02 *Allowances*

A. Any allowances provided for in the Contract Documents are for the sole use of Owner to cover the costs of certain types of extra work that may need to be performed as part of the Project. The allowance may be used in whole, in part, or not at all as determined by Owner and Engineer. No portion of any sum of money designated as an allowance shall become due or payable to the Contractor unless there is a Change Order specifically allocating a portion of an allowance to the work described in the Change Order. All such work will be considered extra work that was not included in the original Contract, but which has been provided for as an allowance.

B. Notwithstanding 11.02.A. above, the allowance for the HMA Price Index Fluctuation Adjustment shall not be limited to only extra work. (See Par. 1.28 of Section 01025 "Measurement and Payment".)

C. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer, and approved by Owner, to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted. Contractor shall make no Claim nor receive any compensation for anticipated profits, loss of profit, damages, or any extra payment due to the difference between the amount of Work actually completed and the original amount allocated for the allowance.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price.

Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 for Unit Price Work only when the following conditions are satisfied:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement, and if the change increases or decreases the actual unit cost of the changed item as compared to the estimated actual unit cost of performing the Work; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. If Contractor has incurred additional expense justifying an increase in Contract Price for the Unit Price Work, Contractor's exclusive remedy is set forth in Paragraph 10.05.

11.04 *Extra Work*

A. "Extra work" consists of work, desired or performed, not included in the original Contract, which the Engineer determines is not covered by any of the various items for which there is a Bid price or by combinations of those items. In the event portions of this work are determined by the Engineer to be covered by some of the various items for which there is a Bid price or combinations of those items, the remaining portion of the work will be classed as extra work. Extra work also includes work specifically designated as "extra work" in the Specifications.

B. The Contractor shall do the extra work and furnish labor, material and equipment therefor upon receipt of a Change Order or Work Change Directive from the Engineer, and in the absence of such Change Order or Work Change Directive, the Contractor shall not be entitled to payment for the extra work.

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

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by Contractor in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents and the total pay quantity varies from the estimated quantity of such item indicated in the Agreement by 25% or less, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C); or

4. where the Work involved is covered by unit prices contained in the Contract Documents and the total pay quantity of any item of Work required under the Contract exceeds the total pay quantity of the item indicated in the Agreement therefor by more than 25 percent, the Work in excess of 125 percent and not covered by an executed Change Order specifying the compensation to be paid therefor will be paid for by adjusting the Contract unit price, as hereinafter provided, or at the option of Engineer, payment for the Work involved in the excess will be paid for as extra work as provided in Paragraph 11.01.

   The adjustment of the unit price for said Work in excess of 125 percent will be the difference between the Contract unit price and the actual unit cost which will be determined as hereinafter provided, of the total pay quantity of the item. If the costs applicable to the item of work include fixed costs, the fixed costs will be deemed to have been recovered by Contractor by the payments made for 125 percent of the estimated quantity of such item indicated in the Agreement, and in computing the actual unit cost, the fixed costs will be excluded. Subject to the above provisions, the actual unit cost will be determined by Engineer in the same manner as if the work were to be paid for as extra work as provided in Paragraph 11.01; or the adjustment will be as agreed to by Contractor and Engineer.

   When the compensation payable for the number of units of an item of work performed in excess of 125 percent of the total pay quantity of the item indicated in the Agreement is less than $5,000 at the applicable Contract unit price, Engineer reserves the right to make no adjustment in the Contract unit price if Engineer so elects, except that an adjustment will be made if requested in writing by Contractor; or

5. where the Work involved is covered by unit prices contained in the Contract Documents and the total pay quantity of any item of Work required under the Contract is less than 75 percent of the total pay quantity of the item indicated in the Agreement therefor, an adjustment in compensation pursuant to this paragraph will not be made unless Contractor submits a written request to Engineer. If Contractor so requests, the quantity of the item performed, unless covered by an executed

Contract Change Order specifying the compensation payable therefor, will be paid for by adjusting the Contract unit price as hereinafter provided, or at the option of Engineer, payment for the quantity of the work of the item performed will be paid for as extra work as provided in Paragraph 11.01, provided however, that in no case shall the payment for that Work be less than that which would be made at the Contract unit price.

The adjustment of the Contract unit price will be the difference between the Contract unit price and the actual unit cost, which will be determined as hereinafter provided, of the total pay quantity of the item, including fixed costs. The actual unit cost will be determined by Engineer in the same manner as if the Work were to be paid for as extra work as provided in Paragraph 11.01; or the adjustment will be as agreed to by Contractor and Engineer.

The payment for the total pay quantity of the item of work will in no case exceed the payment which would be made for the performance of 75 percent of the of the total pay quantity of the item indicated in the Agreement of the quantity for the item at the original contract unit price.

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

   a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 10 percent;

   b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

   c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 10 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor, provided, however, that on any subcontracted work the total maximum fee to be paid by Owner under this subparagraph shall be no greater than 27 percent of the costs incurred by the Subcontractor who actually performs the work;

   d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

   e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net

decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

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

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

C. All time limits stated in the Contract Documents are of the essence of the Agreement. Contractor acknowledges and understands that Owner has a need for the completed Work, shortly after the date set forth in the Agreement.

12.03 *Delays*

A. If Contractor believes it has been prevented from completing any part of the Work with the Contract Times due to delay beyond the control of Contractor, Contractor's exclusive remedy is set forth in Paragraph 10.05.

B. If Owner delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

1. Owner shall not be liable, as damages for delays under Paragraph 12.03.B, for any consequential damages, lost opportunity costs, impact damages, or other similar remuneration. Owner's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, directing suspension, rescheduling, or correction of the Work, or terminating this Agreement for its convenience), regardless of the extent or frequency of Owner's exercise of such rights or remedies, shall not be construed as active interference with Contractor's performance of the Work. If Contractor submits a Progress Schedule or any other schedule indicating, or otherwise expressing, an intention to achieve completion of the Work prior to any completion date required by the Contract Documents, or expiration of the Contract Times, Owner shall have no liability to Contractor for any failure of Contractor to so complete the Work according to such schedule.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond

control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

F. In no event shall Owner or Engineer be liable to Contractor, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. any delays caused by or within the control of Contractor, its Subcontractors, Suppliers, agents and representatives; or

2. any delays beyond the control of Owner including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, the State Water Resources Control Board, the Governor of the State, the United States Environmental Protection Agency, the Office of Inspector General, any member of Congress, the President of the United States, or any authorized representative of the foregoing, and governmental agencies with jurisdictional interests will have access to the Site and the Work at all times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests. Inspection of the Work shall not relieve Contractor of the obligation to fulfill all conditions of the Contact.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer sufficient advanced written notice of Contractor's intention to cover the same and Engineer has not acted in the time set forth in Contractor's notice, or by the end of the next business day after Engineer receives Contractor's notice, whichever is later, in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as

Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction, unless Contractor failed to provide the written notice required in Paragraph 13.03.F. If Contractor believes it is entitled to an adjustment in Contract Price and/or Contract Time, or any other relief, Contractor's exclusive remedy is set forth in Paragraph 10.05.

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner’s special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee or warranty specified or required by the Contract Documents), any Work is found to be defective, or

if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service for the benefit of Owner before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed, or for such additional period as specified in the Contract Documents.

E. Contractor's obligations under this Paragraph 13.07 are in addition to Contractor's general warranty and guarantee under Paragraph 6.19 and any other obligation or warranty required by the Contract Documents. The provisions of this Paragraph 13.07 and Paragraph 6.19 shall not be construed as a substitute for, or a waiver of, or limitation upon the provisions of any applicable statute of limitation or repose. Establishment of the one-year correction period relates only to the specific obligation of the Contractor to correct defective Work, and has no relationship to the time within which the Contractor's obligation to comply with the Contract Documents may be enforced.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay Owner all of the following sums

(hereafter "Paragraph 13.08 Costs"): (1) all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work; (such costs to be approved by Engineer as to reasonableness) (2) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price in the sum of the Paragraph 13.08 Costs. If the parties are unable to agree as to the amount thereof, Owner may withhold the sum of the Paragraph 13.08 Costs from any payments otherwise due Contractor, and Contractor may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation or if the amount of the payment(s) otherwise due the Contractor are less than the Paragraph 13.08 Costs, Contractor shall pay Owner the appropriate amount to fully compensate the Owner for all Paragraph 13.08 Costs.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 (hereafter, collectively "Paragraph 13.09 Costs") will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price in the sum of the Paragraph 13.09 Costs. If the parties are unable to agree as to the amount of the adjustment, Owner may withhold the sum of the Paragraph 13.09 Costs from any payments otherwise due Contractor, and Contractor may make a Claim therefor as provided in Paragraph 10.05. If the amount of the payment(s) otherwise due Contractor are less than the Paragraph 13.09 Costs, Contractor shall pay Owner the appropriate

amount to fully compensate Owner for all Paragraph 13.09 Costs. Paragraph 13.09 Costs include, but are not limited to, all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments:*

1. On the first business day of the month, Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents including, but not limited to, a Schedule of Values reflecting current status; an updated Project Schedule; and affidavits signed by all Subcontractor performing the Work to date, stating that each of them has been paid, less earned retainage, as their interest appeared in the last preceding Application for Payment. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement. No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of Contractor.

4. The Application for Payment Form to be used on this Project is located in Section 00820. The Agency must approve all Applications for Payment before payment is made.

B. *Review of Applications:*

1. Engineer will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application. Engineer will be acting as Owner's authorized representative in reviewing each Application for Payment, and Engineer shall perform such review in compliance with Public Contract Code section 20104.50. If Engineer determines that an Application for Payment is not proper, Engineer shall return said application to Contractor as soon as practicable, but not later than 7 days after Engineer's receipt of said application, and shall set forth in writing to Contractor the reasons why the payment request is not proper. If Engineer exceeds the 7-day return requirement set forth in this paragraph, the number of days available to Owner to make a payment without incurring interest shall be correspondingly reduced as set forth in Paragraph 14.02.C.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

   d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

   e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Contractor shall also comply with the following specific requirements:

   a. The aggregate cost of materials stored off site shall not exceed $10,000.00 at any time without written approval of Owner.

   b. Title to such materials shall be vested in Owner, as evidenced by documentation satisfactory in form and substance to Owner, including, without limitation, recorded financing statements, UCC filings, and UCC searches.

   c. With each Application for Payment, Contractor shall submit to Engineer a written list identifying each location where materials are stored off the Project Site and the value of materials at each location. Contractor shall procure insurance satisfactory to Owner for materials stored off the Project Site in an amount not less than the total value thereof.

   d. The consent of any surety shall be obtained, to the extent required by the surety, or Owner prior to payment for any materials stored off the Project Site.

   e. Engineer and Owner shall have the right to make inspections of the storage areas for any materials stored off the Project Site at any time.

   f. Such materials shall be (1) protected from diversion, destruction, theft, and damage to the satisfaction of the Engineer and/or Owner; (2) specifically marked for use on the Project; and (3) segregated from other materials at the storage facility.

6. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner

stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

e. Third party claims filed or reasonable evidence indicating probable filing of such claims;

f. Contractor's failure to make payments properly to subcontractors or suppliers for labor, materials or equipment;

g. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Price;

h. Damage to property, the Work, Owner, another contractor or a third party;

i. Reasonable evidence that the Work will not be completed within the Contract Times, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

j. Work that required submittals was performed prior to obtaining in writing from the Engineer any required acceptance, approval or other response required under the Contract Documents for said submittals;

l. Contractor's persistent failure to carry out the Work in accordance with the Contract Documents;

m. Contractor's failure to submit a construction schedule or to update the construction schedule in accordance with the Contract Documents;

n. Contractor's failure to timely provide or update any record documents, Shop Drawings, or Samples as required of Contractor under the Contract Documents (including, but not limited to, Paragraph 6.12);

o. Contractor's failure to reinstate required insurance that has been allowed to lapse;

p. Contractor's failure to pay money owed to Owner under the Contract Documents; or

q. Contractor's failure to provide Engineer copies of any contracts with Subcontractors or Suppliers requested by Engineer.

6. Engineer will help coordinate and attend any Site visit(s) or other meetings requested by Agency or Owner to help facilitate Agency and/or Owner approval of a recommended payment. If so directed by Owner, Engineer shall simultaneously send to the Agency any payment recommendations it sends to Owner.

C. *Payment Becomes Due:*

1. Pursuant to Public Contract Code section 20104.50, Owner shall make a progress payment (subject to the provisions of Paragraph 14.02.D.) within 30 days of Engineer's receipt of an undisputed and properly submitted Application for Payment. If Owner fails to make a progress payment on an undisputed and properly submitted Application for Payment within said 30 day period, Owner shall pay interest to Contractor equivalent to the legal rate set forth in subdivision (a) of section 685.010 of the Code of Civil Procedure. The number of days available to Owner to make a payment without incurring interest pursuant to Public Contract Code section 20104.50 shall be reduced by the number of days by which Engineer exceeds the 7 day return requirement set forth in Paragraph 14.02.B.1.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens, stop notices or third-party claims for non-payment have been filed in connection with the Work, except where Contractor has delivered a specific release bond satisfactory to Owner to secure the satisfaction and discharge of such Liens and stop notices;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.D.5.q or Paragraph 15.02.A.

e. Contractor's failure to submit or obtain acceptance of a progress schedule, schedule of values, and any updated schedules;

f. Defective or non-conforming Work;

g. Costs incurred by Owner to correct, repair or replace Defective or nonconforming Work, or to complete the Work;

h. A reasonable doubt that the Work can be completed for the balance then unpaid;

i. A reasonable concern by Owner that the materials, equipment or component parts are not in proper operating condition;

j. Assessment of Liquidated Damages;

k. Contractor's failure to perform in accordance with the Agreement;

l. A reasonable concern that cost or liability that may occur to Owner as the result of Contractor's, Subcontractor's or Supplier's improper acts, omissions, fault, or negligence will cause Owner to incur cost, expense or liability (even if Owner is indemnified for such cost, expense or liability under Paragraph 6.15);

m. Reduction in contract Work;

n. Failure of Contractor to repair damaged materials, equipment, property, or Work;

o. Contractor's failure to provide or obtain review of submittals;

p. Contractor's failure to pay Subcontractors or Suppliers;

q. Contractor's failure to keep record documents up to date;

r. Contractor's failure to comply with all applicable federal, state, and local laws, statutes, regulations, codes, licenses, easements, and permits;

s. Contractor's failure to obtain and maintain applicable permits, insurance, and bonds;

t. Contractor's failure to provide certified payroll records

u. Contractor's failure to comply with the contract safety requirements; and

v. Contractor's failure to pay money owed to Owner under the Contract Documents.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

14.03 *Contractor's Warranty of Title*

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

1. Contractor further expressly undertakes to defend Owner and Engineer, at Contractor's sole expense, against any actions, lawsuits, or proceedings brought

against Owner, Engineer, or any third party as a result of liens filed against the Work, the site of any of the Work, the Project Site and any improvements thereon, payments due Contractor, or any portion of the property of Owner, Engineer, or third party. Contractor hereby agrees to indemnify and hold Owner, Engineer, and third parties harmless against any such liens or claims of lien and agrees to pay any judgment or lien resulting from any such action, lawsuit, or proceeding.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work is properly completed in conformance with the Contract Documents and ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for minor items which do not materially affect the intended use of the Project and which are specifically listed in writing by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion. Failure to include an item on such list does not alter the responsibility of Contractor to complete all Work in accordance with the Contract Documents. Such written notification in writing by Contractor is a prerequisite to any assertion or claim by Contractor that the entire Work is substantially complete, or that a certificate of Substantial Completion has been improperly withheld or delayed.

B. After Contractor's notification and at a time Engineer and Owner determine to be reasonable, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer or Owner does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor. Engineer shall provide Owner and Designer sufficient advance notice of any such inspection so as to provide Owner and Designer a reasonable amount of time to make arrangements to join Engineer and Contractor during such inspection. If requested by Owner, the date and time of any such inspection shall be rescheduled to allow Owner and/or Designer to accompany Engineer and Contractor during the inspection

C. If Engineer and Owner consider the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of minor items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer or Owner concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer and Owner consider the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer and Owner believe justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer and Owner will deliver to Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities,

insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Contractor.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

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

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer or Owner does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer and Owner consider that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, documents described in Paragraph 6.12, and other documents;

   a. Engineer shall make a formal recommendation to Owner to initiate Owner's internal procedures that would allow the County Board of Supervisors to accept the Work at a future Board meeting.

   b. Contractor may make an application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled (this list must accompany the final Application for Payment regardless of whether it has been previously delivered); and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

4. Paragraph 14.07.A.3 shall be interpreted in a manner consistent with the applicable California law relating to stop notices. To the extent there is any inconsistency between Paragraph 14.07.A.3 and California stop notice law, the applicable law shall prevail.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty-five days after the filing of a Notice of Completion with the County Recorder and after presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and payable by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims listed in the final Application for Payment that were made in accordance with Paragraph 10.05.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. *Blank*

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements of Paragraph 10.05 that were listed in the final Application for Payment and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. If Contractor believes it is entitled to an adjustment in Contract Price and/or Contract Time, or any other relief, as a result of Owner suspending Work, Contractor's exclusive remedy is set forth in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor’s persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to have Contractor’s authorized representative, required by Paragraph 2.06.B, available as reasonably needed, including the repeated absence of such authorized representative for two business days consecutively or more at a time, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor’s disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor’s repeated disregard of the authority of Engineer; or

4. Contractor’s violation in any substantial way of any provisions of the Contract Documents.

5. Contractor’s persistent failure to provide enough workers or materials to properly pursue the Work as required to complete the Work within the Contract Time;

6. Contractor’s persistent failure to perform the Work in accordance with the Contract Documents including, but not limited to providing monthly updates to the schedule of Work and monthly updates to Record Drawings, or to correct or replace Defective Work when directed to do so;

7. Contractor’s failure to make payment to subcontractors or material suppliers;

8. Contractor becomes insolvent, commences any form of voluntary bankruptcy proceedings, has any petition or action filed against it under any bankruptcy code or law, makes a general assignment for the benefit of creditors, or if a trustee, receiver or agent is appointed under law to take charge of Contractor's property or operations for the benefit of creditors;

9. Contractor persistently disregards laws, regulations, rules or orders of public bodies having jurisdiction or persistently disregards the authority of Engineer or Owner;

10. Contractor's failure to retain a valid Contractor's license of the required class in the applicable jurisdiction; or

11. Contractor otherwise commits a material breach of the Contract.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice thereof, terminate the services of Contractor, in whole or in part, without prejudicing any other right or remedy of Owner under the Contract. After giving Contractor (and surety) such written notice of its intent to terminate, in whole or in part, the services of Contractor, Owner may:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

4. accept assignment of any or all agreements between Contractor and any Subcontractor or Supplier pursuant to Paragraph 6.06.K.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

15.03 *Owner's Termination For Convenience*

A. Owner may, at any time, terminate the Contractor's services in whole or in part, for Owner's convenience and without cause. Termination by Owner under this paragraph shall be by a written notice of termination delivered to Contractor specifying the extent of termination and the effective date. Any such termination of Contractor's services, in whole or in part, shall not prejudice any other right or remedy of Owner under the Contract.

B. Upon receipt of a notice of termination for convenience, Contractor shall immediately, in accordance with instructions from Owner, proceed with performance of the following duties regardless of any delay in determining or adjusting amounts due under this paragraph:

1. cease operations as specified in the notice;

2. place no further orders and enter into no further subcontracts for materials, labor, services, or facilities except as necessary to complete continued portions of the Contract;

3. terminate all subcontracts and orders to the extent they relate to the Work terminated

4. proceed to complete the performance of Work not terminated; and

5. take actions that may be necessary, or that Owner may direct, for the protection and preservation of the terminated Work.

C. Upon such termination, Contractor shall recover as its sole remedy for Work performed the percentage of the Contract Price equal to the percentage of the Work performed satisfactorily and not previously paid for as determined by Engineer and Owner (so if only 10 percent of a Bid item is completed, Contractor's sole remedy for that Work completed is recovery of 10 percent of that Bid item price, or 10 percent of the Schedule of Values relating to that bid item, whichever is the lesser amount). Contractor's sole remedy for uncompleted Work shall be the recovery of those reasonable expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus a five percent markup (that would cover all overhead and profit). Contractor's sole remedy for demobilization costs shall be the recovery of those reasonable costs incurred in demobilization, reduced by the percentage of the completed Work relating to the demobilization undertaken (so if certain reasonable demobilization costs relate to Work that is 60 percent completed, Contractor shall only be entitled to recover 40 percent of those costs). Contractor hereby waives and forfeits all other Claims for payment and damages, including, without limitation, anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

D. Owner shall be credited for: (1) payments previously made to Contractor for the terminated portion of the Work; and (2) the value of the materials, supplies, equipment,

or other items that are to be disposed of by Contractor that are part of the Contract Price.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05. Neither Owner nor Contractor is required to mediate any Claims. The cost of any mediator or mediation service shall be shared equally by Owner and Contractor. Each party shall be responsible for its own costs relating to its participating in any mediation.

B. Once Owner and Contractor agree to mediate a Claim, Owner and Contractor shall participate in the mediation process in good faith.

C. For all civil actions filed on Claims less than or equal to three hundred seventy-five thousand dollars ($375,000), the applicable procedures set forth in Pubic Contract Code section 20104.4 and 20104.6 shall apply, including the mediation and judicial arbitration procedures set forth therein.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

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

Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

ARTICLE 18 – FEDERAL REQUIREMENTS

18.01 *Funding*

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

A. This Contract is expected to be funded in part with funds provided by the State Water Resources Control Board. Neither the State Water Resources Control Board, nor any of its departments, entities, or employees is a party to this Contract.

18.02 *Contract Approval*

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit SC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

18.03 *Conflict of Interest*

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither

solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

18.04 *Gratuities*

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may reviewed in proceedings under the dispute resolution provisions of this Contract.

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

18.05 *Audit and Access to Records*

A. Owner, Agency, the Comptroller General of the United States, the State Water Resources Control Board, the Bureau of State Audits, the United States Environmental Protection Agency, and the Office of Inspector General, or any of their duly authorized representatives shall have access to any books, documents, papers, and records of Contractor which are pertinent to the Agreement, for the purpose of making audits, examinations, excerpts, and transcriptions. Contractor shall maintain all required records for six years after final payment is made and all other pending matters are closed.

18.06 *Disadvantaged Business Enterprise Program Requirements*

A. This Contract is subject to 40 CFR part 33 entitled "Participation by Disadvantages Business Enterprises in United States Environmental Protection Agency Programs." 40 CFR 33 in its entirety is incorporated herein by this reference.

The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 40 CFR part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the Contractor to carry out these requirements is a material breach of this Contract which may result in the termination of this Contract or other legally available remedies.

B. *DBEs, MBEs, and WBEs.*

1. Disadvantaged Business Enterprise (DBE) means an entity owned or controlled by a socially and economically disadvantaged individual as described by Public Law

102–389 (42 U.S.C. 4370d) or an entity owned and controlled by a socially and economically disadvantaged individual as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note); a Small Business Enterprise (SBE); a Small Business in a Rural Area (SBRA); or a Labor Surplus Area Firm (LSAF), a Historically Underutilized Business (HUB) Zone Small Business Concern, or a concern under a successor program.

2. Minority business enterprise (MBE) means an entity that is at least 51% owned and/or controlled by a socially and economically disadvantaged individual as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note), and Public Law 102-389 (42 U.S.C. 4370d), respectively.

3. Women's business enterprise (WBE) means an entity that is at least 51% owned and/or controlled by women.

C. If Contractor intends to let any subcontracts for a portion of the Work, Contractor shall employ the six Good Faith Efforts described in 40 CFR 33.301 to assure that DBEs are used when possible as sources of supplies, equipment, construction, and services. Good Faith Efforts shall consist of: (1) including DBEs on solicitation lists and assuring that DBEs are solicited whenever they are potential sources; (2) establishing delivery schedules, where the requirements for the Work permit, which will encourage participation by DBEs; (3) dividing total requirements, when economically feasible, into small tasks or quantities to permit maximum participation of DBEs; (4) Encouraging contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; and (6) requiring each party to a subcontract to take the steps in (1) through (5) of this paragraph.

D. Owner must be notified in writing by Contractor prior to any termination of a DBE subcontractor for convenience by the Contractor.

E. If a DBE subcontractor fails to complete work under the subcontract for any reason, the Contractor shall employ the six good faith efforts described in 40 CFR 33.301 if soliciting a replacement subcontractor.

F. *DBE Certifications.*

Contractors, Subcontractors, and Suppliers must be certified by one of the following:

1. The Environmental Protection Agency

2. The Small Business Administration (SBA) (both SBA 8(a) program certifications and SBA Small Disadvantaged Business (SDB) Program self-certifications);

3. The Department of Transportation’s state implemented DBE Certification Program (with U.S. citizenship);

4. Tribal, State and Local governments; and

5. Recognized independent private organization certifications.

If an entity holds one of these certifications, it is considered acceptable for establishing MBE or WBE status.

18.07 *Anti-Kickback*

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 U.S.C. 874 and 40 U.S.C. 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans and Grants of the United States.") The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

18.08 *Clean Air and Pollution Control Acts*

A. If this Contract exceeds $100,000, Compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h) and 42 U.S.C. 7401 et.seq.), section 508 of the Clean Water Act (33 U.S.C. 1368) and Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15) is required. Contractor will report violations to the Agency and the Regional Office of the EPA.

18.09 *State Energy Policy*

A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

18.10 *Equal Opportunity Requirements*

A. If this Contract exceeds $10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the

Contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

18.11 *Restrictions on Lobbying*

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

18.12 *Environmental Requirements*

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

A. Wetlands- When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

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

C. Historic Preservation- Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Engineer, Owner, and representatives of Agency and the State Water Resources Control Board. Construction shall be temporarily halted pending the notification process and further direction issued by Agency after consultation with the State Historic Preservation Officer (SHPO).

D. Endangered Species- Contractor shall comply with the Endangered Species Act, which provides for protection of endangered and/or threatened species and critical habitat.

Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Engineer, Owner, and representatives of Agency and the State Water Resources Control Board. Construction shall be temporarily halted pending notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

E. Mitigation Measures- The project has an Environmental Assessment to meet the requirements of the National Environmental Policy Act, compliance with the mitigation measures, if any, in that document are hereby included as a condition of this Contract. The Environmental Assessment is available at the following website:

http://www.slocounty.ca.gov/PW/LOWWP/DOCS/Environmental_Documents/NEPA_DOCUMENTS.htm

18.13 *Buy American (ARRA Section 1605)*

A. This Contract is funded in whole or in part using funds from the American Recovery and Reinvestment Act (ARRA). Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed at 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for the Project may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this Project.

18.14 *Davis Bacon Wage Rates (ARRA Section 1606)*

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

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

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

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

18.15 *Non-Discrimination*

A. During the performance of this Contract, Contractors and its Subcontractors shall not unlawfully discriminate, harass, or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed. National origin, sexual orientation, physical disability (including HIV and AIDS), mental disability, medical condition (cancer), age (over 40), marital status, and denial of family care leave.

B. Contractor and its Subcontractors shall insure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment.

C. Contractors and Subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code §12990 (a-I) et seq.) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code Section 12990 (a-I), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations, are incorporated into this Contact by reference and made a part hereof as if set forth in full.

D. Contractor and Subcontractors shall give written notice of their obligations under this paragraph to labor organizations with which they have a collective bargaining or other agreement.

E. Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under this Contract.

18.16 *Debarment*

A. Contractor shall not subcontract with any party who is debarred or suspended or otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549, "Debarment and Suspension".

B. Contractor shall not subcontract with any individual or organization on the United States Environmental Protection Agency's List of Violating Facilities. (40 CFR, Part 31 .35, Gov. Code 4477).

18.17 *Prompt Payment to Subcontractors*

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

18.18 *Policy for Implementing the State Revolving Fund for Construction of Wastewater Treatment Facilities*

A. Contractor shall comply with the State Water Resources Control Board’s “Policy for Implementing the State Revolving Fund for Construction of Wastewater Treatment Facilities,” as amended from time to time.

ARTICLE 19 – BLANK

ARTICLE 20 – ADDITIONAL CALIFORNIA STATE REQUIREMENTS

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

20.02 Unless otherwise indicated in the Contract Documents, all utility lines, conduits, wires, or structures shall be maintained by Contractor and shall not be disturbed, disconnected, or damaged by Contractor during the progress of the Work, provided, that should Contractor in the performance of the Work disturb, disconnect, or damage any of the above, all expenses arising from such disturbance or in the replacement or repair thereof shall be borne by Contractor. However, Contractor may be entitled to compensation in accordance with Section 4215 of the California Government Code if any existing main or trunkline utility facilities located on the Site are not indicated in the Contract Documents with reasonable accuracy.

20.03 Notwithstanding any other provision of law, every contract involving the expenditure of public funds in excess of Ten thousand dollars ($10,000) entered into by any state agency, board, commission, or department or by any other public entity, including a city, county, city and county, or district, shall be subject to the examination and audit of State auditor, at the request of the public entity or as part of any audit of the public entity, for a period of three (3) years after final payment under the Contract.

ARTICLE 21 – LABOR STANDARD PROVISIONS FOR FEDERALLY ASSISTED PROJECTS, 29 CFR PART 5

Labor standards provisions applicable to contracts funded with federal assistance authorized by the American Recovery and Reinvestment Act of 2009 and Clean Water State Revolving funds are:

§ 5.5 Contract provisions and related matters.

(a) The Owner shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in Sec. 5.1, the following clauses:

(1) Minimum wages. (i) All laborers and mechanics employed or working upon the Site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the

construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in Sec. 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its Subcontractors at the Site of the Work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The Owner shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the Contract shall be classified in conformance with the wage determination. The Environmental Protection Agency award official shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Owner agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the Owner to the State Water Resources Control Board and the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Owner or will notify the Owner within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the Owner do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Owner shall refer the questions, including the views of all interested parties and the recommendation of the State Water Resources Control Board, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Owner or will notify the Owner within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the Contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) *Withholding*. The **Owner** shall upon its own action or upon written request of an authorized representative of the Department of Labor or the Environmental Protection Agency Award Official, withhold or cause to be withheld from the Contractor under this Contract or any other Federal contract with the same Contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any Subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the Site of the Work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the Project), all or part of the wages required by the Contract, the (Agency) may, after written notice to the Contractor, sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) *Payrolls and basic records*. (i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the Work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the Work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the Project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily

and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The Contractor shall submit weekly for each week in which any Contract Work is performed a copy of all payrolls to Engineer, Owner, and the USDA Rural Development. Such documentation shall be available on request to the State Water Resources Control Board or the Environmental Protection Agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (*e.g.*, the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/forms/ or its successor site. The Contractor is responsible for the submission of copies of payrolls by all Subcontractors. Contractors and Subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Owner, for transmission to the State Water Resources Control Board, Environmental Protection Agency, USDA Rural Development, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a Contractor to require a Subcontractor to provide addresses and social security numbers to the Contractor for its own records, without weekly submission to the Owner.

(B) Each payroll submitted shall be accompanied by a ``Statement of Compliance," signed by the Contractor or Subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under Sec. 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under Sec. 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or Subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The Contractor or Subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State Water Resource Control Board, Environmental Protection Agency, USDA Rural Development, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or Subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) *Apprentices and trainees*--(i) *Apprentices.* Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job Site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or Subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a

different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

(iii) *Equal employment opportunity*. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) *Compliance with Copeland Act requirements*. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this Contract.

(6) *Subcontracts.* The Contractor or Subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal agency) may by appropriate instructions require, and also a clause requiring the Subcontractors to include these clauses in any lower tier subcontracts. The Contractor shall be responsible for the compliance by any Subcontractor or lower tier Subcontractor with all the Contract clauses in 29 CFR 5.5.

(7) *Contract termination: debarment.* A breach of the Contract clauses in 29 CFR 5.5 may be grounds for termination of the Contract, and for debarment as a Contractor and a Subcontractor as provided in 29 CFR 5.12.

(8) *Compliance with Davis-Bacon and Related Act requirements*. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this Contract.

(9) *Disputes concerning labor standards.* Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its Subcontractors) and the Owner, State Water Resources Control Board, Environmental Protection Agency, the U.S. Department of Labor, or the employees or their representatives.

(10) *Certification of eligibility.* (i) By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(b) *Contract Work Hours and Safety Standards Act.* The following clauses set forth in paragraphs (b)(1), (2), (3), and (4) of this section in full in any Contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Sec. 5.5(a) or 4.6 of part 4 of this title. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) *Overtime requirements*. No Contractor or Subcontractor contracting for any part of the Contract Work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the Contractor and any Subcontractor responsible there for shall be liable for the unpaid wages. In addition, such Contractor and Subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) *Withholding for unpaid wages and liquidated damages*. The Owner shall upon its own action or upon written request of the Environmental Protection Agency Award Official or an authorized

representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or Subcontractor under any such contract or any other Federal contract with the same Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The Contractor or Subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the Subcontractors to include these clauses in any lower tier subcontracts. The Contractor shall be responsible for compliance by any Subcontractor or lower tier Subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

(c) In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in Sec. 5.1, the Owner shall insert a clause requiring that the Contractor or Subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, Owner shall insert in any such Contract a clause providing that the records to be maintained under this paragraph shall be made available by the Contractor or Subcontractor for inspection, copying, or transcription by authorized representatives of the Environmental Protection Agency, State Water Resources Control Board, and the Department of Labor, and the Contractor or Subcontractor will permit such representatives to interview employees during working hours on the job.

SECTION 00815
EXHIBIT GC-A

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of ____County of San Luis Obispo____, do hereby certify as follows:

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

_____
(Attorney's Signature)

Date: _____

AGENCY CONCURRENCE

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

By: _____ Date: _____

Type Name: _____

END OF SECTION

SECTION 00820

	Contractor's Application for Payment No.	
	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment
Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

Contractor's Certification

The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By: Date:

1. ORIGINAL CONTRACT PRICE	**$**	
2. Net change by Change Orders	**$**	
3. Current Contract Price (Line 1 ± 2)	**$**	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	**$**	
5. RETAINAGE:		
a. X _____ **Work Completed**	**$**	
b. X _____ **Stored Material**	**$**	
c. Total Retainage (Line 5a + Line 5b)	**$**	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	**$**	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	**$**	
8. AMOUNT DUE THIS APPLICATION	**$**	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	**$**	

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

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Progress Estimate **Contractor's Application**

For (contract):	Application Number:
Application Period:	Application Date:

A		B	Work Completed		E	F		G
Item			C	D				
Specification Section No.	Description	Scheduled Value	From Previous Application (C+D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F) B	Balance to Finish (B - F)
	Totals							

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Progress Estimate **Contractor's Application**

For (contract):	Application Number:
Application Period:	Application Date:

A				B	C	D	E	F		
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

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Stored Material Summary **Contractor's Application**

For (contract):	Application Number:
Application Period:	Application Date:

A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
			Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)	
		Totals							

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SECTION 00830

CHANGE ORDER

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Los Osos Wastewater Project	Owner: County of San Luis Obispo	Owner's Contract No.: 300448.08.01.AD
Contract: Collection System Areas A & D		Date of Contract:
Contractor:		

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIMES
Original Contract Price: $_____	Original Contract Times: ☐ Working days ☐ Calendar days Substantial completion (days): _____ Ready for final payment (days): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: $_____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial completion (days): _____ Ready for final payment (days): _____
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial completion (days): _____ Ready for final payment (days): _____

ENGINEER RECOMMENDATION BY::

Signature (Print Name and Title) Date

OWNER ACCEPTANCE BY:

Signature (Print Name and Title) Date

Signature (Print Name and Title) Date

We the undersigned Contractor, have given careful consideration to the change(s) proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full consideration therefor the change(s) in Contract Price and/or Contract Times shown above. Once this Change Order is accepted by Owner and Engineer, it constitutes a final settlement of all matters referenced in Paragraph 10.03.B of section 700.

CONTRACTOR ACCEPTANCE BY:

Signature (Print Name and Title) Date

USDA APPROVAL BY:

Signature (Print Name and Title) Date

Technical Specifications

County of San Luis Obispo
Los Osos Wastewater Collection System

County of San Luis Obispo
Los Osos, California

Technical Specifications for the Construction of

Los Osos Wastewater Collection System
Areas A & D

Volume I

REGISTERED PROFESSIONAL ENGINEER
BRUCE JAMES CORWIN
C 051414
EXP. 06/30/12
3/14/12
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
MICHAEL D. MIDDLETON
C 061533
EXP. 06/30/13
3-14-12
CIVIL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
CHARLES A. LINDQUIST II
No. E 8841
Exp. 3/31/12
3/14/12
ELECTRICAL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
CARLOS N. ORTIZ
C 77930
EXP. 6/30/13
3/14/2012
CIVIL
STATE OF CALIFORNIA

March 2012

Division 1 General Requirements

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SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The Work to be performed under this Contract shall consist of furnishing plant, tools, equipment, materials, supplies, and manufactured articles, and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents that may be necessary for the complete and proper construction of the Work in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

1.02 WORK

A. Description of the Work

1. The Los Osos Wastewater Project (Project) will provide wastewater collection, conveyance, treatment, and recycled water reuse for the community of Los Osos that is currently unsewered and utilizes septic tanks. The Project consists of construction divided into four geographical areas (Area A, Area B, Area C, and Area D), Pump Station construction, Mid-Town site restoration, and water recycling facility, and roadway improvements, including storm drainage facilities.

2. The Work of this Contract consists of work in Areas A and D.

3. Area A serves the northernmost portion of Los Osos, bordered by Morro Bay to the north and west, South Bay Boulevard to the east and Area D to the south. Area D serves the central portion of Los Osos, bordered by Area A to the north, Area B to the west, South Bay Road to the east and Area C to the south.

4. Area A has eleven lift stations due to the low elevations near Morro Bay, and Area D has five lift stations. installation of pump station wetwells and underground piping and conduit is included in this Contract. A separate contract will install pumps, wiring, backup generator buildings, and controls at these facilities. CONTRACTOR will be required to coordinate connections to and from these facilities.

5. The Areas A and D collection systems convey the sewage from their respective Areas to the West Paso Pump Station, located in Area A, and then to Area C via the sewer force main to Los Osos Valley Road. The recycled effluent water is conveyed from the proposed water recycling plant through Areas C and D to the Baywood Elementary School and the Los Osos Middle School, both located on El Morro Avenue in Area A, for irrigation purposes.

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B. The Areas A and D Work includes, but is not limited to, the following:

1. Wastewater collection system consisting of approximately 111,020 linear feet of gravity mains ranging in size from 8-inch to 18-inch diameter, 10,183 linear feet of sewer force mains ranging in size from 2-inch to 14-inch diameter, 305 manholes, 3,038 service laterals and 35,424 linear foot of fiber optic conduit..

2. Recycled water system consisting of 8,088 linear feet of 6- and 4-inch diameter recycled effluent water force mains.

3. Wetwells and ancillary items, consisting of 11 Pocket Pump Stations, 4 Duplex Submersible Stations, and 1 Triplex Submersible Station.

C. Location of the Project

1. The location of the Project is in the community of Los Osos, San Luis Obispo County, at the south end of the Morro Bay estuary, west of San Luis Obispo, California and Highway 101. The project is located in the Los Osos residential and business community. The Project will be constructed in rolling to steep dune terrain with sandy soils and with shallow groundwater in low lying areas of the community.

D. Coordination of the Project

1. Close coordination with the Owner, Engineer, and others will be mandatory as well as minimizing construction impacts upon the residential and business communities.

1.03 CONTRACT METHOD

A. The Work hereunder will be constructed under a single unit-price and/or lump sum contract as designated by the Bid Schedule.

1.04 WORK BY OTHERS

A. CONTRACTOR shall be responsible for coordinating the performance of its Work with the performance of other work on the Project at the Site. The following work will be performed by others concurrently with the Work of this Contract.

1. Construction of the ‘Area B’ Collection system and force mains.

2. Construction of the ‘Area C’ Collection system and force mains.

3. Construction of the ‘Area PS’ Pump Stations.

4. Restoration of the Mid-Town site.

5. Construction of the water recycling facility.

6. Construction of road improvements and storm drainage facilities in the County road right-of-way.

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B. The OWNER will execute a subsequent separate contract for construction of a wastewater treatment and water recycling facility. This facility will treat the wastewater collected by the pipelines and pump stations constructed under this Contract and the two other packages, The CONTRACTOR for this package is not responsible for connection to the water recycling facility.

1.05 CONTRACTOR USE OF STAGING AREA

A. The CONTRACTOR's use of the construction staging areas shall be as defined in Section 01500.

1.06 PROJECT MEETINGS

A. Preconstruction Conference

1. Prior to the commencement of Work on this Contract, and within 15 days of Notice to Proceed, a preconstruction conference will be held at a mutually agreed time and place. The conference shall be attended by the CONTRACTOR's Project Manager, its superintendent, and its subcontractors as the CONTRACTOR deems appropriate. Other attendees will be:

a. Engineer and the Resident Project Representative.

b. Representatives of OWNER.

c. Governmental representatives as appropriate.

d. Others as requested by CONTRACTOR, OWNER, or ENGINEER.

2. The CONTRACTOR shall bring the preconstruction conference submittals in accordance with Section 01300 – Contractor Submittals.

3. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date. However, the CONTRACTOR should be prepared to discuss all of the items listed below.

a. Status of CONTRACTOR's insurance and bonds.

b. CONTRACTOR's tentative schedules.

(1) CONTRACTOR shall provide a preliminary schedule as defined in Section 01311.

c. Transmittal, review, and distribution of CONTRACTOR's submittals.

d. Processing applications for payment.

e. Maintaining record documents.

f. Critical work sequencing.

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g. Field decisions and Change Orders.

h. Use of Site, office and storage areas, security, housekeeping, and OWNER's needs.

i. Major equipment deliveries and priorities.

j. CONTRACTOR's assignments for safety and first aid.

k. Daily Report Form which the ENGINEER will furnish.

l. Submittal Transmittal Form which the ENGINEER will furnish.

4. The ENGINEER will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.

B. Progress Meetings

1. The ENGINEER will schedule and hold regular on-Site progress meetings at least weekly and at other times as requested by CONTRACTOR or as required by progress of the Work. The CONTRACTOR, ENGINEER, and all subcontractors active on the Site shall attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

2. The ENGINEER will preside at the progress meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings is to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems that may develop. During each meeting, the CONTRACTOR shall present any issues that may impact its progress with a view to resolve these issues expeditiously.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

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SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 MOBILIZATION (Item 1)

A. MOBILIZATION shall include preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site, for the establishment of all offices, buildings and other facilities necessary for work on the project, and for all other work and operations which must be performed or costs incurred prior to beginning work on the various items on the project site. Bid item for MOBILIZATION shall not exceed five percent (5%) of the original contract amount.

B. Payment

1. The lump sum price shall be paid for MOBILIZATION.

2. Partial payments for MOBILIZATION shall be in accordance with California Public Contract Code Section 10264.

1.02 SHEETING, SHORING, AND BRACING (Item 2)

A. Payment

1. The lump sum price shall be paid for SHEETING, SHORING, AND BRACING; which shall be full compensation for all costs incurred to provide sheeting, shoring, and/or bracing of open cut excavation; inclusive of all construction conforming to applicable safety orders; preparing and submitting shoring designs, labor, tools, materials, equipment, power and fuels for doing all required work, complete as specified and as indicated on the Drawings.

1.03 DEWATERING (Item 3)

A. Payment

1. The lump sum price shall be paid for DEWATERING; which shall be full compensation for all costs incurred to provide dewatering system design, installation, operation, and removal of dewatering systems inclusive of all labor, equipment, materials, and incidentals necessary to handle groundwater an surface water including but not limited to sinking well points, furnishing, installing and maintaining pumping systems including all pumps, piping, casing, and other appurtenances, filter sand required for pumping systems, erosion and sediment control, excavation of monitoring wells, providing power, maintaining excavation free of water on a continuous basis, sedimentation or other means of removing suspended solids, disinfection and neutralization, and disposal of water consistent with requirements as set forth in the Contract Documents and RWQCB permit(s).

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1.04 SITE PREPARATION (Item 4)

A. Payment

1. The lump sum price shall be paid for SITE PREPARATION; which shall be full compensation for all costs incurred to provide removal of debris, clearing, grubbing, protection of trees, shrubbery, and other plantings not designated for removal, certified arborist services, and other incidental work pertaining to SITE PREPARATION.

1.05 HOT MIX ASPHALT PAVEMENT (HMA) (Item 5)

A. Measurement

1. Measurement for payment for HOT MIX ASPHALT PAVEMENT shall be by the ton and will be the number of tons placed in the Work; which shall be full compensation for all costs incurred to furnish all HMA, labor, materials, tools, equipment, and incidentals for work involved in placing HMA for all pavement repair and resurfacing, including dikes, berms, and miscellaneous areas to the payment limits as shown on the Drawings, and as directed by the ENGINEER.

B. Payment

1. The unit price shall be paid for HMA on a per ton basis.

1.06 AGGREGATE BASE (Item 6)

A. Measurement

1. Measurement for payment for AGGREGATE BASE shall be by the cubic yard and will be the number of cubic yards placed in the Work; which shall be full compensation for all costs incurred to furnish all aggregate base, labor, materials, tools, equipment, and incidentals for doing all work to replace aggregate base beneath existing roadway pavement, sidewalk, curb and gutter to the payment limits as shown on the Drawings, and as directed by the ENGINEER.

B. Payment

1. The unit price shall be paid for AGGREGATE BASE on a per cubic yard basis.

1.07 PULVERIZED COMPACTED SUBGRADE/PULVERIZED TREATED AND COMPATCED SUBGRADE (Item 7)

A. Measurement

1. Measurement for payment for PULVERIZED COMPACTED SUBGRADE/PULVERIZED TREATED AND COMPATCED SUBGRADE (PCSG/PTSG) will be by the square yard placed in the Work; which shall be full compensation for all costs incurred to provide pulverization of existing pavement, base, and subgrade materials and compacting and treating the material prior to paving complete as specified and shown in the Drawings.

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B. Payment

1. The unit price shall be paid for PULVERIZED COMPACTED SUBGRADE/ PULVERIZED TREATED AND COMPATCED SUBGRADE (PCSG/PTSG) on a per square yard basis.

1.08 TRAFFIC CONTROL (Item 8)

A. Payment

1. The lump sum price shall be paid for TRAFFIC CONTROL; which shall be full compensation for all costs incurred to provide traffic control to all phases of work and include furnishing and installing: traffic control equipment and personnel; flagging; sign panels, including all mounting hardware; furnishing and installing signal equipment and controllers and other incidental work pertaining to TRAFFIC CONTROL.

1.09 GRAVITY SEWER 0 – 8 FEET DEEP (Item 9)

A. Measurement

1. Measurement for payment for GRAVITY SEWER 0 – 8 FEET DEEP will be by the linear foot installed in the Work and the length will measured along the horizontal centerline of the pipe, with no allowance for fittings or manholes. Measurement will be to the nearest tenth of a foot. Fittings for service laterals installed in the completed project shall be included in the cost of installed pipe. The per linear foot cost shall be full compensation for: furnishing and installing PVC pipe of the class and size specified; in open cut trench and trenchless excavations; warning tape; tracer wire; potholing; casing pipe; bedding; backfill to road subbase; geotextile fabric; compaction; removal and disposal of trench spoils; removal and replacement of existing pipes as needed to facilitate installation; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to GRAVITY SEWER 0 – 8 FEET DEEP as specified and shown on the Drawings. Measurement of depth will be from the invert of the pipe to the ground surface at the pipe centerline, as shown by the Drawings.

B. Payment

1. The unit price shall be paid for GRAVITY SEWER 0 – 8 FEET DEEP on a per linear foot basis.

1.10 GRAVITY SEWER 8 – 15 FEET DEEP (Item 10)

A. Measurement

1. Measurement for payment for GRAVITY SEWER 8 – 15 FEET DEEP will be by the linear foot installed in the Work and the length will measured along the horizontal centerline of the pipe, with no allowance for fittings or manholes. Measurement will be to the nearest tenth of a foot. Fittings for service laterals installed in the completed project shall be included in the cost of installed pipe. The per linear foot cost shall be full compensation for: furnishing and installing PVC pipe of the class and size specified; in open cut trench and trenchless excavations; warning tape; tracer wire; potholing; casing pipe; bedding; backfill to road subbase; geotextile fabric; compaction; removal and disposal of trench spoils;

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removal and replacement of existing pipes as needed to facilitate installation; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to GRAVITY SEWER 8 – 15 FEET DEEP as specified and shown on the Drawings. Measurement of depth will be from the invert of the pipe to the ground surface at the pipe centerline, as shown by the Drawings.

B. Payment

1. The unit price shall be paid for GRAVITY SEWER 8 – 15 FEET DEEP on a per linear foot basis.

1.11 GRAVITY SEWER OVER 15 FEET DEEP (Item 11)

A. Measurement

1. Measurement for payment for GRAVITY SEWER OVER 15 FEET DEEP will be by the linear foot installed in the Work and the length will measured along the horizontal centerline of the pipe, with no allowance for fittings or manholes. Measurement will be to the nearest tenth of a foot. Fittings for service laterals installed in the completed project shall be included in the cost of installed pipe. The per linear foot cost shall be full compensation for: furnishing and installing PVC pipe of the class and size specified; in open cut trench and trenchless excavations; warning tape; tracer wire; potholing; casing pipe; bedding; backfill to road subbase; geotextile fabric; compaction; removal and disposal of trench spoils; removal and replacement of existing pipes as needed to facilitate installation; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to GRAVITY SEWER OVER 15 FEET DEEP as specified and shown on the Drawings. Measurement of depth will be from the invert of the pipe to the ground surface at the pipe centerline, as shown by the Drawings.

B. Payment

1. The unit price shall be paid for GRAVITY SEWER OVER 15 FEET DEEP on a per linear foot basis.

1.12 GRAVITY SEWER MANHOLES UP TO 8 FEET DEEP (Item 12)

A. Measurement

1. Measurement for payment for GRAVITY SEWER MANHOLES UP TO 8 FEET DEEP will be by the number of each placed in the Work, and shall be full compensation for: all pre-cast concrete manhole sections; cast in place concrete; manhole frames and covers; reinforced concrete work; metal castings; steel reinforcement; sealing gaskets; sewer drop manhole piping; PVC lining and protective coatings; excavation; bedding; backfill; compaction; cleaning; testing; and all incidental work pertaining to GRAVITY SEWER UP TO 8 FEET DEEP complete as specified and as indicated on the Drawings. Measurement of depth will be from the elevation of the invert of the sewer at the center of the manhole to the top of the manhole cover as depicted on the Drawings.

B. Payment

1. The unit price shall be paid for GRAVITY SEWER MANHOLES UP TO 8 FEET DEEP for each manhole.

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1.13 GRAVITY SEWER MANHOLES OVER 8 FEET DEEP (Item 13)

A. Measurement

1. Measurement for payment for GRAVITY SEWER MANHOLES OVER 8 FEET DEEP will be by each additional foot of vertical manhole depth in excess of 8 feet placed in the Work, and shall be full compensation for: all precast concrete manhole sections; PVC lining and protective coatings; sewer drop manhole piping; excavation; backfill; compaction; and all incidental work pertaining to GRAVITY SEWER MANHOLES OVER 8 FEET DEEP complete as specified and as indicated on the Drawings. Measurement of depth will be elevation of the invert of the sewer at the center of the manhole to the top of the manhole cover as depicted on the Drawings.

B. Payment

1. The unit price shall be paid for GRAVITY SEWER MANHOLES OVER 8 FEET DEEP on a per vertical foot basis.

1.14 SEWER LATERALS (Item 14)

A. Measurement

1. Measurement for payment for SEWER LATERALS will be by the number of each placed in the Work, and shall be full compensation for: installation of sewer laterals; cleanouts; cleanout boxes; plugs; chimneys; fittings; tracer wire; warning tape; excavation; bedding; backfill to road subbase; compaction; removal and disposal of trench spoils; removal and replacement of existing pipes as needed to facilitate installation; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to SEWER LATERALS complete as specified and as indicated on the Drawings.

B. Payment

1. The unit price shall be paid for SEWER LATERALS for each sewer lateral.

1.15 SEWER FORCE MAIN OVER 4” DIAMETER (Item 15)

A. Measurement

1. Measurement for payment for SEWER FORCE MAIN OVER 4” DIAMETER will be by the linear foot installed in the Work and the length will be measured along the horizontal centerline of the pipe, with no allowance for fittings, valves, or manholes. Measurement will be to the nearest tenth of a foot. Fittings, valves, and manholes installed in the completed project shall be included in the cost of installed pipe. The per linear foot cost shall be full compensation for: furnishing and installing pipe of the class and size specified; in open cut trench and trenchless excavations; warning tape; tracer wire; potholing; bedding; backfill to road subbase; geotextile fabric; thrust restraints; compaction; removal and disposal of trench spoils; removal and replacement of existing pipes as needed to facilitate installation; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to SEWER FORCE MAIN OVER 4” DIAMETER as specified and shown on the Drawings.

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B. Payment

1. The unit price shall be paid for SEWER FORCE MAIN OVER 4” DIAMETER on a per linear foot basis.

1.16 RECYCLED WATER FORCE MAIN OVER 4” DIAMETER (Item 16)

A. Measurement

1. Measurement for payment for RECYCLED WATER FORCE MAIN OVER 4” DIAMETER will be by the linear foot installed in the Work and the length will be measured along the horizontal centerline of the pipe, with no allowance for fittings, valves, blowoffs, or manholes. Measurement will be to the nearest tenth of a foot. Fittings, valves, blowoffs, and manholes installed in the completed project shall be included in the cost of installed pipe. The per linear foot cost shall be full compensation for: furnishing and installing pipe of the class and size specified; in open cut trench and trenchless excavations; warning tape; tracer wire; potholing; bedding; backfill to road subbase; geotextile fabric; thrust restraints; compaction; removal and disposal of trench spoils; removal and replacement of existing pipes as needed to facilitate installation; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to RECYCLED WATER FORCE MAIN OVER 4” DIAMETER as specified and shown on the Drawings.

B. Payment

1. The unit price shall be paid for SEWER RECYCLED WATER FORCE MAIN OVER 4” DIAMETER on a per linear foot basis.

1.17 SEWER AND RECYCLED WATER FORCE MAIN 4” DIAMETER AND LESS (Item 17)

A. Measurement

1. Measurement for payment for SEWER AND RECYCLED WATER FORCE MAIN 4” DIAMETER AND LESS will be by the linear foot installed in the Work and the length will measured along the horizontal centerline of the pipe, with no allowance for fittings, valves, blowoffs, or manholes. Measurement will be to the nearest tenth of a foot. Fittings, valves, blowoffs, and manholes installed in the completed project shall be included in the cost of installed pipe. The per linear foot cost shall be full compensation for: furnishing and installing pipe of the class and size specified; in open cut trench and trenchless excavations; warning tape; tracer wire; potholing; bedding; backfill to road subbase; geotextile fabric; thrust restraints; compaction; removal and disposal of trench spoils; removal and replacement of existing pipes as needed to facilitate installation; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to SEWER AND RECYCLED WATER FORCE MAIN 4” DIAMETER AND LESS as specified and shown on the Drawings.

B. Payment

1. The unit price shall be paid for SEWER AND RECYCLED WATER FORCE MAIN 4” DIAMETER AND LESS on a per linear foot basis.

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1.18 POCKET PUMP STATION SITEWORK AND WETWELLS UP TO 12 FEET DEEP (Item 18)

A. Measurement

1. Measurement for payment for POCKET PUMP STATION SITEWORK AND WETWELLS UP TO 12 FEET DEEP will be by the number of each placed in the Work, which shall be full compensation for: all precast concrete sections; cast in place concrete; PVC lining and protective coatings; vaults; hatches; valves; discharge piping to force main connection; odor control canisters and venting; water service connections, meters, and backflow preventers; excavation; backfill; compaction; removal and disposal of excavation spoils; site accessories; testing; cleaning; and all incidental work pertaining to POCKET PUMP STATION SITEWORK AND WETWELLS UP TO 12 FEET DEEP complete as specified and as indicated on the Drawings. Measurement of depth will be elevation of the finished floor the wetwell to the top of the access cover as shown on the Drawings.

B. Payment

1. The unit price shall be paid for POCKET PUMP STATION SITEWORK AND WETWELLS UP TO 12 FEET DEEP for each wetwell.

1.19 POCKET PUMP STATION WETWELLS OVER 12 FEET DEEP (Item 19)

A. Measurement

1. Measurement for payment for POCKET PUMP STATION WETWELLS OVER 12 FEET DEEP will be by each additional foot of vertical wetwell depth in excess of 12 feet placed in the Work, and shall be full compensation for: all precast concrete sections; cast in place concrete; PVC lining and protective coatings; excavation; backfill; compaction; removal and disposal of excavation spoils; and all incidental work pertaining to POCKET PUMP STATION WETWELLS OVER 12 FEET DEEP complete as specified and as indicated on the Drawings. Measurement of depth will be elevation of the finished floor the wetwell to the top of the access cover as shown on the Drawings.

B. Payment

1. The unit price shall be paid for POCKET PUMP STATION WETWELLS OVER 12 FEET DEEP on a per vertical foot basis.

1.20 DUPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELLS UP TO 14 FEET DEEP (Item 20)

A. Measurement

1. Measurement for payment for DUPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELLS UP TO 14 FEET DEEP will be by the number of each placed in the Work, which shall be full compensation for: all precast concrete sections; cast in place concrete; PVC lining and protective coatings; vaults; hatches; valves; discharge piping to force main connection; odor control canisters and venting; water service connections, meters, and backflow preventers; excavation; backfill; compaction; removal and disposal of excavation spoils; site accessories; testing; cleaning; and all incidental work pertaining to DUPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELLS UP TO 14

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FEET DEEP complete as specified and as indicated on the Drawings. Measurement of depth will be elevation of the finished floor the wetwell to the top of the access cover as shown on the Drawings.

B. Payment

1. The unit price shall be paid for DUPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELLS UP TO 14 FEET DEEP for each wetwell.

1.21 DUPLEX SUBMERSIBLE LIFT STATION WETWELLS OVER 14 FEET DEEP (Item 21)

A. Measurement

1. Measurement for payment for DUPLEX SUBMERSIBLE LIFT STATION WETWELLS OVER 14 FEET DEEP will be by each additional foot of vertical wetwell depth in excess of 14 feet placed in the Work, and shall be full compensation for: all precast concrete sections; cast in place concrete; PVC lining and protective coatings; excavation; backfill; compaction; removal and disposal of excavation spoils; and all incidental work pertaining to DUPLEX SUBMERSIBLE LIFT STATION WETWELLS OVER 14 FEET DEEP complete as specified and as indicated on the Drawings. Measurement of depth will be elevation of the finished floor the wetwell to the top of the access cover as shown on the Drawings.

B. Payment

1. The unit price shall be paid for DUPLEX SUBMERSIBLE LIFT STATION WETWELLS OVER 14 FEET DEEP on a per vertical foot basis.

1.22 TRIPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELL (Item 22)

A. Measurement

1. Measurement for payment for TRIPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELL will be by the number of each placed in the Work, which shall be full compensation for: all precast concrete sections; cast in place concrete; PVC lining and protective coatings; vaults; hatches; valves; discharge piping to force main connection; odor control canisters and venting; water service connections, meters, and backflow preventers; excavation; backfill; compaction; removal and disposal of excavation spoils; site accessories; testing; cleaning; and all incidental work pertaining to TRIPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELL complete as specified and as indicated on the Drawings.

B. Payment

1. The unit price shall be paid for TRIPLEX SUBMERSIBLE LIFT STATION SITEWORK AND WETWELL for each wetwell.

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1.23 FIBEROPTIC AND ELECTRIC CONDUITS/DUCTS (Item 23)

A. Measurement

1. Measurement for payment for FIBEROPTIC AND ELECTRIC CONDUITS/DUCTS will be by the linear foot installed in the Work, measured along the horizontal centerline of the conduit or ductbank, regardless of the number or size of conduit, with no allowance for fittings, boxes, or manholes. Measurement will be to the nearest tenth of a foot. Pullboxes, fittings, and manholes installed in the completed project shall be included in the cost of installed conduit and duct. Linear foot price in the bid form shall be full compensation for: furnishing and installing conduits of the class and size specified; trench excavation; pull ropes; warning tape; duct encasement concrete; bedding; backfilling to road subbase; compaction; removal and disposal of trench spoils; protecting existing installed facilities; cleaning; testing; and all incidental work pertaining to FIBEROPTIC AND ELECTRIC CONDUITS/DUCTS as specified and shown on the Drawings.

B. Payment

1. The unit price shall be paid for FIBEROPTIC AND ELECTRIC CONDUITS/DUCTS on a linear foot basis.

1.24 MISCELLANEOUS CONCRETE (Item 24)

A. Measurement

1. Measurement for payment for MISCELLANEOUS CONCRETE will be by the cubic yard and shall be full compensation for: furnishing and installing concrete used for driveways, cross gutters, sidewalks as part of pavement restoration and will be the number of cubic yards placed in the Work to the lines and grades shown or to restore existing concrete.

B. Payment

1. The unit price shall be paid for MISCELLANEOUS CONCRETE on a cubic yard basis.

1.25 ALLOWANCE: HMA PRICE INDEX FLUCTUATION ADJUSTMENT (Item 25)

A. Measurement

1. The provisions of this section shall apply only to Item No. 5 “HOT MIX ASPHALT PAVEMENT”

2. The compensation payable HOT MIX ASPHALT PAVEMENT will be increased or decreased in conformance with the provisions of this section for paving asphalt price fluctuations exceeding 5 percent (Iu/Ib is greater than 1.05 or less than 0.95) which occur during performance of the Work.

3. The adjustment in compensation will be determined in conformance with the following formulae when the item HOT MIX ASPHALT PAVEMENT is included in a monthly estimate:

a. Total monthly adjustment = AQ

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b. For an increase in paving asphalt price index exceeding 5 percent:

$A = 0.90 (Iu/Ib - 1.05) Ib$

c. For a decrease in paving asphalt price index exceeding 5 percent:

$A = 0.90 (Iu/Ib - 0.95) Ib$

d. Where:

A = Adjustment in dollars per ton of paving asphalt used to produce Hot Mix Asphalt rounded to the nearest $0.01.

Iu = The California Statewide Paving Asphalt Price Index which is in effect on the first business day of the month within the pay period in which the quantity subject to adjustment was included in the estimate.

Ib = The California Statewide Paving Asphalt Price Index for the month in which the bid opening for the project occurred.

Q = Quantity in tons of paving asphalt that was used in producing the quantity of hot mix asphalt shown under "This Estimate" on the monthly estimate using the amount of asphalt determined by the ENGINEER.

4. The adjustment in compensation will also be subject to the following:

a. The compensation adjustments provided herein will be shown separately on progress payments. The CONTRACTOR shall be liable to the OWNER for decreased compensation adjustments and the OWNER may deduct the amount thereof from any moneys due or that may become due the CONTRACTOR.

b. In the event of an overrun of contract time, adjustment in compensation for paving asphalt included in estimates during the overrun period will be determined using the California Statewide Paving Asphalt Price Index in effect on the first business day of the month within the pay period in which the overrun began.

5. The California Statewide Paving Asphalt Price Index is determined each month on the first business day of the month by the CA Department of Transportation using the median of posted prices in effect as posted by Chevron, Mobil, and Unocal for the Buena Vista, Huntington Beach, Kern River, Long Beach, Midway Sunset, and Wilmington fields.

6. In the event that the companies discontinue posting their prices for a field, the OWNER will determine an index from the remaining posted prices. The OWNER reserves the right to include in the index determination the posted prices of additional fields.

7. The California Statewide Paving Asphalt Price Index is available at the Caltrans Division of Engineering Services website:

http://www.dot.ca.gov/hq/esc/oe/asphalt_index/astable.html

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B. Payment

1. Payment for HMA PRICE INDEX FLUCTUATION ADJUSTMENT is a lump sum bid item that provides an allowance as part of the Contract Price for payment adjustments for Price Index Fluctuations, if there is an increase in the price of asphalt, in accordance with the provisions of this section, as directed or approved by the ENGINEER.

1.26 ALLOWANCE: UNFORESEEN UNDERGROUND FACILITIES (Item 26)

A. UNFORSEEN UNDERGROUND FACILITIES is a lump sum bid item that provides an allowance as part of the Contract Price to pay for extra work required as a result of a conflict with existing underground facilities that were not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have discovered, or have been expected to be aware of or to have anticipated, in accordance with Paragraph 4.04.B of the General Conditions.

1.27 ALLOWANCE: REMEDIAL WORK ON EXISTING SEWER PIPE NOT REQUIRED IN CONTRACT DOCUMENTS (Item 27)

A. REMEDIAL WORK ON EXISTING SEWER PIPE NOT REQUIRED IN CONTRACT DOCUMENTS is a lump sum bid item that provides an allowance as part of the Contract Price to pay for extra work associated with testing and repair of pre-existing sewer pipe as directed by the ENGINEER.

1.28 ALLOWANCE: SUPPORT SERVICES FOR RIGHT OF WAY ENCROACHMENTS NOT REQUIRED IN CONTRACT DOCUMENTS (Item 28)

A. SUPPORT SERVICES FOR RIGHT OF WAY ENCROACHMENTS NOT REQUIRED IN CONTRACT DOCUMENTS is a lump sum bid item that provides an allowance as part of the Contract Price to pay for extra work required as a result of the relocation or restoration of existing encroachments in the Right of Way as directed by the ENGINEER. .

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01046

CONTROL OF WORK

PART 1 GENERAL

1.01 PRIVATE LAND

A. Do not enter or occupy private land outside of easements, except by permission of the land owner.

1.02 PIPE LOCATIONS

A. Locate pipelines substantially as indicated on the Drawings. The ENGINEER reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures, existing overhead or buried utilities, or for other reasons. Where fittings are noted on the Drawings, such notation is for the CONTRACTOR's convenience and does not relieve him from laying and jointing different or additional items where required.

1.03 OPEN EXCAVATIONS

A. Adequately safeguard all open excavations by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property. Provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Remove bridges provided for access during construction when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the ENGINEER. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the ENGINEER may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street and requiring that the trench shall not remain open overnight.

B. Take precautions to prevent injury to the public due to open trenches. Provide adequate light at all trenches, excavated material, equipment, or other obstacles which could be dangerous to the public at night.

1.04 POTHOLING

A. Excavate potholes to locate underground pipelines or structures in advance of the construction. Backfill potholes immediately after their purpose has been satisfied, and restore and maintain the surface in a manner satisfactory to the ENGINEER.

1.05 MAINTENANCE OF TRAFFIC

A. Unless permission to close a street is received in writing from the proper authority, place all excavated material so that vehicular and pedestrian traffic may be maintained at all times. If the construction operations cause traffic hazards, repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety in accordance with Section 01571 – Traffic Control.

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B. Detours around construction will be subject to the approval of the ENGINEER. Where detours are permitted, provide all necessary barricades and signs as required to divert the flow of traffic. Expedite construction operations while traffic is detoured. Periods when traffic is being detoured will be strictly controlled by the OWNER.

C. Take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist. The CONTRACTOR shall be fully responsible for damage or injuries.

1.06 CARE AND PROTECTION OF PROPERTY

A. CONTRACTOR shall be responsible for the preservation of all public and private property and use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the CONTRACTOR, restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the ENGINEER.

1.07 WATER FOR CONSTRUCTION PURPOSES

A. CONTRACTOR shall furnish all water needed for construction and testing.

B. CONTRACTOR shall be responsible for adequate and lawful disposal of all water used for testing.

C. CONTRACTOR shall observe any water use restrictions in place during the execution of the Contract.

1.08 MAINTENANCE OF FLOW

A. Provide for the flow of sewers, drains and water courses interrupted during the progress of the work, and immediately remove all materials affecting facilities and dispose of in a legal manner. Notify the ENGINEER in writing at least one week in advance of the interruption of any flow.

1.09 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with CONTRACTOR and Subcontractors or trades and assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the ENGINEER.

1.10 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the work, keep the site of operations as clean and neat as possible. Dispose of all residue resulting from the construction work and, at the conclusion of the work, remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and leave the entire site of the work in a neat and orderly condition.

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B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and in other related sections.

C. Disposal of excess excavated material in wetlands, stream corridors and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the CONTRACTOR or any person employed by him will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The CONTRACTOR will be required to remove the fill and restore the area impacted at no increase in the Contract Price.

D. If CONTRACTOR elects to dispose of materials at locations other than those where arrangements have been made by OWNER, or, if material is to be disposed of and OWNER has not made arrangements for disposal of the material, the CONTRACTOR shall make arrangements for disposing of the materials outside the right of way and shall pay all costs involved. Arrangements shall include, but not be limited to, entering into agreements with property owners and obtaining necessary permits, licenses, and environmental clearances. Before disposing of any material outside the right of way, CONTRACTOR shall furnish to ENGINEER satisfactory evidence that CONTRACTOR has entered into agreements with the property owners of the site involved and has obtained the permits, licenses, and clearances.

E. When any material is to be disposed of outside the right of way, and the OWNER has not made arrangements for disposal of the material, CONTRACTOR shall first obtain written authorization from the property owner on whose property the disposal is to be made and CONTRACTOR shall file with ENGINEER the authorization or a certified copy thereof together with a written release from the property owner absolving the OWNER from any and all responsibility in connection with the disposal of material on the property. Before any material is disposed of on the property, CONTRACTOR shall obtain written permission from ENGINEER to dispose of the material at the location designated in the authorization.

F. When material is disposed of as above provided and the disposal location is visible from a highway, the CONTRACTOR shall dispose of the material in a neat and uniform manner to the satisfaction of the ENGINEER.

G. Where the OWNER has made arrangements with owners of land in the vicinity of the Project for the disposal of materials on an owner's property, the arrangements are made solely for the purpose of providing all Bidders an equal opportunity to dispose of the materials on the property. Bidders or CONTRACTORs may, upon written request, inspect the documents evidencing the arrangements between property owners and the OWNER. The CONTRACTOR may, if the CONTRACTOR so elects, exercise any rights that have been obtained, which may be exercised by a CONTRACTOR under the arrangements, subject to and upon the conditions hereinafter set forth.

H. Such arrangements are not a part of the Contract and it is expressly understood and agreed that the OWNER assumes no responsibility to the Bidder or CONTRACTOR whatsoever in respect to the arrangements made with the property owner to dispose of materials thereon and that the Contractor shall assume all risks in connection with the use of the property, the terms upon which the use shall be made, and there is no warranty or guaranty, either express or implied, as to the quantity or types of materials that can be disposed of on the property.

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I. The Bidder or CONTRACTOR is cautioned to make such independent investigation and examination as the CONTRACTOR deems necessary to be satisfied as to the quantity and types of materials which may be disposed of on the property and the rights, duties and obligations acquired or undertaken under the arrangement with the property owner.

J. Notwithstanding that the CONTRACTOR may elect to dispose of materials on any such property owner's property, no material may be disposed of on that property unless the CONTRACTOR has first either:

1. Executed a document that will guarantee to hold the owner harmless from all claims for injury to persons or damage to property resulting from the CONTRACTOR's operations on the property owner's premises and also agree to conform to all other provisions set forth in the arrangement made between the OWNER and the property owner. The document will be prepared by the ENGINEER for execution by the CONTRACTOR, or

2. Entered into an agreement with the owner of the disposal site on any terms mutually agreeable to the owner and the CONTRACTOR; provided that the CONTRACTOR shall furnish to the ENGINEER a release, in a form satisfactory to the ENGINEER, executed by the owner, relieving the OWNER of any and all obligations under the OWNER's arrangement with the owner.

K. If the CONTRACTOR elects to dispose of material under (1), the use of the site shall be subject to the terms, conditions and limitations of the arrangement made between the property owner and the OWNER and the CONTRACTOR shall pay those charges that are provided for in the arrangement made by the OWNER with the property owner, and deductions will be made from any moneys due or that may become due the CONTRACTOR under the Contract sufficient to cover the charges for the material disposed of.

L. If the CONTRACTOR elects to dispose of material under (2), the CONTRACTOR shall pay those charges that are provided for in the agreement between the owner and the CONTRACTOR and deductions will not be made from any moneys due or that may become due the CONTRACTOR under the Contract to cover the charges.

M. Before acceptance of the Contract, the ENGINEER may require the CONTRACTOR to submit written evidence that the owner of the disposal site is satisfied that the CONTRACTOR has satisfactorily complied with the provisions of either - (1), the arrangement between the OWNER and the owner, or (2), the agreement between the owner and the CONTRACTOR, as the case may be.

N. Full compensation for all costs involved in disposing of materials as specified in this paragraph, including all costs of hauling, shall be considered as included in the price paid for the contract item of work involving the materials and no additional compensation will be allowed therefor.

END OF SECTION

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SECTION 01050

PROJECT CONTROLS (SURVEYING)

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Provide field engineering services required for the WORK; including but not limited to:

1. Survey work required for project controls and layout.

2. Certified as-built surveys specified herein.

B. Retain the services of a registered land surveyor licensed in the State of the California to:

1. Identify existing control points and property line corners indicated on the Drawings.

2. Verify and record all existing structure locations in the vicinity of, or adjacent to, the WORK.

3. Maintain an accurate record of locations of all new buried piping and existing buried piping and other buried existing facilities (piping, conduits, and structures) encountered and/or relocated during construction of the new WORK.

1.02 SUBMITTALS

A. Submit, to the ENGINEER, the name, address and state registration and license number of proposed registered land surveyor.

B. At the end of the project, and prior to final payment, submit certified drawing(s) (with the Surveyor’s title block) of the items listed below. All surveys shall be tied to the applicable Grid System and shall indicate all pre-existing and new project benchmarks. Vertical Control shall conform to the project elevation datum designated on the plans.

1. Provide a certified survey drawn at the same scale as the ENGINEER's line drawings indicating lines, grades, elevations, and stationing at 100-ft increments, changes in alignment or grade. Provide elevations of structure inverts, pipe invert(s) and rim elevations on all flow structures.

1.03 QUALIFICATIONS OF SURVEYOR

A. Registered land surveyor, licensed in the State of California.

1.04 SURVEY REFERENCE POINTS

A. Existing basic horizontal and vertical control points for the project will be provided by the ENGINEER.

B. Locate and protect control points prior to starting site work and preserve all permanent reference points during construction.

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1. Make no changes or relocations without prior written notice to and approval by the ENGINEER.

2. Report to the ENGINEER when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

3. Require the surveyor to correctly replace project control points which may be lost or destroyed. Establish replacements based on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

A. Engineer shall provide construction staking to establish the lines and grades for the WORK.

B. Execute the WORK in accordance with the lines and grades indicated.

C. If lines, levels or layouts are lost or destroyed, or if required by the OWNER or ENGINEER, verify layouts by same methods.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 RECORDS

A. Prepare and submit Record Documents as specified in Section 01720.

B. Maintain a complete, accurate log of all control and survey work as it progresses.

C. Update the project as-built survey on a monthly basis, based on the work performed during the month. Submit one copy of up to date as-built documentation with CONTRACTOR's monthly applications for payment.

D. Maintain an accurate record of new and existing piping, conduit and structure changes, revisions, relocations, and modifications.

E. At the end of the project, submit the following:

1. Four signed and sealed prints of all required as-built survey information

2. Copy of all AutoCAD files of documents specified in Article 1.03.C, above on a CD or DVD.

END OF SECTION

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SECTION 01060

REGULATORY AGENCY AND UTILITY REQUIREMENTS

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall apply for, obtain and comply with terms, conditions and requirements attached to all permits, bonds and licenses required by any local, regional, state or federal agencies to perform work, construct, erect, test and start up the Work. The CONTRACTOR shall also obtain written agreements from any private property owners with whom it arranges to use their land and/or facilities during construction.

B. The OWNER has obtained certain permits during the project design phase. These are appended to these Specifications and described in Paragraph 1.02 below. The CONTRACTOR is required to abide by the requirements of these permits and shall also obtain construction phase permits and abide by their requirements.

C. While not covered by permits or agreements, the CONTRACTOR shall also plan and execute its work in coordination with utility agencies. This shall include, but not be limited to, working adjacent to and protecting in place existing water, gas, fiber optic and other underground utilities and arranging for utility connections to the new wastewater facilities. Utility contacts are listed in the General drawings of the Contract Drawings. Also see Paragraph 1.03, below.

1.02 PERMITS AND AGREEMENTS

A. The CONTRACTOR shall abide by the conditions of all permits and agreements and shall obtain written proof of satisfaction of conditions from issuers of permits and agreements prior to acceptance of the Work by the OWNER.

B. Conditions and requirements affecting the CONTRACTOR are found in the following permits and agreements. Note, however, that this list may not be all inclusive:

1. County of San Luis Obispo Project Encroachment Permit. The OWNER has obtained an encroachment permit for constructing the project within County right of way and has incorporated the applicable provisions into the Contract Documents. The CONTRACTOR shall abide by all requirements pertaining to it. No encroachment permit related fees or trench cut fees are required to be paid by the CONTRACTOR.

2. County of San Luis Obispo, Department of Planning and Building, Approved Development Plan/Coastal Development Plan A-3-SLO-09-055/069. See “Conditions of Approval” construction phase requirements pertaining to the CONTRACTOR as presented in Paragraph 1.04, below.

3. Central Coast Regional Water Quality Control Board (RWQCB) Low Threat Discharge General Permit CAG993001, Order No. R3-2011-0223. The subject permit applies for disposal of dewatering water by the CONTRACTOR. The CONTRACTOR shall abide by the requirements of said permit including dewatering water desilting prior to disposal.

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4. Central Coast Regional Water Quality Control Board Storm Water General Permit. The OWNER has submitted to the RWQCB its intent to comply with the requirements of the Storm Water General Permit. CONTRACTOR shall modify the permit to become the listed QSP. CONTRACTOR may also modify the permit as required. The CONTRACTOR shall abide by all of said permit requirements including preparing and submitting its Stormwater Pollution Prevention Plan (SWPPP) to the RWQCB. Also see Section 01570 Stormwater Pollution Prevention Plan and the erosion control plans shown in the Contract Drawings.

5. County of San Luis Obispo Fill and Grading Permits. The CONTRACTOR shall obtain a fill and grading permit for each property used for disposal of excavation spoils.

6. Private Property Use Agreements. Should the CONTRACTOR arrange for and negotiate agreements with private property owners for use of their property for staging or laydown areas, it shall provide a copy of said agreements to the ENGINEER. These private property use agreements are subject to the approval of the ENGINEER upon verification that such use complies with all environmental permit requirements. Upon construction completion, the CONTRACTOR shall also provide a signed off copy of said agreements signifying that the property has been properly restored.

1.03 UTILITY CONNECTIONS

A. The CONTRACTOR will include all costs in its bid to contact utilities and make arrangements for and provide all utilities required for the project facilities. The foregoing shall include costs for any utility engineering, construction work that must be performed by utility forces including their facility extension costs, metering and other appurtenances, utility inspection and other fees and other costs associated with providing the utility service to the wastewater project facilities.

B. CONTRACTOR shall contact the Utilities listed on Sheet G-004 of the Contract Drawings to obtain service needed for the project facilities

1.04 CONDITIONS OF COSTAL DEVELOPMENT APPROVAL PERTAINING TO CONTRACTOR

The CONTRACTOR shall conform to the conditions of the Coastal Development Permit (CDP) and provide measures required.

A. Condition 11. Fire Safety: Prior to occupancy or final inspection, whichever comes first, the CONTRACTOR shall assist the OWNER in obtaining final inspection approval of all required fire/life safety measures.

B. Condition 12. Portable Engines: Prior to initiating grading activities, if it is determined that portable engines and portable equipment will be used, the CONTRACTOR shall contact the SLOAPCD and obtain a permit to operate portable engines or portable equipment, and such engines or equipment shall be registered in the statewide portable equipment registration program. The SLOAPCD Compliance Division shall be contacted to determine the implementation requirements of this mitigation measure.

C. Condition 13. Encroachment Permit: see Section 1.02B.1 of this specification.

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D. Condition 19. Erosion Control: Prior to commencement of grading activities for each facility, erosion control measures shall be incorporated into the grading plans to minimize the potential for erosion or loss of top soil during grading to the satisfaction of the Planning Director. Any erosion and sedimentation control netting or other erosion and sedimentation control devises used for temporary or permanent erosion and sedimentation control, shall be limited to biodegradable mesh or other biodegradable products

E. Condition 19. Erosion Control – Landscaping: Prior to commencement of grading activities for each facility, vegetation/landscaping shall be provided on the graded cut and fill slopes to reduce the long-term potential for soil erosion or loss of topsoil to the satisfaction of the ENGINEER.

F. Condition 28. Cultural Resources: The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

G. Condition 32. Traffic Management Plan. The CONTRACTOR is directed to Specification Sections 01571 – Traffic Control.

H. Condition 35. Construction Activity Management Plan. Prior to commencement of grading activities, the OWNER will submit a Construction Activities Management Plan for the review and approval of the SLOAPCD. The CONTRACTOR shall assist the OWNER in preparation of this Plan. This plan shall include but not be limited to the following Best Available Control Technologies for construction equipment:

1. Minimize the number of large pieces of construction equipment operating during any given period.

2. Schedule construction related truck/equipment trips during non-peak hours to reduce peak-hour emissions and overall daily and quarterly emissions.

3. Properly maintain and tune all construction equipment according to manufacturer's specifications.

4. Fuel all off-road and portable diesel powered equipment including but not limited to: bulldozers, graders, cranes, loaders, scrapers, backhoes, generators, compressors, auxiliary power units, with ARB certified motor vehicle diesel fuel.

5. All diesel construction equipment shall meet ARB's Tier 3 standard for off-road heavy duty diesel engines.

6. All on-road heavy-duty trucks shall meet the ARB's 2007 or newer certification standard for on-road heavy-duty diesel engines.

7. All on and off-road diesel equipment shall not be allowed to idle for more than 5 minutes. Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the 5 minute idling limit.

8. Electrify portable equipment where possible throughout the project area.

9. All diesel powered portable equipment used shall have tier 2 or tier 3 engines and retrofitted with an ARB level 3 verified diesel emissions control strategy (VEDEC).

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10. Locate construction staging areas at least 1000 feet from sensitive receptors.

I. Condition 36. Construction Activity Management Plan. The Construction Activity Management Plan (CAMP) should include but not be limited to the following elements:

1. Schedule construction truck trips during non-peak hours to reduce peak hour emissions.

2. Limit the length of the construction work-day period, if necessary.

3. Phase construction activities to minimize overlapping emissions.

4. Construction Equipment composition and schedule including:

a. Equipment Type

b. Equipment Model

c. Equipment Year

d. Engine Type

e. Engine Model

f. Engine Year

g. Engine Horsepower

h. Schedule of use

J. Condition 44. Noise. Equipment noise measured at the property lines shall not exceed ambient level of 50 dBA Leq. The noise from installed equipment may be attenuated through the use of a "manufacturer enclosure" or through incorporation of noise attenuation design features into the enclosure structure.

K. Condition 48. CAL-OSHA Standards. All CONTRACTORs shall comply with relevant provisions of CAL-OSHA CAC Title 8 regarding the provision of safety and rescue equipment, to the satisfaction of the County Department of Public Works in consultation with the Planning Director.

L. Condition 54. Staging-Visual. CONTRACTOR staging areas shall be located as shown in Section 01500. Construction staging areas shall conform to Estero Area Plan AES-1 and be located away from sensitive viewing areas to the extent feasible.

M. Condition 58. Monarch Butterfly Surveys. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

N. Condition 63. Morro Shoulderband Snail Monitoring. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

O. Condition 64. California Red-legged Frog Monitoring. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

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P. Condition 66. Botanical Surveys. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

Q. Condition 68. Worker Education Program. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

R. Condition 69. Nesting Bird Survey. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

S. Condition 70. Nesting Raptor Survey. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

T. Condition 73. Discovery of Human Remains. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

U. Condition 74. Paleontological Resources. Although unlikely, should any vertebrate fossils or potentially significant finds (e.g., numerous well-preserved invertebrate or plant fossils) be encountered by anyone working on the site, all activities in the immediate vicinity of the find are to cease until a qualified paleontologist evaluates the find for its scientific value. If deemed significant, the paleontological resource(s) shall be salvaged and deposited in an accredited and permanent scientific institution where they will be properly curated and preserved for the benefit of current and future generations.

V. Condition 75. APCD Equipment Requirements. Prior to initiating activities, the CONTRACTOR shall:

1. Use one catalyzed diesel particulate filter (CDPF) on the piece of equipment estimated to generate the greatest emissions. If a CDPF is unsuitable for the potential equipment to be controlled, five diesel oxidation catalysts (DOC) shall be used.

2. Identify equipment to be operated during construction as early as possible in order to place the order for the appropriate filter and avoid any project delays. This is necessary so that contractors bidding on the project can include the purchase, proper installation, and maintenance costs in their bids.

3. Contact the SLOAPCD Compliance Division to initiate implementation of this mitigation measure at least two months prior to start of construction.

W. Condition 76. Dust Control. The CONTRACTOR shall comply with Section 1562 – Dust Control.

X. Condition 78. Noise Abatement Requirements. The CONTRACTOR shall adhere to the following noise attenuation requirements:

1. A construction noise control plan shall be developed for the project that identifies the nature and timing of operations designed to minimize noise exposure to noise sensitive receptors including natural resource areas.

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2. Generally, construction activities shall be limited to between the hours of 7 a.m. to 9 p.m. on any day except Saturday or Sunday or between the hours of 8 a.m. to 5 p.m. on Saturday or Sunday.

3. Construction activities in the vicinity of schools should be scheduled for times when classes are not in session.

4. All construction equipment shall use noise-reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.

5. The noise produced by construction activities shall be monitored to insure that the noise produced by construction equipment is compliant with the emission standards listed in the project EIR (Appendix L, page 5.10-4 and in source document, FHWA Construction Noise Model, page 3).

6. Measures to minimize back-up alarm issues shall be established including such techniques as:

   a. use of self-adjusting ambient sensitive back-up alarms.

   b. manual adjustable alarms on lower settings.

   c. use of observers.

   d. scheduling of activities so that alarm noise is minimized.

   e. construction site access designed such that deliveries and trucks move through the site in a forward manner without the need to back up.

7 Construction staging and heavy equipment maintenance activities shall be performed a minimum distance of 300 feet from the nearest residence, unless safety or technical factors take precedence.

8. Stationary combustion equipment such as pumps or generators operating near any noise sensitive receptor shall, if necessary, be shielded with a noise protection barrier. Leq values at the property line of receiver locations shall not exceed 65 dB.

Y. Condition 80. Pile Driving Vibration. Prior to initiation of construction of the collection system, the CONTRACTOR shall identify all areas where pile driving, or other construction methods that would result in severe ground vibrations, could occur. Deep pile foundation designs shall favor techniques that can be constructed with minimal vibration effects. Prior to construction, using technology and standards recommended in the Caltrans Transportation and Construction Induced Vibration Manual, the CONTRACTOR shall calculate the vibration effects of pile driving and other high vibration activities using the Peak Particle Velocity (PPV) metric, and shall ensure that the PPV does not exceed the following thresholds at any affected building: 0.5 at modern industrial/commercial or residential buildings; 0.3 for any building composed of masonry, unreinforced concrete, lath & plaster interiors or of similar construction; and 0.25 for any building identified as particularly sensitive to vibration impacts. Alternative design and/or construction methods shall be used to meet these limits. In addition, the construction CONTRACTOR shall notify all property owners and tenants adjacent to the proposed pile driving or other vibration inducing activities of the days and hours of operation. Prior to

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construction activities associated with this type of work, the construction CONTRACTOR shall inspect all structures within the area predicted to experience vibration in excess of 0.25 PPV to document existing characteristics of the structures. During construction, vibration shall be monitored and recorded and adjustments made to operation or to the radius of concern if the level of vibration differs from estimates. If a post construction survey indicates that damages to structures (e.g., residences, pools) occurred during the work, the property owner shall be fairly compensated for the cost of remediating damages.

Z. Condition 81, Invasive Plants: The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

AA. Condition 82, Los Osos Creek Environmental Requirements. The CONTRACTOR is directed to Specification 01561 – Biological and Cultural Resource Environmental Controls.

AB. Condition 94, Laterals - Biology. Installation of lateral lines will conform to the mitigation procedures contained in the "Lateral Line Installation – Biological Resources & Mitigation" report date 10-16-02.

AC. Coastal Condition 1l, Approved Development – Construction. All areas within which construction staging are to take place shall be minimized to the maximum extent feasible in order to minimize impacts on resources (e.g., terrestrial habitat, wetlands, creeks, riparian areas, or other sensitive resource areas, etc.). All measures to be taken to minimize impacts associated with construction staging and related areas shall be identified, including but not limited to screening, fencing (see Part 2 of this Specification), landscaping, signage, and designation of various activity and storage areas on the site. If additional construction staging and related areas are needed following award of the Work, such areas shall be identified in a plan and submitted for Executive Director review and approval. Copies of the signed Coastal Development Permit (CDP) shall be maintained in a conspicuous location at the construction staging area at all times, and that such copies be available for public review on request. All persons involved with the construction shall be briefed on the content and meaning of the CDP, and the public review requirements applicable to them, prior to commencement of construction. A primary construction coordinator shall be designated by the CONTRACTOR for public inquiries regarding the construction, and that their contact information (i.e., address, phone numbers, etc.) including, at a minimum, a telephone number available 24 hours a day for the duration of construction, be conspicuously posted at the construction staging area and at individual construction sites where such contact information is readily visible from public viewing areas, along with indication that the construction coordinator should be contacted in the case of questions regarding the construction (in case of both regular inquiries and emergencies). The construction coordinator shall record the name, phone number, and nature of all complaints received regarding the construction, and shall investigate complaints and take remedial action, if necessary, within 24 hours of receipt of the complaint or inquiry.

1.05 SURFACE MINE AND RECLAMATION ACT

A. Imported borrow or aggregate material must come from a surface mine permitted under the Surface Mining and Reclamation Act of 1975 (SMARA), Pub Res Code § 2710, et seq., or from an exempt site.

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B. The Department of Conservation, Office of Mine Reclamation maintains a list of permitted mine sites. For the list of permitted sites, go to:

http://www.conservation.ca.gov/omr/ab_3098_list

C. If CONTRACTOR uses import borrow or aggregate material from a surface mine not on this list, CONTRACTOR shall submit proof the mine is exempt from SMARA to Engineer.

1.06 SOLID WASTE DISPOSAL AND RECYCLING

A. For the purpose of complying with San Luis Obispo County Code, Title 8, Health and Sanitation, Chapter 8.12, "Solid Waste Management," CONTRACTOR shall recycle at least 50% of the construction and demolition waste generated by the Project.

B. The following is a list of IWMA-Certified Recycling Facilities:

1. C&D Recycling Facility at Cold Canyon Landfill 805-549-8332

2. C&D Recycling Facility at Chicago Grade Landfill 805-466-2985

3. North SLO County Recycling 805-434-0043

4. API (roll-off/debris box company) 805-928-8689

5. R&R (a roll-off/debris box company) 805-929-8000

6. Recycling Facility at the Paso Robles Landfill 805-238-2028

7. Santa Maria Transfer Station 805-922-9255

8. Bedford Enterprises/SMART 805-922-4977

C. CONTRACTOR shall complete and sign the "RECYCLING PLAN" form in conformance with the provisions in Paragraph 2.05 of the General Conditions. This form must be submitted and approved by the ENGINEER prior to receiving the Notice to Proceed.

D. This form must show how at least 50% of the Project construction and demolition waste will be recycled. CONTRACTOR shall maintain receipts or other documentation for any facility or site that received waste from the Project.

E. CONTRACTOR shall submit a complete and accurate "DISPOSAL REPORT" form with original receipts and supporting documentation. This form must be submitted and approved prior to receiving the Notice of Completion.

F. If CONTRACTOR fails to submit the required information showing the 50% recycling goal was met, the OWNER could impose a penalty equal to 2 percent of the total Contract Price.

G. Full compensation for complying with these requirements shall be considered as included in the prices paid for the various items of work generating such construction and demolition waste and no additional compensation will be allowed therefor.

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H. The copies of the “RECYCLING PLAN” and “DISPOSAL REPORT” forms are included at the end of this Specification Section.

PART 2 – PRODUCTS

2.01 PROTECTIVE FENCING

A. Protective fencing shall be 4-feet tall international orange high-density polyethylene resin, with 1-inch by 3 ¾-inch mesh openings to withstand a temperature service rating of -40 to 200 degrees Fahrenheit (e.g., Visi Barrier or equivalent). Protective fencing shall be at locations as indicated on the Drawings. Metal T-posts should be placed at maximum of 20-feet on-center and fencing should be secured to the posts for the entire construction period, according to the manufacturer’s specifications.

PART 3 – EXECUTION

NOT USED

END OF SECTION

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RECYCLING PLAN FOR COUNTY PROJECTS

SECTION 1. PROJECT INFORMATION

Contract Title	Contractor Name	
	Contractor Phone	Contractor Fax
Contract Number	Street Address	
Total Contract Amount	City, State, Zip	
Print Name and Title	Signature	Date

SECTION 2. RECYCLING PLAN

	Before Construction (estimated tons)				
	Landfill	Recycling Facility		Reuse	
Materials	(Tons)	(Tons)	Location	(Tons)	Location
Cleared Vegetation					
Asphalt Concrete					
Concrete					
Metals (including spent equipment)					
Lumber					
Drywall					
Mixed Recyclables					
Trash					
Totals					
% Diversion					

Official Use Only

Recycling Plan Approved ☐	Recycling Plan Denied ☐
Information Required:	
Print Name and Title	Signature / Date

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DISPOSAL REPORT FOR COUNTY PROJECTS

SECTION 1. PROJECT INFORMATION

Contract Title	Contractor Name	
	Contractor Phone	Contractor Fax
Contract Number	Street Address	
Total Contract Amount	City, State, Zip	

Contractor Certification: I certify under penalty of perjury that the information provided in this form is complete and accurate.

Print Name and Title	Signature	Date

SECTION 2. DISPOSAL REPORT

	After Construction (actual tons)				
	Landfill	Recycling Facility		Reuse	
Materials	(Tons)	(Tons)	Location	(Tons)	Location
Cleared Vegetation					
Asphalt Concrete					
Concrete					
Metals (including spent equipment)					
Lumber					
Drywall					
Mixed Recyclables					
Trash					
Totals					
% Diversion					

I have reviewed and approved the information submitted in this report for completeness

Resident Engineer's Name:	Signature:	Date:

Official Use Only

Disposal Report Approved ☐	Disposal Report Denied ☐

Information Required

Print Name and Title	Signature	Date

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SECTION 01101

SAFETY, HEALTH AND EMERGENCY RESPONSE

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Site specific health and safety procedures including a detailed accident prevention plan are required. These procedures shall be described in a Safety, Health and Emergency Response Plan (SHERP) prepared by the CONTRACTOR. The SHERP shall be submitted to the ENGINEER and be reviewed and approved by the ENGINEER and OWNER before any WORK at the site can be initiated. Implement, maintain and enforce the SHERP procedures at the appropriate time prior to and during all phases of the WORK.

B. Utilize the services of a health and safety professional designated the Health and Safety Manager (HSM) to develop and implement the SHERP, including the air monitoring program, conduct initial site specific training and provide support for all health and safety activities as needed, including the upgrading or downgrading of the level of personnel protection.

1. In addition, a Site Safety and Health Officer (SSHO) shall assist and represent the HSM in the continued implementation and enforcement of the SHERP. The SSHO shall be assigned to the site on a full time basis and shall be either the CONTRACTOR's employee or a subcontractor who reports to the CONTRACTOR and the HSM in matters pertaining to site safety and health.

C. The following definitions shall be used throughout this Safety, Health and Emergency Response Plan.

1. Health and Safety Manager (HSM): The CONTRACTOR's employee assigned to develop the SHERP and assume full responsibility for the CONTRACTOR's health and safety program.

2. Site Safety and Health Officer (SSHO): The CONTRACTOR's employee assigned to the site on a full-time basis for the duration of the project with functional responsibility for implementation of the SHERP.

3. Site: For the purpose of the SHERP, the site shall be the area within the limits of work as shown on the Drawings.

4. Physician: A licensed physician provided by the CONTRACTOR with experience in the practice of occupational medicine.

1.02 REGULATORY REQUIREMENTS AND APPLICABLE PUBLICATIONS

A. The site specific SHERP shall be consistent with the requirements of:

1. Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926). Revised July 1, 2009.

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2. United States Environmental Protection Agency (USEPA) Standard Operating Procedures. Revised November, 2007.

3. Corps of Engineers Accident Prevention and Safety and Health Requirements Manual, EM 385-1-1. Revised July, 2011.

4. Cal-OSHA Title 8, Subchapter 4 Requirements for Trench Shoring Systems. Dated July, 2001.

B. The SHERP shall include but not necessarily be limited to, the following components as required by OSHA 29 CFR 1910.120(i)(2):

1. Names of key personnel and alternates responsible for site safety and health (responsibilities and chain of command)

2. Safety and health hazard assessment and risk analysis for each site task and operation (Accident Prevention Plan).

3. Site Description and Evaluation

4. Education and Training

5. Personnel Protective Equipment

6. Medical Surveillance

7. Air Monitoring

8. Standard Operating Procedures, Engineering Controls and Work Practices

9. Site Control Measures (Work Zones, Communications and Security)

10. Personnel Hygiene and Decontamination

11. Equipment Decontamination and Record Keeping

12. Emergency Equipment and First Aid Requirements

13. Emergency Response Plan and Contingency Procedures

14. Heat/Cold Stress Monitoring

15. Logs, Reports and Record Keeping

C. Six copies of the site specific SHERP shall be submitted to the ENGINEER within 7 days following the Effective Date of the Agreement and must be approved prior to commencement of any on-site work.

D. Determination of the appropriate level of worker safety equipment and procedures shall be made by the CONTRACTOR as a result of initial site survey review of existing data and a continued safety and health monitoring program performed by the SSHO and approved by the

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ENGINEER, in accordance with the requirements specified herein. Existing data indicate that all work can be performed in Level D with contingency procedures to move to Level C protection.

E. Standards delineated in this Section are in addition to or an amplification of procedures and requirements of the above referenced regulations and documents.

F. Should any unforeseen or site specific safety related factor, hazard, or condition become evident during the performance of work at this site, it shall be the CONTRACTOR's responsibility to bring such to the attention of the ENGINEER both verbally and in writing as quickly as possible, for resolution. In the interim, the CONTRACTOR shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public and the environment.

G. Should the CONTRACTOR seek relief from, or substitution for, any portion or provision of the SHERP, such relief or substitution shall be requested of the ENGINEER in writing and if approved, be authorized in writing.

1.03 SITE CONTROL

A. Communications

1. Provide portable two-way radio or portable vehicle telephone communication at the site and emergency numbers, including police, fire, ambulance, hospital and OWNER, shall be prominently posted near the radio or telephone.

1.04 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

A. Develop contingency plans including evacuation procedures and routes to places of refuge or safe distances from the danger area, for the following potential emergencies: chemical exposure, personal injury, potential or actual fire or explosion, or environmental accident (spill or release).

B. Emergency medical care services shall be prearranged at a nearby medical facility with established emergency routes. The staff at the facility shall be advised of the potential medical emergencies that might result.

C. Establish emergency communications with health and emergency services. The name of this facility, name of contact, emergency routes and emergency communications arrangements shall be provided in the SHERP. In addition the CONTRACTOR shall provide the following equipment:

1. At least one first aid kit shall be provided and maintained fully stocked at a first aid station which is in close proximity to the work, but not inside a hazardous work area. First aid kit locations shall be specially marked and provided with adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions.

2. Have at least one certified First Aid Technician on the site at any time there is work being performed. This person may perform other duties, but must be immediately available to render first aid when needed. Certification shall be by the American Red Cross or other approved agency and shall be submitted to the ENGINEER.

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3. 2A-10 B:C type dry chemical fire extinguishers shall be provided at the site office.

1.05 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

A. Develop an emergency response and contingency plan for on-site and off-site emergencies, as specified in OSHA 29 CFR 1910.120(l), which shall address at a minimum:

1. Pre-emergency planning

2. Personnel roles, lines of authority, training and communication

3. Emergency recognition and prevention

4. Safe distances and places of refuge

5. Site security and control

6. Evacuation routes and procedures

7. Decontamination

8. Emergency medical treatment and first aid

9. Emergency alerting and response procedures

10. Critique of response and follow-up

11. Personal Protection Equipment (PPE) and emergency equipment

B. In the event of any emergency associated with Response Action, without delay: take diligent action to remove or otherwise minimize the cause of the emergency; alert the ENGINEER and institute whatever measures might be necessary to prevent any repetition of the conditions or actions leading to, or resulting in, the emergency.

C. Emergency medical care services shall be prearranged at a nearby medical facility with established emergency routes.

D. Establish emergency communications with health and emergency services. The name of this facility, name of contact, emergency routes and emergency communications arrangements shall be posted at the site. The posted list shall include the following minimum points:

1. CONTRACTOR physician name, address and telephone number.

2. Ambulance service and fire department telephone numbers.

E. In the event that an accident for some other safety related incident occurs during the course of the project, the OWNER shall be telephoned immediately and receive a written notification within 24 hours. The report shall include the following items:

1. Name, organization, telephone number, and location of the CONTRACTOR.

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2. Name and title of the person(s) reporting.

3. Date and time of accident/incident.

4. Location of accident/incident, including site location and facility name.

5. Brief summary of accident/incident giving pertinent details including type of operation ongoing at time of accident.

6. Cause of accident/incident, if known.

7. Casualties (fatalities, disabling injuries).

8. Details of any existing chemical hazard or contamination.

9. Estimated property damage, if applicable.

10. Nature of damage; effect on contract schedule.

11. Action taken by CONTRACTOR to ensure safety and security.

12. Other damage or injuries sustained (public or private).

1.06 PERSONAL PROTECTIVE EQUIPMENT

A. Provide all on-site personnel with appropriate personal safety equipment and protective clothing, and will ensure that all safety equipment and protective clothing is kept clean and well maintained. The CONTRACTOR's HSM shall establish upgrade/downgrade "action levels" from the specified minimum levels of protection based upon air monitoring results and direct contact potential. Protocols formally changing the level of protection and the communication network for doing so shall be described in the SHERP. Any changes to the minimum level of protection shall be approved by the SSHO and the ENGINEER. At a minimum the following items shall be provided:

1. Protective clothing shall be furnished for on-site personnel, consisting of:

a. Level D: use as appropriate

1) Coveralls

2) Gloves*

3) Boots/shoes, chemical-resistant steel toe and shank

4) Boots, outer, chemical-resistant (disposable)*

5) Safety glasses or chemical splash goggles*

6) Hard hat

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7) Escape mask*

8) Face shield*

*Optional as applicable.

2. Footwear used on site shall be steel-toed, steel shank safety shoes or boots, with chemical resistant soles.

3. All on-site personnel shall wear a hard hat.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01115

ESCROW BID DOCUMENTS

PART 1 GENERAL

1.01 GENERAL

A. The three low bidders shall submit, within two business days of the opening of bids, one copy of all documentary information generated in preparation of bid prices for this Contract. This material is hereinafter referred to as Escrow Bid Documents (EBDs). The Escrow Bid Documents of the successful bidder will be held in escrow for the duration of the Contract.

B. The successful bidder agrees, as a condition of award of the Contract, that the Escrow Bid Documents constitute all of the information used in preparation of his bid. No other bid preparation information shall be considered in resolving any disputes or claims.

C. Nothing in the Escrow Bid documents shall change or modify the terms or conditions of the Contract.

1.02 OWNERSHIP

A. The EBDs are and shall always remain the property of the CONTRACTOR subject only to joint review by OWNER and the CONTRACTOR, except as provided for herein.

B. OWNER stipulates and expressly acknowledges that the EBDs, as defined herein, constitute trade secrets. This acknowledgment is based on the OWNER's express understanding that the information contained in the EBDs is not known outside the CONTRACTOR's business, is known only to a limited extent and only by a limited number of employees of the CONTRACTOR, is safeguarded while in the CONTRACTOR's possession, and is extremely valuable to competitors by virtue of it reflecting the CONTRACTOR's contemplated techniques of construction.

C. OWNER acknowledges that EBDs and the information contained therein are made available to OWNER only because such action is an express prerequisite to award of the Contract. OWNER acknowledges that the EBDs include a compilation of information used in the CONTRACTOR's business, intended to give the CONTRACTOR an opportunity to obtain an advantage over competitors who do not know of or use the contents of the documentation. OWNER agrees to safeguard the EBDs and all information contained therein to the fullest extent permitted by law.

1.03 PURPOSE

A. EBDs will be used to assist in the negotiation of price adjustments and variations and in the settlement of disputes, Claims and other controversies. They will not be used for pre-award evaluation of the CONTRACTOR's anticipated methods of construction or to assess the CONTRACTOR's qualifications for performing the Work.

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1.04 FORMAT AND CONTENTS

A. No standard format is required for EBDs, but the submitted documentary information must be legible and complete. Documentary information shall be submitted in the format the information was generated in the preparation of Bid prices for the Project. It is not intended that extra work is required in preparing the bid but to ensure that the EBDs will be adequate to enable complete and proper understanding and proper interpretation for their intended use. The EBDs shall be in the English language only.

B. The EBDs shall clearly itemize the estimated costs of performing the work of each item contained in the Bid Schedule. Items should be separated into sub-items as required to present a complete and detailed cost estimate and allow a detailed cost review. The EBDs shall include all quantity take-offs, crews, equipment, calculations of rates of production and progress, copies of quotations from sub-Contractors and suppliers, and memoranda, narratives, consultants reports, add/deduct sheets and all other information used by the CONTRACTOR to arrive at the prices contained in the bid. Estimated costs shall be broken down into the CONTRACTOR's usual estimate categories such as direct labor, repair labor, equipment operation, equipment Ownership, expendable materials, permanent material and subcontract costs as appropriate. Plant and equipment and indirect costs should be detailed in the CONTRACTOR's usual format. The CONTRACTOR's allocation of plan and equipment, indirect costs, contingencies, mark-up and other items to each bid item shall be clearly indicated.

C. The EBDs shall clearly show in calculations, text, or both, the relationship between baseline indications presented in the contract Documents and assumptions that form the basis for the CONTRACTOR's means, methods, equipment selection, rates of production, and costs.

D. All costs shall be identified. For bid items where the extended amount is less than$10,000 estimated unit costs are acceptable without a detailed cost estimate, providing that labor, equipment, materials and subcontracts, as applicable, are included and provided that indirect costs, contingencies, and mark-up, as applicable, are allocated.

E. Bid Documents provided by OWNER should not be included in the EBDs unless needed to comply with the above requirements.

1.05 SUBMITTAL

A. The EBDs shall be submitted by the three lowest bidders in a sealed container within two business days of the bid opening. The container shall be clearly marked on the outside with the Bidder's name, date of submittal, project name, Contract No., and the words "Escrow Bid Documents".

B. The EBDs shall be accompanied by the following "Escrow Bid Documentation Certification", signed by an individual authorized by the bidder to execute the bid, stating that the material in the Escrow Bid Documentation constitutes all the documentary information used in the preparation of the bid and that he or she has personally examined the contents of the EBDs container and has found that the documents in the container are complete.

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"Escrow Bid Document Certification"

THE UNDERSIGNED HEREBY CERTIFIES THAT THE BID DOCUMENTATION CONTAINED HEREIN CONSTITUTES ALL THE INFORMATION USED IN PREPARATION OF THE BID AND THAT I HAVE PERSONALLY EXAMINED THESE CONTENTS AND HAVE FOUND THAT THIS BID DOCUMENTATION IS COMPLETE.

*SIGNATURE:*_____

*NAME:*_____
(Print)

*TITLE:*_____

*FIRM:*_____

*DATE:*_____

C. Timely submission of the complete EBDs is an essential element of the bidder's responsibility and a prerequisite to contract award. Failure to provide the necessary EBDs within the specified time frame will be sufficient cause for OWNER to reject the bid.

D. If the bidder's proposal is based on subcontracting any part of the Work, each subcontractor whose total subcontract price exceeds five percent of the total contract price proposed by the bidder, shall provide separate EBDs to be included with those of the bidder. These documents will be opened and examined in the same manner and at the same time as the examination described above for the apparent successful bidder.

E. If the CONTRACTOR wishes to subcontract any portion of the Work after award, OWNER retains the right to require the CONTRACTOR to submit EBDs from the subcontractor before the subcontract is approved.

1.06 INITIAL EXAMINATION

A. Once received by OWNER, the EBDs of the apparent lowest Bidder will be promptly examined, organized, and inventoried by representatives of the OWNER and members of the Bidder’s staff who are knowledgeable of how the Bid was prepared. Such members of Bidder’s staff shall attend said initial examination upon being provided with 48 hour advance written notice (email and facsimile included) by the OWNER of the date and time of such examination.

B. This examination is to ensure that the EBDs are authentic, legible and complete. It will not include review of and will not constitute approval of proposed construction methods, estimating assumptions, or interpretations of Contract Documents. Examination will not alter any condition or term of the Contract.

C. Should the examination and inventory by the OWNER’s designated review representatives indicate that data is incomplete or missing data, the OWNER will give notice of such to the CONTRACTOR who shall supply it within twenty four (24) hours.

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D. If all the itemized cost breakdowns and allocations required previously mentioned herein have not been made, due to last minute bid revisions, the detailed breakdown of estimated costs shall be reconciled and revised by agreement between the CONTRACTOR and the OWNER before making the award.

1.07 EBDS OF OTHER BIDDERS

A. If the OWNER has reason to believe that the Contract may not be awarded to the apparent lowest Bidder, the OWNER may process the EBDs of the next apparent lowest Bidder as described above.

B. If the OWNER has reason to believe that the Contract may not be awarded to the apparent lowest Bidder, the OWNER may request the apparent fourth lowest Bidder to submit its EBDs within two business days.

C. EBDs submitted by unsuccessful Bidders will be returned unopened, unless opened as provided for above, following award of the Contract.

1.08 STORAGE

A. The EBDs shall be placed in escrow prior to award of the contract, for the life of the Contract, in a mutually agreeable institution. The cost of storage will be borne by OWNER.

1.09 EXAMINATION

A. The EBDs shall be examined by both OWNER and the CONTRACTOR, at any time deemed necessary by either OWNER or the CONTRACTOR, to assist in the negotiation of price adjustments and change orders, or the settlement of disputes.

B. Examination of the EBDs is subject to the following conditions:

1. As trade secrets, the EBDs are proprietary and confidential as described above.

2. OWNER and the CONTRACTOR shall each designate, in writing to the other party a minimum of ten days prior to examination, representatives who are authorized to examine the EBDs. No other person shall have access to the EBDs.

3. Access to the EBDs will take place only in the presence of duly designated representatives of both OWNER and the CONTRACTOR.

4. Members of the Disputes Review Board (DRB) may examine the EBDs in the presence of representatives of OWNER and CONTRACTOR if such examination would assist the DRB's review of a Claim that the parties have submitted to the DRB for review. Any mediator used by the Owner and Contractor to mediate a Claim may examine the EBDs in the presence of representatives of OWNER and CONTRACTOR if such examination would assist the mediator's review of a Claim for purposes of mediation. The EBDs may also constitute discoverable evidence in any litigation relating to the Project, to the extent allowed under applicable law.

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1.10 FINAL DISPOSITION

A. The EBDs will be returned to the CONTRACTOR at such time as the Contract has been completed and final settlement has been achieved.

1.11 CONDITIONS FOR RETURN TO CONTRACTOR

a. Upon completion of the Contract, issuance of Final Payment by the OWNER, verification that all Claims have been settled, litigation has been completed, and verification that future litigation does not exist, the EBDs will be sealed and promptly returned to the CONTRACTOR by the escrow entity in charge of the EBDs.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01120

PROJECT PARTNERING

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall participate in "project partnering" along with the ENGINEER and the OWNER for this Project. Partnering will be effective only if all parties willingly enter into this cooperative arrangement with the support of each entity at the highest level in their organizations. The OWNER and ENGINEER consider partnering important to the overall success of this project. It is desired that the CONTRACTOR will be equally concerned with cooperation, effective communication, quality, performance, budget, and schedule and will endorse and adopt partnering as an effective tool for achieving these objectives.

B. It must be recognized that the OWNER, CONTRACTOR, and ENGINEER all hold in common the goal of successful completion of this Project. Success necessarily must include the following requirements.

1. Construction of a facility that meets the project performance standards as defined in the Drawings and Technical Specifications.

2. Completion of the project on schedule.

3. Conformance to budgetary requirements and limitations.

4. Cooperation and effective communication.

In addition, it is recognized that safety, profit, liability limitation, avoidance of litigation, reputation, good will, and other factors are of significant importance to all parties involved in the Project. These goals can be achieved most readily if the CONTRACTOR, OWNER, and ENGINEER join together in a mutually beneficial alliance which recognizes the issues that each considers of greatest importance and work to accomplish them.

C. Through partnering, the three parties will agree among themselves regarding the primary goals for the Project and the methods that will be used to accomplish them. This will require development of a trust relationship, not an adversarial one, among these parties who will be working closely and cooperatively for the duration of the project. Commitment, communication and conflict resolution must be of highest importance for this relationship to succeed.

D. The CONTRACTOR should include its major subcontractors and suppliers in partnering so these participants may "buy-in" to the concept and work cooperatively with other parties on the project.

E. Partnering will include an initial one-day workshop in which the basic requirements for the partnering relationship will be established, an issue resolution ladder developed and a Partnering Charter prepared. The workshop will be held within 30 days of issuance of the Notice to Proceed at a time and date agreed upon by all parties at a neutral location away from each entities' home office and field facilities. Attendees at the workshop will include:

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CONTRACTOR REPRESENTATIVES

- Principal-in-Charge
- Project Manager
- Superintendent
- General Foreman
- Major Subcontractors

OWNER REPRESENTATIVES

- Public Works Director
- Deputy Public Works Director
- Project Manager
- Environmental Programs Manager

ENGINEER REPRESENTATIVES

- Principal in Charge
- Construction Manager
- Resident Project Representatives
- Public Information Liaison
- Inspectors

F. Semi-annual half-day partnering sessions also may be held during the Project to confirm the relationship and assure the partnering effort continues to be successful. In this manner, it can best be assured that the CONTRACTOR, OWNER and ENGINEER all will work cooperatively to ensure a successful Project.

G. A partnering facilitator will be employed by the OWNER who will help establish and monitor the partnering relationship. The OWNER will pay all costs associated with employing the partnering facilitator and will pay all costs for facilities and food services at the initial workshop. The CONTRACTOR shall pay all costs associated with its own and its subcontractor's participation in partnering.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01170

SPECIAL PROVISIONS

PART 1 GENERAL

1.01 INSTALLATION OF EQUIPMENT

A. The CONTRACTOR shall be responsible for the exact alignment of equipment with associated piping and under no circumstances, will "pipe springing" be allowed.

B. All wedges, shims, filling pieces, keys, packing, grout, or other materials necessary to properly align, level and secure pipe in place shall be furnished by the CONTRACTOR.

1.02 SLEEVES AND OPENINGS

A. Provide all openings, channels, chases, etc, in new construction and furnish and install anchor bolts and other items to be embedded in concrete, as required to complete the work under this Contract. Perform all cutting, coring and rough and finish patching required in existing construction for the work of all trades.

1.03 TOOLS

A. Any special tools which may be necessary for the adjustment, operation and maintenance of any equipment shall be furnished with the respective equipment.

B. Tools shall be furnished in heavy steel tool boxes complete with lock and duplicate keys.

1.04 PIPE MARKING

A. It shall be the CONTRACTOR's responsibility to assist, as required by the ENGINEER, in identifying pipe contents, direction of flow and all else required for proper marking of pipe.

1.05 VALVE IDENTIFICATION

A. The CONTRACTOR shall prepare a valve schedule for all valves required for the work showing a number, the location, type, function, and normal operating position, for each valve. The schedule shall be submitted to the ENGINEER for approval not less than 120 days prior to start-up.

B. The CONTRACTOR shall furnish tags for all above ground valves required for the work. Valve tags shall be 2-in diameter, 19 gauge, brass or plastic, with brass hooks suitable for attaching the tag to the valve operator. Tags shall be stamped or etched with the valve number and the information on the valve schedule coded in a system provided by the OWNER. Submit two samples of the type of tag proposed and the manufacturer's standard color chart and letter styles to the ENGINEER for approval.

C. The CONTRACTOR shall install valve tags on all valves required for the WORK.

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1.06 SPARE PARTS

A. Where spare parts are specified in the technical sections, furnish all spare parts recommended by the manufacturer or system supplier for one year of service. In addition, furnish all spare parts itemized in each Section.

B. Collect and store all spare parts in an area to be designated by the ENGINEER. Furnish the ENGINEER with an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivery cost.

C. Spare parts shall be packed in cartons, properly labeled with indelible markings with complete descriptive information including manufacturer, part number, part name and equipment for which the part is to be used and shall be properly treated for one year of storage.

1.07 RIGHT TO KNOW LAW

A. The CONTRACTOR shall submit the Material Safety Data Sheets for all substances or mixture of substances used on the Project by him or his subcontractors prior to commencing any work in accordance with the requirements of MGL Chapter 111F, Section 16.

1.08 WEATHER PROTECTION

A. In the event of inclement weather, the CONTRACTOR shall protect the WORK and materials from damage or injury from the weather. If, in the opinion of the ENGINEER, any portion of the WORK or materials has been damaged by reason of failure on the part of the CONTRACTOR to so protect the WORK, such WORK and materials shall be removed and replaced with new materials and WORK to the satisfaction of the ENGINEER.

1.09 NOISE LIMITATIONS

A. All equipment to be furnished under this Contract, unless specified otherwise in the technical specifications, shall be designed to ensure that the sound pressure level does not exceed 85 decibels over a frequency range of 37.8 to 9600 cycles per second at a distance of 3-ft from any portion of the equipment, under any load condition, when tested using standard equipment and methods. Noise levels shall include the noise from the motor. Mufflers or external baffles shall not be acceptable for the purpose of reducing noise. Data on noise levels shall be included with the shop drawing submittal.

B. Installed equipment shall comply with the noise requirements of the Coastal Development Permit as outlined in Section 01060 – Regulatory Agency and Utility Requirements.

END OF SECTION

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SECTION 01292

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Requirements for preparation, format, and submittal of Schedule of Values.

1.02 PREPARATION

A. Prepare Schedule of Values identifying costs of Major Items of Work.

B. Divide the Work into Major Items of Work, as provided in the CONTRACTOR's Schedule.

C. Assign prices to Major Items of Work which aggregate the Contract Price. Base prices on costs associated with scheduled activities based on the Project Schedule for each Major Item of Work.

1.03 SUBMITTALS

A. Submit preliminary schedule of values in accordance with Document 00700, General Conditions, Paragraph 2.05 A.3.

B. Submit corrected schedule of values within 10 days upon receipt of reviewed Schedule of Values, but no later than 10 days prior to anticipated submittal of first Application for Payment, in accordance with Document 00700, General Conditions, Paragraph 2.07.

C. Upon request, support prices with data which will substantiate their correctness.

D. If activities are added or removed from the Progress Schedule revise the Schedule of Values and resubmit.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes requirements and procedures for submitting Shop Drawings, Product Data, Samples, other submittals relating to products, and as specified in individual sections.

1.02 DEFINITIONS

A. Manufacturer's Instructions: Instructions, stipulations, directions, and recommendations issued in printed form by the manufacturer of a product addressing handling, installation, erection, and application of the product; Manufacturers Instructions are not prepared especially for the Work.

B. Shop Drawings: Drawings, diagrams, schedules, and other data specially prepared for the Work to illustrate some portion of the Work.

C. Product Data: Illustrations, standard schedules, performance charts, brochures, diagrams and other information to illustrate materials or equipment for some portion of the Work.

D. Samples: Physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.

E. Special Samples: Physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged, and will be incorporated in the Work.

1.03 PROCEDURES

A. Deliver submittals electronically in PDF format through EADOC per Section 01322.

B. Submit submittals in ample time for each to serve submittals' intended purpose.

C. Prepare and submit a schedule indicating when shop drawings are required to be submitted to support the as-planned construction schedule. The submittal schedule shall allow sufficient time for preparation and submittal, review and approval, and fabrication and delivery to support the construction schedule.

D. Submit submittals which are specified or reasonably required for construction, operation, and maintenance of the Work.

E. Deliver submittals using transmittal form provided by the ENGINEER, which identifies:

1. Submittal date.

2. Project and CONTRACTOR.

3. Subcontractor and major supplier, when appropriate

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4. Reference submittal to Contract Documents by Drawing, detail, and/or Specification section numbers, as appropriate.

5. Variations from Contract Documents when variations are included in submittal.

F. Submit specified number of copies of submittal.

G. In addition to the specified number of hard copies, submit electronic copy of ALL submittals on CD and in .pdf format. Electronic copy is to be organized identical to hard copy submittals utilizing bookmarks to delineate individual sections and subsections.

H. Provide or furnish products and execute the Work in accordance with accepted submittals, unless in conflict with Contract Documents.

I. When minor deviations from Contract Documents are accepted, modify Contract Documents in accordance with the Contract.

1.04 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Submit Shop Drawings, Product Data, Samples, and other pertinent information in sufficient detail to show compliance with specified requirements.

1. Detailed installation drawings (sewers, equipment, piping, electrical conduits and controls, etc.) shall be prepared and submitted for review and approval by the ENGINEER prior to installing such work. Installation drawings shall be to-scale and shall be fully dimensioned.

2. Piping working drawings shall show the laying dimensions of all pipes, fittings, valves, as well as the equipment to which it is being connected. In addition, all pipe supports shall be shown.

3. Equipment working drawings shall show all equipment dimensions, anchor bolts, support pads, piping connections and electrical connections. In addition, show clearances required around such equipment for maintenance of the equipment.

B. Check, verify, and revise submittals as necessary to bring them into conformance with Contract Documents and actual field conditions.

1. Determine and verify quantities, dimensions, specified design and performance criteria, materials, catalog numbers, and similar data.

2. Coordinate submittal with other submittals and with the requirements of the Contract Documents.

C. After completion of checking, verification, and revising; sign and date submittals indicating review and approval; and submit to ENGINEER.

1. Signature indicates CONTRACTOR has satisfied shop drawing review responsibilities and constitutes CONTRACTOR's written approval of shop drawing.

2. Shop drawings without CONTRACTOR's written approval will be returned for resubmission.

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D. Shop Drawings: Submit 5 copies to the ENGINEER. One copy will be returned to the CONTRACTOR with reviewer's comments and stamp.

E. Product Data and Manufacturer's Instructions: Submit 5 copies to the ENGINEER. Excise or cross out non-applicable information and clearly mark applicable information with citations to and terminology consistent with Contract Documents.

   1. 1 copy will be returned with reviewer's comments.

F. Samples: Submit 2 samples labeled with reference to applicable Contract Documents. Label will be returned with reviewer's selection and comments when appropriate. Samples will not be returned unless return is requested in writing and additional sample is submitted

G. Special Samples: Submit 1 sample labeled with reference to applicable Contract Documents. Sample and 1 label will be returned for installation in the Work.

H. No portion of the work requiring a shop drawing (including working drawings and product data) or sample shall be started, nor shall any materials be fabricated or installed before approval of such item. Procurement, fabrication, delivery or installation or products or materials that do not conform to approved shop drawings shall be at the CONTRACTOR's risk. Furthermore, such products or materials delivered or installed without approved shop drawings, or in non-conformance with the approved shop drawings will not be eligible for progress payment until such time as the product or material is approved or brought into compliance with approved shop drawings. Neither the OWNER nor ENGINEER will be liable for any expense or delay due to corrections or remedies required to accomplish conformity

I. Assume risk of expense and delays when proceeding with work related to required submittals without review and acceptance.

J. Submittals in Electronic Media Format: Include with each submittal electronic copies of all product data, shop drawings as follows:

   1. General: Provide all information on CDs, PC compatible using Windows XP operating system.

   2. Product Data: Provide text documents and manufacturer’s literature using current version of Adobe Acrobat.

   3. Shop Drawings, Diagrams: Provide all graphic submittals utilizing current version of Adobe Acrobat.

   4. CONTRACTOR using other software shall be required to provide to the ENGINEER conclusive evidence of 100 percent data transfer compatibility.

   5. Adobe Acrobat: Any information provided as an image file shall be in the latest version of Adobe Acrobat (i.e. PDF extension).

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1.05 MANUFACTURER'S INSTRUCTIONS

A. Submit manufacturer's instructions whenever made available by manufacturers and when installation, erection, or application in accordance with manufacturer's instructions are required by the Specifications.

B. Submit manufacturer's instructions prior to installation, erection, or application of equipment and other project components. Submit manufacturer's instructions in accordance with requirements for Product Data.

1.06 ENGINEER'S REVIEW

A. ENGINEER's review of submittals shall not release CONTRACTOR from CONTRACTOR's responsibility for performance of requirements of Contract Documents. Neither shall ENGINEER's review release CONTRACTOR from fulfilling purpose of installation nor from CONTRACTOR's liability to replace defective work.

B. Do not consider submittals as Contract Documents. Purpose of submittals is to demonstrate how CONTRACTOR intends to conform with the design concepts.

C. ENGINEER's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents. ENGINEER's review does not extend to:

1. Accuracy of dimensions, quantities, or performance of equipment and systems designed by CONTRACTOR.

2. CONTRACTOR's means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings, or required by Contract Documents

3. Safety precautions or programs related to safety which shall remain the sole responsibility of the CONTRACTOR.

D. No less than 21 calendar days will be required for ENGINEER’s review time for shop drawings and O&M manuals involving only one engineering discipline. No less than 30 calendar days will be required for ENGINEER’s review time for shop drawings and O&M manuals that require review by more than one engineering discipline. Resubmittals will be subject to the same review time.

E. For Submittals returned “APPROVED” – There are no notations or comments on the submittal. The CONTRACTOR may release the equipment and/or material for manufacture.

F. For submittals returned "APPROVED AS NOTED" - Confirmation of the notations and comments IS NOT required by the CONTRACTOR. The CONTRACTOR may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

G. For submittals returned "APPROVED AS NOTED/CONFIRM" - This combination is assigned when a confirmation of the notations and comments is required by the CONTRACTOR. The CONTRACTOR may release the equipment or material for manufacture; however, all notations

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and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the ENGINEER within 15 calendar days of the date of the ENGINEER's transmittal requiring the confirmation.

H. For submittals returned "APPROVED AS NOTED/RESUBMIT" - This combination is assigned when notations and comments are extensive enough to require a resubmittal of the entire package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the ENGINEER within 30 calendar days of the date of the ENGINEER's transmittal requiring the resubmittal.

I. For submittals returned "NOT APPROVED" – This is assigned when the submittal does not meet the intent of the contract documents. The CONTRACTOR must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the contract documents.

J. For submittals returned "COMMENTS ATTACHED" – This is assigned where there are comments attached to the returned submittal, which provide additional data to the CONTRACTOR.

K. For submittals returned "RECEIPT ACKNOWLEDGED (Not subject to ENGINEER's Review or Approval)" – This is assigned to acknowledge receipt of a submittal that is not subject to the ENGINEER's review and approval, and is being filed for informational purposes only. This code is generally used in acknowledging receipt of means and methods of construction work plans, field conformance test reports, and health and safety plans.

L. ENGINEER will be entitled to rely upon the accuracy or completeness of designs, calculations, or certifications made by licensed professionals accompanying a particular submittal whether or not a stamp or seal is required by Contract Documents or Laws and Regulations.

M. Costs incurred by OWNER as a result of additional reviews of a particular submittal after the second time it has been reviewed shall be borne by CONTRACTOR. Reimbursement to OWNER will be made by deducting such costs from CONTRACTOR's subsequent partial payments.

1.07 MINOR OR INCIDENTAL PRODUCTS AND EQUIPMENT SCHEDULES

A. Shop Drawings of minor or incidental fabricated products will not be required, unless requested.

B. Submit tabulated lists of minor or incidental products showing the names of the manufacturers and catalog numbers, with Product Data and Samples as required to determine acceptability.

1.08 SUBMITTALS FOR INFORMATION OR RECORD ONLY

A. Submit electronic PDF copy of each. None will be returned.

PART 2 PRODUCTS

NOT USED

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PART 3 EXECUTION

3.01 SUBMITTAL SCHEDULE

A. Provide an initial submittal schedule at the pre-construction meeting for review by ENGINEER. Incorporate comments from ENGINEER into a revised submittal schedule.

B. Maintain the submittal schedule and provide sufficient copies for review by ENGINEER. An up-to-date submittal schedule shall be provided at each project progress meeting.

END OF SECTION

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SECTION 01311

CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Preparation, submittal, and maintenance of computerized progress schedule and reports, contract time adjustments, and payment requests, including the following:

1. Preliminary Schedule.
2. Baseline Schedule.
3. Weekly Schedule.
4. Schedule Updates.
5. Schedule Revisions.
6. Time Impact Analyses.
7. Final Schedule Submittal.

B. Related Sections:

1. Section 00700 – General Conditions

1.02 RESPONSIBLE PERSON

A. Designate, in writing and within 14 calendar days after Notice of Award, person responsible for preparation, maintenance, updating and revision of all schedules.

B. Qualifications of Responsible Person:

1. Authority to act on behalf of CONTRACTOR.
2. Five (5) years verifiable experience in preparation of complex construction schedules for projects of similar value, size and complexity.
   a. Knowledge of CPM scheduling utilizing Primavera Project Planner P6

C. ENGINEER reserves the right to accept or reject scheduler when submitted by CONTRACTOR if not qualified. ENGINEER reserves the right to remove scheduler from the project if found to be incompetent.

1.03 SCHEDULING FORMAT AND SOFTWARE

A. Schedule Format: Utilize critical path method (CPM) format.

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B. Prepare computerized schedule utilizing Primavera Project Planner P6.

1.04 PRECONSTRUCTION SCHEDULING MEETING

A. ENGINEER will conduct Preconstruction Scheduling Meeting with CONTRACTOR's Project Manager, General Superintendent and scheduler within 7 calendar days after Notice To Proceed. This meeting is separate from the Preconstruction Conference Meeting and is intended to cover schedule issues exclusively. At the meeting, scheduling requirements shall be reviewed with CONTRACTOR. These include schedule preparation, reporting requirements, updates, revisions, and schedule delay analysis. CONTRACTOR shall present their schedule methodology, planned sequence of operations, and present their proposed activity coding structure.

B. Coding Structure: CONTRACTOR shall submit proposed coding structure, identifying the code fields and the associated code values it intends to use in the project schedule. The coding structure shall, at a minimum, include code fields for Project Segment or Phase, Area of Work, Type of Work, Submittal/Procurement/Construction and Responsibility/Subcontractor. Refer to Article 1.09 I for listing of activity categories to be included in the schedule.

1.05 PREPARATION

A. Preparation and submittal of Progress Schedule represents CONTRACTOR's intention to execute the Work within specified time and constraints. Failure to conform to requirement may result in termination for cause under Article 15.02, Suspension of Work and Termination of the General Conditions.

B. CONTRACTOR's bid covers all costs associated with the execution of the Work in accordance with the Progress Schedule.

C. During preparation of the preliminary Progress Schedule, ENGINEER will facilitate CONTRACTOR's efforts by being available to answer questions regarding sequencing issues, scheduling constraints, interface points, and dependency relationships.

D. Prepare schedule utilizing Precedence Diagramming Method (PDM).

E. Prepare schedule utilizing activity durations in terms of working days. Do not exceed 15 working day duration on activities except concrete curing, submittal review and equipment fabrication and deliveries. Where duration of continuous work exceeds 15 working days, subdivide activities by location, stationing, or other sub-element of the Work.

F. CONTRACTOR shall coordinate holidays to be observed with the ENGINEER and incorporate them into the schedule as non-working days.

G. Failure to include an activity required for execution of the Work does not excuse CONTRACTOR from completing the Work and portions thereof within specified times and at price specified in Agreement. Failure of CONTRACTOR to include required schedule constraints, sequences or milestones in schedule shall not relieve CONTRACTOR of obligation to conform to requirements of Contract. Acceptance of schedule shall not waive Contract requirements. In event of conflict between accepted schedule and Contract requirements, terms of Contract shall govern at all times, unless requirements are waived in writing by the ENGINEER.

H. Reference schedule to working days with beginning of Contract Time as Day "1."

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I. Should CONTRACTOR submit a Baseline Schedule showing project completion more than 20 working days prior to Contract completion date ENGINEER may issue Change Order, at no cost to OWNER, revising time of performance of Work and Contract completion date to match CONTRACTOR's schedule completion date. Contract milestone dates, if any, shall be adjusted accordingly.

J. Contract float is for the mutual benefit of both OWNER and CONTRACTOR. Changes to the project that can be accomplished within this available period of float may be made by OWNER without extending the Contract time, by utilizing float. No time extensions shall be granted nor delay damages owed until Work extends beyond currently accepted Contract completion date. Likewise, CONTRACTOR may utilize float to offset delays other than delays caused by OWNER. Mutual use of float shall continue until all available float shown by schedule has been utilized by either OWNER or CONTRACTOR, or both. At that time, extensions of the Contract time will be granted by ENGINEER for valid OWNER-caused or third party-caused delays which affect the planned completion date and which have been properly documented and demonstrated by CONTRACTOR.

K. Schedule Logic: Schedule shall be assembled to show order in which CONTRACTOR proposes to carry out Work, indicate restrictions of access, availability of Work areas, and availability and use of manpower, materials and equipment. Following criteria shall form basis for assembly of schedule logic.

1. Which activities must be completed before subsequent activities can be started?

2. Which activities can be performed concurrently?

3. Which activities must be started immediately following completed activities?

4. What major facility, equipment or manpower restrictions are required for sequencing these activities?

L. Non-sequestering of Float: Pursuant to float sharing requirements of Contract, use of float suppression techniques such as preferential sequencing or logic, special lead or lag logic restraints, extended activity durations or imposed dates shall be cause for rejection of any schedule submittal.

M. Interim Milestone Dates, Operational Constraints: In event there are interim milestone dates and/or operational constraints set forth in Contract, CONTRACTOR shall show them on schedule as specified in Contract. CONTRACTOR shall not use Zero Total Float constraint or Mandatory Finish Date on such Contract requirements.

N. Schedule Windows for OWNER-furnished, CONTRACTOR-installed Equipment or Materials: Immediately after Award of Contract CONTRACTOR shall obtain from ENGINEER anticipated delivery dates of OWNER furnished equipment or materials. These dates shall be shown on schedule in same manner indicated by ENGINEER.

O. Cost Loading: All schedules shall be cost loaded. Only on-site construction activities shall be cost loaded. The sum total of all cost loaded activities shall equal the current value of the Contract, including change orders, at all times. Upon acceptance by ENGINEER, the Baseline Schedule shall also be the Schedule of Values. The monthly Schedule Updates shall be the monthly

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Payment Application. Submittal and acceptance of these schedules shall be a condition precedent to the making of any payments under this Contract.

1.06 SUBMITTAL OF PROGRESS SCHEDULES

A. Submit preliminary and baseline schedule in accordance with the General Conditions of the Contract.

B. Submit, on a monthly basis, updated schedules as specified. Submit final schedule update as specified.

C. Submit revised schedules and time impact analyses as specified.

D. Submit schedules in the media and number of copies as follows.

1. Three (3) sets of the CPM network and/or barchart specified on D-size sheets. Color-coding shall be included to clearly define and delineate related activities.

2. Three (3) sets of Tabular reports listing all activities sorted numerically identifying duration, early start, late start, early finish, late finish, total float, and all predecessor/successor information.

3. Two (2) CDs containing the computerized CPM Schedule data.

4. Three (3) prints of the Summary Schedule.

1.07 PRELIMINARY SCHEDULE

A. CONTRACTOR shall submit Preliminary Schedule within 10 calendar days after Notice To Proceed. Preliminary Schedule shall contain detailed plan of operations for first 90 calendar days of Work after receipt of Notice to Proceed.

1. ENGINEER and CONTRACTOR shall meet within 7 calendar days after receipt of Preliminary Schedule to review and make necessary adjustments. CONTRACTOR shall submit revised preliminary schedule within 5 calendar days after meeting.

B. CONTRACTOR shall submit schedule of costs for all activities on revised Preliminary Schedule with revised Preliminary Schedule.

C. Schedule of costs shall be Schedule of Values required under Section 01292 for first 90 calendar days of Work. Submittal and acceptance of Preliminary Schedule is condition precedent to making of progress payments for mobilization costs otherwise provided for in the Contract.

D. No pay item Work shall commence until Preliminary Schedule and schedule of costs have been accepted by ENGINEER.

E. Accepted Preliminary Schedule shall be incorporated unchanged, as first 90 calendar days of activity in CONTRACTOR’s Baseline Schedule.

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F. Preliminary Schedule shall be updated monthly during first 90 calendar days after Notice to Proceed. Updated Preliminary Schedule shall be the payment application required under Section 01294.

1.08 BASELINE SCHEDULE

A. No more than 45 calendar days after Notice of Award, CONTRACTOR shall submit the Baseline Schedule for all Work of the project. Baseline Schedule shall show sequence and interdependence of all activities required for complete performance of all Work, beginning with date of Notice to Proceed and concluding with date of final completion of Contract.

B. Baseline Schedule shall conform to requirements of the following Article, "Network Details and Graphical Output."

C. Acceptance of the Baseline Schedule by the ENGINEER is a condition precedent to making payments under Section 01294 after the first 90 calendar days after Notice to Proceed.

1.09 NETWORK DETAILS AND GRAPHICAL OUTPUT

A. Produce a clear, legible, and accurate calendar based, time scaled, graphical network diagram. Group activities related to the same physical areas of the Work.

B. Produce the network diagram based upon the early start of all activities. Include for each activity, the description, activity number, estimated duration in working days, total float and all activity relationship lines. Illustrate order and interdependence of activities and sequence in which Work is planned to be accomplished. Incorporate the basic concept of the precedence diagram network method to show how the start of one activity is dependent upon the start or completion of preceding activities and its completion restricts the start of following activities.

C. Indicate the critical path for the project.

D. Delineate the specified contract duration and identify the planned completion of the Work as a milestone. The time period between the planned and Contract completion dates, if any, shall be shown on the schedule as an activity identified as project float unless a Change Order is issued pursuant to Article 1.05H.

E. Identify system shutdown dates, system tie-in dates, specified interim completion or milestone dates and contract completion date as milestones. Include, in addition to Construction Activities:

F. Submission dates and review periods for major equipment submittals, shoring submittals, and proposals for allowance items.

G. Shoring Reviews: Allow 4-week review period for each shoring submittal.

H. Any activity by the OWNER or the ENGINEER that may affect progress or required completion dates.

I. Equipment and long-lead material deliveries over 8 weeks.

J. Approvals required by regulatory agencies or other third parties.

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K. Produce network diagram on 22 inch by 34 inch sheets with grid coordinate system on the border of all sheets utilizing alpha and numeric designations. Identify the Execution of the following, omitting items not applicable to the Work:

1. Mobilization.
   a. All required submittals and submittal review times showing 30 calendar day duration for such activities and equal amount of time for re-submittal reviews.
   b. Equipment and materials procurement/fabrication/delivery.

2. Excavation.
   a. Shoring design and submission of detailed shoring submittals. Identify submission as a milestone.
   b. Shoring review, shoring materials procurement, shoring installation and shoring removal.
   c. Backfill and compaction.

3. Dewatering.
   a. Grading, subbase, base, paving, and curb and gutters.
   b. Fencing and landscaping.
   c. Concrete, including installation of forms and reinforcement, placement of concrete, curing, stripping, finishing and patching.
   d. Tests for leakage of concrete structures intended to hold water.

4. Masonry.

5. Metal fastenings, framing, structures, and fabrications.

6. Finish carpentry, architectural woodwork, and plastic fabrications.

7. Waterproofing and dampproofing, insulation, roofing and flashing, and sealants.

8. Doors and windows, including hardware and glazing.

9. Finishes including coating and painting, flooring, ceiling, and wall covering.

10. Building specialties including furnishings, laboratory equipment, and toilet and bath accessories.

11. Process equipment, including identification of ordering lead time, factory testing and installation.

12. Conveying equipment including hoists and cranes, conveyor systems, and materials handling equipment, including identification of ordering lead time and installation.

13. Other mechanical equipment including fans and heating, ventilating, and air conditioning equipment.

14. Trenching, pipe laying, and trench backfill and compaction.

15. Piping, fittings and appurtenances, including identification of ordering and fabrication lead time, layout, installation and testing.

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16. Valves, gates and operators, including identification of order lead time installation and testing.

17. Plumbing specialties.

18. Electric transmission, service, and distribution equipment, including identification of ordering lead time, and factory testing.

19. Other electrical work including lighting, heating and cooling, and special systems, including identification of ordering lead time.

20. Instrumentation and controls, including identification of ordering lead time.

21. Preliminary testing of equipment, instrumentation and controls.

22. Final testing, including preparation time.

23. Seven-day operational test.

24. Substantial completion. Substantial completion activity shall meet all requirements set forth in Section 00800, Supplementary Conditions.

25. Punch list work.

26. Operation and maintenance training.

27. Demobilization.

1.10 SCHEDULE OF SHOP DRAWING AND SAMPLE SUBMITTALS

A. After Preliminary Schedule has been submitted and accepted by ENGINEER, CONTRACTOR shall submit a list of all shop drawings and sample submittals anticipated in first 90 calendar days after Notice to Proceed using early start dates. Submittal of this preliminary list shall be a condition precedent to making of progress payments during the first 90 calendar days after Notice to Proceed.

B. After Baseline Schedule has been submitted and accepted by ENGINEER, CONTRACTOR shall print out and submit list of all shop drawings and sample submittals for all Work using early start dates. This listing will contain all submittals required for the entire Work including those listed above. Submittal of final list shall be a condition precedent to making of progress payments after the first 90 calendar days after Notice to Proceed. These schedules shall conform to the requirements of the General Conditions, Article 2.05.

1.11 REVIEW AND ACCEPTANCE OF SCHEDULES

A. ENGINEER will review Baseline Schedules, Schedule Updates, Schedule Revisions and Time Impact Analyses to ascertain compliance with specified project constraints, compliance with milestone dates, reasonableness of durations and sequence, accurate inter-relationships and completeness.

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B. ENGINEER will issue written comments following completion of review of Baseline Schedule within 21 calendar days after receipt. Written comments on review of Schedule Updates and Schedule Revisions and Time Impact Analyses will be returned to CONTRACTOR within 14 calendar days after receipt by ENGINEER.

C. Revise and resubmit schedule in accordance with ENGINEER's comments within 7 calendar days after receipt of such comments, or request joint meeting to resolve objections. If a meeting is requested the CONTRACTOR and all major subcontractors shall participate in the meeting with ENGINEER. Revise and resubmit schedule within 7 calendar days after meeting.

D. When schedule reflects ENGINEER's and CONTRACTOR's agreement of project approach and sequence, schedule will be accepted by ENGINEER. Use accepted schedule for planning, organizing and directing the work and for reporting progress.

E. Provide all items specified in Article 1.06, Submittal of Project Schedules.

1.12 UPDATING THE SCHEDULE

A. Update the schedule on a monthly basis, using a data date as specified by the ENGINEER. Since monthly Schedule Update is the application for progress payment required under Section 01294, Applications for Payment, submittal and acceptance of the monthly Schedule Update is a condition precedent to the making of any progress payments.

B. Should monthly Schedule Update show project completion earlier than current Contract completion date, CONTRACTOR shall show early completion time as schedule activity, identified as "Project Float."

C. Should monthly Schedule Update show project completion later than current Contract completion date, CONTRACTOR shall prepare and submit a Schedule Revision in accordance with Article 1.18, Revisions to Schedule.

1.13 REVISIONS TO SCHEDULE

A. Submit revised schedule within 5 calendar days:

1. When delay in completion of any activity or group of activities indicates an overrun of the Contract time or milestone dates by 20 working days or 5% of the remaining duration, whichever is less.

2. When delays in submittals, deliveries, or work stoppages are encountered making necessary the replanning or rescheduling of activities.

3. When the schedule does not represent the actual progress of activities.

4. When any change to the sequence of activities, the completion date for major portions of the work, or when changes occur which affect the critical path.

5. When Contract modification necessitates schedule revision, submit schedule analysis of change order work with cost proposal.

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B. Submit revised schedule and materials as specified under Article, "Submittal of Progress Schedule."

C. Make revisions on most recently accepted version of schedule. Schedule Revisions shall not be prepared or submitted with Schedule Updates. They shall be separate submittals and shall be noted as Schedule Revisions. Only upon acceptance of a revision by the ENGINEER shall it be reflected in the next monthly Schedule Update.

D. Schedule Revisions submitted for the purpose of mitigating a CONTRACTOR caused project delay (Recovery Schedule) shall not be implemented until the ENGINEER reviews and accepts the Schedule Revision.

1.14 PAYMENT REQUESTS AND CASH FLOW

A. After Baseline Schedule has been submitted and accepted by the ENGINEER, the CONTRACTOR shall submit on a monthly basis, a tabular report showing anticipated earnings each month of the contract period. This tabulation will be based on the summation of the cost-loaded activities each month. CONTRACTOR shall submit an updated payment schedule each month showing actual earned amounts and anticipated remaining earnings.

B. Utilize cost loaded monthly Schedule Updates as the applications for payment specified in Section 01294, Applications for Payment. Payment application shall be a listing in Excel format of all schedule activities showing cost and percentage completion during the current month for which payment is sought. Submittal of the monthly Schedule Update shall be a condition precedent to the issuance of any payment under this Contract.

1.15 WEEKLY SCHEDULE

A. Submit to ENGINEER, on the last working day of every week, a progress schedule showing the activities completed during the previous week and the CONTRACTOR's schedule of activities for the following 2 weeks.

B. The Weekly Schedule may be a CPM schedule or a bar chart but shall utilize the logic and conform to the status of the current progress schedule. In the event that the Weekly Schedule no longer conforms to the current schedule CONTRACTOR may be required to revise the schedule in accordance with Article "REVISIONS TO SCHEDULE."

C. The activity designations used in the Weekly Schedule shall be consistent with those used in the Baseline Schedule and the monthly Schedule Updates.

D. The format of the Weekly Schedule shall be as agreed upon between the CONTRACTOR and the ENGINEER.

1.16 SCHEDULE OF VALUES

A. Requirements for Schedule of Values are specified in Section 01292, Schedule of Values and Paragraph "Cost Loading."

B. Submit, in conjunction with the Progress Schedule, a Schedule of Values identifying costs of all on-site construction activities as generated by the cost loaded schedule. Equate the aggregate of these costs to the Lump Sum Contract Price.

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1.17 ADJUSTMENT OF CONTRACT TIMES

A. If the CONTRACTOR believes that the OWNER has impacted its work, such that the project completion date will be delayed, the CONTRACTOR must submit proof demonstrating the delay to the critical path. This proof, in the form of a Time Impact Analysis, may entitle the CONTRACTOR to an adjustment of contract time.

B. The Time Impact Analysis:

1. The Time Impact Analysis submitted by the CONTRACTOR shall utilize the accepted schedule update that is current relative to the time frame of the delay event (change order, third party delay, or other OWNER-caused delay). The CONTRACTOR shall represent the delay event in the schedule by 1) inserting new activities associated with the delay event into the schedule, 2) revising activity logic, or 3) revising activity durations.

2. If the project schedule’s critical path and completion date are impacted as a result of adding this delay event to the schedule, a time extension equal to the magnitude of the impact may be warranted.

3. The Time Impact Analysis submittal shall consist of 1) a fragment of the portion of the schedule affected by the delay event, 2) a narrative explanation of the delay issue and how it impacted the schedule, and 3) a diskette containing the schedule file used to perform the Time Impact Analysis. When a delay to the project as a whole can be avoided by revising preferential sequencing or logic, and the CONTRACTOR chooses not to implement the revisions, the CONTRACTOR will be entitled to a time extension and no compensation for extended overhead.

4. Indicate clearly that the CONTRACTOR has used, in full, all project float available for the work involved in the request, including any float that may exist between the CONTRACTOR's planned completion date and the Contract completion date. Utilize the latest version of the Schedule Update accepted at the time of the alleged delay, and all other relevant information, to determine the adjustment of the contract time.

C. Float shall be for the mutual benefit of the OWNER and the CONTRACTOR. Adjustment of the Contract Times will be granted only when the Contract Float has been fully utilized and only when the revised date of completion of the Work has been pushed beyond the contract completion date. Adjustment of the Contract Times will be made only for the number of days that the planned completion of the work has been extended.

D. Actual delays in activities which do not affect the critical path work or which do not move the CONTRACTOR's planned completion date beyond the Contract completion date will not be the basis for an adjustment to the contract time.

E. The CONTRACTOR shall not be entitled to job-site or home office overhead beyond the CONTRACTOR's originally planned occupancy of the site if completion of the project occurs within the specified contract time.

F. Notify ENGINEER of a request for contract time adjustment. Submit request in accordance with ARTICLE 10 - CHANGES IN THE WORK; CLAIMS, of the General Conditions. In cases where the CONTRACTOR does not submit a request for contract time adjustment for a specific

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change order, delay, or CONTRACTOR request within the specified period of time, then it is mutually agreed that the particular change order, delay, or CONTRACTOR request has no time impact on the Contract completion date and no time extension is required.

G. The ENGINEER will, within 30 calendar days after receipt of a contract time adjustment, request any supporting evidence, review the facts and advise the CONTRACTOR in writing.

H. The new Progress Schedule data, if accepted by the ENGINEER, shall be included in the next monthly Schedule Update.

1.18 FINAL SCHEDULE SUBMITTAL

A. As a condition precedent to the release of retainage the final Schedule Update shall be identified by the CONTRACTOR as the As-Built Schedule.

B. The As-Built Schedule shall reflect the exact manner in which the project was constructed by reflecting actual start and completion dates for all activities accomplished on the project.

C. The As-Built Schedule shall be signed and certified by the CONTRACTOR's Project Manager and scheduler as being an accurate record of the way in which the project was actually constructed.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01313

CONSTRUCTION AND SCHEDULE CONSTRAINTS

PART 1 GENERAL

1.01 THE REQUIREMENT

A. Work shall be scheduled, sequenced, and performed in a manner which minimizes disruption to the public and to the operation and maintenance of existing facilities along the pipeline alignments.

B. The CONTRACTOR shall perform the Work in compliance with project permits and agreements and in coordination with utility and other agencies and other Contractors working in adjacent Project Areas. See Paragraph 1.07, below.

C. The CONTRACTOR shall incorporate the construction and schedule constraints of this Section in preparing the construction schedules required under Section 01311 –Construction Scheduling.

1.02 PROJECT CONSTRAINTS

A. Street Restrictions: Refer to Section 01571 – Traffic Control and the Contract Drawings traffic control drawings for requirements associated with work in arterial, collector, and minor streets.

B. Working Hours: Refer to Section 01571 – Traffic Control for requirements associated with work in arterial, collector, and minor streets. Working hours for Site locations not within street right-of-ways shall be limited to Monday through Friday, 7:00 a.m. to 6:00 p.m.

C. Noise Requirements: Refer to Section 01561 – Biological and Cultural Resources Environmental Controls including, but not limited to, Conditions of Approval – Item 78.

D. Dust Control: For dust mitigation requirements refer to Section 01562 – Dust Control and Section 01561 – Biological and Cultural Resources Environmental Controls including, but not limited to, Conditions of Approval – Item 76.

E. Mud Control: The CONTRACTOR shall perform its work to prevent mud on roads. Mud control shall include, but not be limited to, providing gravel pads at exits from areas where earthwork is being performed to enable mud removal and street sweeping and/or washing.

F. Air Emissions: For air emissions requirements refer to Section 01060 – Regulatory Agency and Utility Requirements including, but not limited to, Conditions of Approval – Items 35 through 40.

G. Environmental Constraints: For environmental constraints refer to Section 01561 – Biological and Cultural Resources Environmental Controls and the Contract Drawings.

H. Cultural Resources Constraints: For cultural resources constraints refer to Section 01561 – Biological and Cultural Resources Environmental Controls.

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I. Interim Milestones: The CONTRACTOR shall conduct its construction activities to comply with the following interim milestones:

1. Pipeline Work Completion in Given Segment: In order to minimize inconvenience to the public and business communities, the CONTRACTOR shall plan and execute its pipeline installation work in a coordinated and continuous manner. In many cases multiple pipelines and appurtenances (i.e., gravity sewer including manholes and laterals, force main including CAV manholes, recycled water main including CAV manholes, and fiber optic conduit with manholes) will be installed in a given street. Accordingly, within any given block area, or 1,000 foot street segment, whichever is less, the CONTRACTOR shall within 45 days after initiating excavation have completed installing all pipelines and appurtenant facilities and completed final payment restoration in accordance with Section 01571 – Traffic Control.

2. The use of the Mid-Town infiltration basin is dedicated to the CONTRACTOR for Areas A & D for purposes of dewatering disposal. To facilitate the usage of this basin, the CONTRACTOR for A & D will need to build temporary piping or utilize installed collection system facilities to transport dewatering water to the site, subject to the provisions of Paragraph M below. To facilitate this work, the Contract for Areas B & C will require the following to be constructed and available for use the CONTRACTOR by January 31, 2013:

   a. Gravity collection pipe and manholes in 9th Street, from Los Olivos Avenue, beginning at Area C manhole MH-WW-F03A, to Los Osos Valley Road (consisting of approximately 1,300 LF of pipe).

   b. Gravity collection pipe and manholes in Los Osos Valley Road, from 9th Street to the Mid-Town Pump Station Wetwell (consisting of approximately 2,000 LF of pipe).

   c. Mid-Town Pump Station Wetwell.

   The CONTRACTOR for Areas A & D shall assume that this segment of Area B & C gravity system pipe will be available no sooner than February 1, 2013.

3. To facilitate work under a separate contract for the Area Pump Stations, the CONTRACTOR for Area A and D shall complete all construction work at each individual pump station site by August 31, 2013. The CONTRACTOR may coordinate with the Area Pump Station contractor to continue to use the pump station wetwells for the conveyance of dewatering water to disposals sites until April 30, 2014. All site work, testing, and usage of facilities at the pump station sites must be completed no later than April 30, 2014.

J. Existing Live Sanitary Sewers. Existing live sanitary sewers are present at various locations in the project, as shown on the Contract Drawings. These existing sewer systems discharge to existing community septic systems or to a package wastewater treatment plant. The CONTRACTOR shall plan and execute its work to ensure continued operation of these systems until their connection to the new sanitary sewer collection system when the new facilities are ready to receive flow.

K. Existing Septic Systems. The Los Osos community is currently served by septic systems. The great majority of septic systems are located on private property; however, leach fields and septic tanks themselves may be encountered within public right of way. Should the latter be

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encountered, the CONTRACTOR shall provide temporary piping around new pipelines to enable the septic system to continue to operate.

L. Sewer Laterals. Sanitary sewer laterals shall be extended to the property line and plugged in accordance with the detail provided in the contract drawings. Sewer laterals shall be installed at the location shown and shall not be moved at property owner request without prior ENGINEER approval. The ENGINEER will not allow property owners to connect to the lateral until the treatment plant and collection system are ready to receive flow and their upper lateral (private property section of lateral) has been inspected and accepted by the ENGINEER.

M. Collection System Use During Construction. The CONTRACTOR may elect to use portions of the collection system pipelines for conveyance and disposal of dewatering water. If so used, the CONTRACTOR shall thoroughly clean all facilities prior to acceptance by the ENGINEER. The CONTRACTOR shall provide its own temporary pumps and piping as needed to facilitate this use.

1.03 BYPASSING

A. Bypassing of untreated or partially treated sewage, including septic tank contents or effluent, to surface waters or drainage courses is prohibited during construction. In the event accidental bypassing is caused by the CONTRACTOR's operations, the ENGINEER shall immediately be entitled to employ others to stop the bypassing and costs incurred therefore (including any fines that might be levied by regulatory agencies) will be deducted from the CONTRACTOR's construction progress payments.

1.04 OUTAGE REQUESTS

A. Modifications to existing facilities, the construction of new facilities, and the connection of new to existing facilities may require the temporary outage or bypass of existing treatment processes or facilities. In such cases, the CONTRACTOR shall coordinate Work with the ENGINEER as described below. The CONTRACTOR shall submit a detailed outage plan and time schedule for all construction activities which will make it necessary to remove a tank, pipeline, channel, electrical circuit, equipment, structure, road, or other facilities from service.

B. The outage plans shall be submitted to the ENGINEER for acceptance a minimum of 2 weeks in advance of the time that such outages are required. The outage plans shall be coordinated with the construction schedule and shall meet the restrictions and conditions of this Section. The outage plan shall describe the length of time required to complete the operation; any necessary temporary power, controls, instrumentation, or alarms required to maintain control, monitoring, and alarms for the affected processes; and the manpower, plant, and equipment which the CONTRACTOR shall provide in order to ensure proper operation of associated units. All costs for preparing and implementing the outage plans shall be the responsibility of the CONTRACTOR as part of the Work.

C. The Outage Request shall be accompanied by a contingency plan describing how to return facilities to operation should the Outage Request work not be able to be completed with the allotted time. The CONTRACTOR shall perform a "dry run" in advance of beginning Outage Request work to confirm that all necessary labor, equipment and materials are available to accomplish the Work.

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D. The CONTRACTOR shall not begin an alteration affecting existing facilities until specific written approval has been granted by the ENGINEER in each case.

E. The ENGINEER will coordinate the CONTRACTOR's planned procedure with the affected facility personnel. The ENGINEER has the authority to modify any proposed shutdown procedures if such procedures would adversely impact operations.

F. The ENGINEER shall be notified in writing at least one week in advance of the required outage if the schedule for performing the work has changed or if revisions to the outage plan are required. The CONTRACTOR shall provide written confirmation of the shutdown date and time 2 working days prior to the actual shutdown.

1.05 TEMPORARY CONNECTIONS

A. The making of connections to existing facilities or other operations that interfere with the operation of the existing facilities shall be thoroughly planned in advance, and all required equipment, materials, and labor shall be on hand at the time of undertaking the connections. Work shall be completed as quickly as possible and with as little delay as possible, and shall proceed continuously (24 hours a day and seven days a week) if necessary to complete modifications and/or connections in the minimum time.

B. The cost of any temporary facilities and night, weekend, or holiday work and overtime payments required during process interruptions shall be included in the price of the Work.

C. Temporary piping shall be located to minimize interference with CONTRACTOR's construction facilities and OWNER's operation and maintenance existing facilities. Unless otherwise indicated, each temporary pipeline shall be of the same size as its connection to the existing or permanent facility at the downstream end of the pipeline. Piping materials shall be suitable for the material being conveyed and be as required in the Contract Specifications.

D. When temporary electrical power, controls, instrumentation, or alarms are required for routine continuous operations of existing or new equipment, the CONTRACTOR shall provide the necessary equipment and appurtenances. Prior to installing said equipment and appurtenances, CONTRACTOR shall furnish a submittal on the proposed components and installation for ENGINEER's review and approval.

E. A plan showing the size and location of the temporary facilities and piping shall be submitted to the ENGINEER at the same time as the outage plan required under this Section. All costs for design, provision, operation, and removal of temporary facilities and piping shall be the responsibility of the CONTRACTOR.

1.06 CONSTRUCTION SEQUENCING

A. All construction activities shall be scheduled and sequenced to ensure continuous operation of the existing facilities. The CONTRACTOR's scheduling shall develop all construction sequencing so that the work will not adversely impact operations. The CONTRACTOR shall be responsible for development of the construction sequencing. :

1.07 PERMITS, AGREEMENTS AND COORDINATION

A. See Section 01060 – Regulatory Agency and Utility Requirements.

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1.08 SCHEDULE CONSTRAINTS

A. General: It is the CONTRACTOR's responsibility to coordinate and plan the construction activities to integrate each schedule constraint into performance of the overall work.

B. The listing of schedule constraints in 1.02 does not mean that all constraints or special conditions have been identified. The list does not substitute for the CONTRACTOR's coordination and planning for completion of the Work within the Contract Times.

C. Refer to Paragraph 1.02 – Project Constraints for items that affect the construction schedule.

1.09 WORKING WITH THE PUBLIC

A. The project will be constructed in residential and business communities. It is essential that the CONTRACTOR conduct its work to minimize impacts on the public and businesses and that it communicates effectively with them. Also see Section 01566 – Public Information Program.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

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SECTION 01322

WEB BASED CONSTRUCTION DOCUMENT MANAGEMENT (EADOC)

PART 1 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR, ENGINEER and DESIGNER shall use EADOC LLC's EADOC system for electronic submittal of all data and documents throughout the duration of the Contract. EADOC is a web-based electronic media site that is hosted by EADOC LLC. using their EADOC web solution. The EADOC system will be made available to all CONTRACTOR project personnel, subcontractor personnel and suppliers. The joint use of this system is to facilitate electronic exchange of information, automation of key processes, and overall management of the Contract. EADOC shall be the primary means of project information submission and management. Paper or hard copy documents will also be required as specified or as directed by the ENGINEER. In the event of discrepancy between the electronic version and paper documents, the paper documents will govern. EADOC is a registered trademark of EADOC LLC.

1.02 USER ACCESS LIMITATIONS

A. The ENGINEER will control the CONTRACTOR's access to EADOC by allowing access and assigning user profiles to accepted CONTRACTOR personnel. User profiles will define levels of access into the system; determine assigned function-based authorizations (determines what can be seen) and user privileges (determines what they can do). Sub-contractors and suppliers will be given access to EADOC through the CONTRACTOR. Entry of information exchanged and transferred between the CONTRACTOR and its sub-contractors and suppliers on EADOC shall be the responsibility of the CONTRACTOR.

B. Joint Ownership of Data - Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the EADOC system) by the ENGINEER and the CONTRACTOR will be jointly owned.

1.03 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

A. Review comments made (or lack thereof) by the ENGINEER on CONTRACTOR submitted documentation shall not relieve the CONTRACTOR from compliance with requirements of the Contract Documents. The CONTRACTOR is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. ENGINEER’s acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the CONTRACTOR's submitted information.

1.04 SUBMITTALS

A. See Section 01300 SUBMITTALS.

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B. Preconstruction Submittals:

1. List of CONTRACTOR's key EADOC personnel, include descriptions of key personnel's roles and responsibilities for this project. CONTRACTOR should also identify their organization's administrator on the list.

1.05 COMPUTER REQUIREMENTS

A. The CONTRACTOR shall use computer hardware and software that meets the requirements of the EADOC system as recommended by EADOC LLC. to access and use EADOC. As recommendations are modified by EADOC, the CONTRACTOR will upgrade their system(s) to meet the recommendations or better. Upgrading of the CONTRACTOR's computer systems will not be justification for a cost or time modification to the Contract. The contractor will ensure that connectivity to the EADOC system (whether at the home office or job site) is accomplished through DSL, cable, T-1, or wireless communications systems. The minimum bandwidth requirement for using the system is 128kb/s. It is recommended a faster connection be used when uploading pictures and files into the system.

B. EADOC currently supports Mozilla's Firefox v3.0-3.6, Apple's Safari V3.0-5.0, and Microsoft's Internet Explorer v7.0-8.0 web browsers for accessing the application.

1.06 CONTRACTOR RESPONSIBILITY

A. The CONTRACTOR shall be responsible for the validity of their information placed in EADOC and for the abilities of their personnel. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, cad drawing applications, and Adobe Portable Document Format (PDF) document distribution program. The CONTRACTOR shall use the existing forms in EADOC to the maximum extent possible. If a form does not exist in EADOC the CONTRACTOR must include a form of their own or provided by the ENGINEER as an attachment to a submittal. Adobe PDF documents will be created through electronic conversion rather than optically scanned whenever possible. The CONTRACTOR is responsible for the training of their personnel in the use of EADOC (outside what is provided by the ENGINEER) and the other programs indicated above as needed.

B. User Access Administration - Provide a list of CONTRACTOR's key EADOC personnel for the ENGINEER's acceptance. CONTRACTOR is responsible for adding and removing users from the system. The ENGINEER reserves the right to perform a security check on all potential users. The CONTRACTOR will be allowed to add additional personnel and sub contractors to EADOC.

1.07 CONNECTIVITY PROBLEMS

A. EADOC is a web-based environment and therefore subject to the inherent speed and connectivity problems of the Internet. The CONTRACTOR is responsible for its own connectivity to the Internet. EADOC response time is dependent on the CONTRACTOR's equipment, including processor speed, Internet access speed, etc. and current traffic on the Internet. The Owner will not be liable for any delays associated from the usage of EADOC including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information.

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B. The CONTRACTOR will ensure that connectivity to the EADOC system (whether at the home office or job site) is accomplished through DSL, cable, T-1, or wireless communications systems. The minimum bandwidth requirement for using the system is 128kb/s. It is recommended a faster connection be used when uploading pictures and files into the system. Under no circumstances shall the usage of the EADOC system be grounds for a time extension or cost adjustment to the Contract.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. EADOC project management application (no equal). Provided by EADOC LLC www.EADOCsoftware.com

PART 3 EXECUTION

3.01 EADOC UTILIZATION

A. EADOC shall be used in connection with submittal preparation and information management required by the CONTRACT. Requirements of this Section are in addition to requirements of all other Sections of the CONTRACT.

B. Related Sections:

1. Section 01010 Summary of Work

2. Section 01046 Control of Work

3. Section 01170 Special Provisions

4. Section 01300 Submittals

5. Section 01311 Construction Scheduling

6. Section 01313 Construction and Schedule Constraints

C. Design Document Submittals

1. All design drawings and specifications shall be submitted as cad ".dwg" files or PDF attachments to the EADOC submittal work flow process and form.

D. Shop Drawings

1. Shop drawing and design data documents shall be submitted as cad ".dwg" files or PDF attachments to the EADOC submittal work flow process and form.

E. Product Data

1. Product catalog data and manufacturer's instructions shall be submitted as PDF attachments to the EADOC submittal work flow process and form.

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F. Samples

1. Sample submittals shall be physically submitted as specified in Section 01300 SUBMITTALS. CONTRACTOR shall enter submittal data information into EADOC with a copy of the submittal form(s) attached to the sample.

G. Administrative Submittals

1. All correspondence and pre-construction submittals shall be submitted using EADOC.

H. Compliance Submittals

1. Test reports, certificates, and manufacture field report submittals shall be submitted on EADOC as PDF attachments.

I. Record and Closeout Submittals

1. Operation and maintenance data and closeout submittals shall be submitted on EADOC as PDF documents during the approval and review stage as specified, with actual set of documents submitted for final.

J. Financial Submittals

1. Schedule of Values, Pay Estimates and Change Request Proposals shall be submitted on EADOC. Supporting material for Pay Estimates and Change Requests shall be submitted on EADOC as PDF attachments.

END OF SECTION

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SECTION 01381

AUDIO VIDEO TAPING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials and equipment to furnish color digital audio video taping of the project site as specified herein.

B. Furnish to the Owner an original and one copy of a continuous color digital audio video tape recording around the entire site. The recording shall be taken prior to any construction activity associated with this contract.

C. Furnish to the Owner an original and one copy of a continuous digital audio video tape recording of the Manufacturer's training sessions. CONTRACTOR shall be responsible for performing the video taping.

D. The Owner reserves the right to reject the digital audio video taping because of poor quality, unintelligible audio, or uncontrolled pan or zoom. Any taping rejected by the Owner shall be re-taped at no cost to the Owner. Under no circumstances shall construction begin until the Owner has received and accepted the pre-construction digital audio video tape(s).

E. The taping shall be performed by a qualified member of the CONTRACTOR's team that is knowledgeable in construction practices and experienced in the implementation of established inspection procedures.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 COLOR DIGITAL AUDIO VIDEO SURVEY

A. Furnish a continuous color digital audio video tape recording around the entire site and adjacent areas.

B. Coverage shall include, but not be limited to, all existing roadways, sidewalks, curbing, driveways, buildings and structures, above ground utilities, landscaping, trees, signage and other physical features located within the zone of influence of the construction. The coverage may be expanded if directed by ENGINEER.

C. All exterior taping will be done during daylight hours. No taping shall be performed if weather is not acceptable, such as rain, fog, etc. Lighting shall be provided as required.

3.02 AUDIO AND VIDEO

A. Audio video cassettes shall be professional grade video tapes, digital format.

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B. Each tape shall begin with the OWNER's name, Contract name and number, CONTRACTOR's name, date and location information such as street name, direction of travel, viewing side, etc.

C. Information appearing on the tape must be continuous and run simultaneously by computer generated transparent digital information. No editing or overlaying of information at a later date will be acceptable.

D. Time must be accurate to within 1/10 of a second and continuously generated.

E. Engineering station numbers (where applicable) must be continuous, be accurate and correspond to project stationing. The symbols should be the standard engineering symbols (i.e., 16+64).

F. Written documentation must coincide with the information on the tape so as to make easy retrieval of locations sought for at a later date.

G. The video system shall have the capability to transfer individual frames of video electronically into hard copy prints or photographic negatives.

H. Audio shall be recorded at the same time as the video recording and shall have the same information as on the viewing screen. Special commentary will be given for unusual conditions of buildings, sidewalks and curbing, foundations, trees and shrubbery, etc.

I. All tapes shall be transferred to DVD.

J. All discs and boxes shall have labels with the following information:

1. Tape Number
2. OWNER's Name
3. Date of Taping
4. Project Name and Number
5. Location and Standing Limit of Tape
6. Discs shall be searchable by street name or intersection.

END OF SECTION

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SECTION 01445

PIPELINE TESTING AND CLEANING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and test and clean all new pipelines installed under this Contract as specified herein.

B. Unless specified otherwise in individual Sections, the cleaning and testing of pipelines shall follow the requirements of this Section.

1.02 RELATED WORK

A. Buried pipelines are included in Division 2.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 GENERAL

A. Furnish all necessary equipment and labor for cleaning and testing the pipelines. The procedures and methods shall be approved by the ENGINEER.

B. Make any taps and furnish all necessary caps, plugs, etc, as required in conjunction with testing pipelines. Furnish a test pump, gauges and any other equipment required in conjunction with carrying out the hydrostatic tests.

3.02 CLEANING PIPELINES

A. As pipe laying progresses and at the conclusion of the work thoroughly clean all new pipelines by flushing with water or other means to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period. If, after this cleaning, obstructions remain, they shall be removed.

3.03 TESTING PRESSURE PIPELINES

A. All pressure pipelines shall be pressure and leakage tested. Pipelines shall be subjected to a hydrostatic pressure of 50 percent above the normal operating pressure and this pressure maintained for at least 10 minutes. The leakage test shall be conducted at the maximum operating pressure as determined by the ENGINEER, and this pressure shall be maintained for at least two hours. The test pump and water supply shall be arranged to allow accurate measurement of the water required to maintain the test pressure. The amount of leakage which will be permitted shall be in accordance with AWWA C600.

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3.04 TESTING GRAVITY PIPELINES

A. All gravity pipelines shall be tested for leakage by an infiltration or exfiltration test. Buried piping shall be tested by an infiltration test if the groundwater is more than 2-ft above the crown of the pipe for the full length of the section to be tested. Air testing may be used in lieu of an exfiltration test subject to approval of the ENGINEER.

B. Exfiltration Test

1. Leakage tests by exfiltration shall be made by creating a head in the pipeline to be tested by filling the line and either a manhole or temporary riser on one end of the line with water. The length of pipe to be tested shall be such that the head over the crown at the upstream end is not less than 2-ft and the head over the downstream crown is not more than 6-ft. The pipe shall be plugged by pneumatic bags or mechanical plugs in such a manner that the air can be released from the pipe while it is being filled with water. Before any measurements are made, the pipe shall be kept full of water long enough to allow absorption and the escape of any trapped air to take place. Following this, a test period of at least one hour shall begin. Provisions shall be made for measuring the amount of water required to maintain the water at a constant level during the test period.

2. If any joint shows an appreciable amount of leakage, the jointing material shall be removed and the joint repaired. If any pipe is defective, it shall be removed and replaced. If the quantity of water required to maintain a constant head in the pipe does not exceed 1.9 gallons per inch of diameter per day per 100-ft of pipe and if all the leakage is not confined to a few joints, workmanship shall be considered satisfactory.

C. Infiltration Test

1. Pipe shall be tested for infiltration after the backfill has been placed and the ground water allowed to return to normal elevation. The length of line to be tested shall be not less than the length between adjacent manholes and not more than the total length of each size of pipe. The allowable infiltration shall be 1.9 gallons per inch of diameter per day per 100-ft of pipe in each section tested. There shall be no gushing or spurting leaks.

2. If an inspection of the completed pipeline or any part thereof shows pipes or joints which allow noticeable infiltration of water, the defective work or material shall be replaced or repaired as directed.

3. Rates of infiltration shall be determined by means of V-notch weirs, pipe spigots, or by plugs in the end of the pipe installed in an approved manner and at such times and locations as may be directed by the ENGINEER.

D. When the pipeline to be tested is reinforced concrete pipe, the allowable leakage in the above tests shall be 4.7 gallons per inch of diameter per 100-ft of pipe.

E. Low Pressure Air Test

1. Low-pressure air tests shall be made with equipment specifically designed and manufactured for the purpose of testing pipelines using low-pressure air. The equipment shall be provided with an air regulator valve or air safety valve so set that the internal air pressure in the pipeline cannot exceed 8 psig. Pneumatic plugs shall have a sealing length

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equal to or greater than the diameter of the pipe to be tested. All air used shall pass through a single control panel.

2. Install plugs at manholes. Brace plugs securely as required for safety and allow no one in the manholes while pressurizing the line or during the test.

3. Low-pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig. The internal air pressure in the sealed line shall not be allowed to exceed 8 psig. At least 2 minutes shall be allowed for the air pressure to stabilize in the section under test. After the stabilization period, the low-pressure air supply hose shall be quickly disconnected from the control panel. The time required in minutes for the pressure in the section under test to decrease from 3.5 to 2.5 psig shall not be less than that shown in Table 1 of ASTM F1417.

4. If the pipe section does not pass the air test, sectionalize the section tested to determine the location of the leak. Once the leak has been located, repair and retest.

END OF SECTION

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SECTION 01500

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, equipment, materials, and incidentals necessary and provide separate temporary facilities for the CONTRACTOR's use as specified herein and as shown on the Drawings.

B. Operate and maintain temporary facilities for the duration of the project and as directed by the ENGINEER. All cost and use charges for temporary facilities shall be included in the Contract Price.

1.02 SUBMITTALS

A. Submit shop drawings and product data, in accordance with Section 01300, showing materials of construction and details of installation for:

1. Site Plan: Show the proposed locations for temporary facilities including offices, temporary utilities, storage containers/buildings, vehicle access and parking areas, material laydown and staging areas, temporary fencing, and other security measures.

2. CONTRACTOR's Field Office: Dimensioned floor plan, office systems, furnishings, and equipment.

3. Temporary Fence: Layout drawings which indicate dimensions, access to fire hydrants, gate locations and opening sizes, and other site specific requirements.

4. Project Sign: Layout, graphics, and wording.

B. Submittals shall be received by the ENGINEER no later than the date of the Preconstruction Meeting.

1.03 QUALITY ASSURANCE

A. Temporary facilities shall comply with all applicable state and local ordinances, codes and regulations.

B. Coordinate with authorities having jurisdiction to inspect (and test if required) temporary facilities.

C. Obtain all required permits for temporary facilities.

1.04 DEFINITIONS

A. Duration of the project: The period of time from the date of the Notice to Proceed to the date of Final Completion, inclusive.

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1.05 CONTRACTOR USE OF CONSTRUCTION STAGING AREAS

A. The CONTRACTOR's use of the construction staging areas designated Figure 1 in this Section and on the Drawings shall be limited to its storage of materials and equipment, project component fabrication facilities, and field offices.

B. CONTRACTOR is advised that all construction staging areas designated on the final plans are located within or in close proximity to residential neighborhoods.

C. CONTRACTOR shall NOT use construction staging areas for:

1. Storage of vehicles or equipment not directly used for construction of the project.

2. Overnight camping or overnight accommodations for non-security personnel

3. Storage of motor fuel in excess of 5 gallons, unless in the onboard tank of engine driven equipment or self-propelled vehicle.

D. Equipment maintenance and materials fabrication in staging areas must be conducted during normal working hours in accordance with the Noise Abatement Requirements of Section 01060.

E. CONTRACTOR shall assume full responsibility for security of all its subcontractors materials and equipment stored at the construction staging areas.

F. If directed by the OWNER or ENGINEER, move any stored items which interfere with operations of OWNER or other contractors

G. Obtain and pay for use of additional construction staging, storage or equipment maintenance areas if needed to perform the Work.

H. Construction staging areas beyond those shown shall be identified on a site plan and submitted to the ENGINEER for review and approval. CONTRACTOR shall not utilize any additional area for construction staging without first obtaining approval from the ENGINEER.

I. CONTRACTOR shall submit a site plan for all construction staging and related areas, and all development associated with such areas. All areas within which construction staging are to take place shall be minimized to the maximum extent feasible in order to minimize impacts on resources (e.g., terrestrial habitat, wetlands, creeks, riparian areas, or other sensitive resource areas, etc.). All measures to be taken to minimize impacts associated with construction staging and related areas shall be identified on the site plan, including but not limited to screening, fencing, landscaping, signage, and designation of various activity and storage areas on the site.

J. Copies of the signed COASTAL DEVELOPMENT PERMIT shall be maintained in a conspicuous location at all construction staging areas at all times.

K. Use of any building or site in a residential area for field offices or related purposes not previously designated in the project’s COASTAL DEVELOPMENT PERMIT, is prohibited.

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PART 2 PRODUCTS

2.01 MATERIALS

A. Temporary Fence: Fabric shall be No. 9 gauge galvanized wire woven in 2-in diamond mesh with top and bottom twisted selvage. Intermediate and terminal posts shall be galvanized steel H or pipe, minimum 2-3/8-in OD line posts, 2-7/8-in OD corner and pull posts, and 1-5/8-in OD top rails.

B. Project Sign: Plywood shall be A-A EXT-APA grade, 1-in thick. Posts and braces shall be pressure treated lumber.

2.02 EQUIPMENT

A. Fire Extinguishers: Provide portable, UL-rated with class and extinguishing agent required by locations and classes of fire exposure. Provide at least one for each trailer/office.

B. Temporary Heat: Provide vented, self-contained, liquid propane gas or fuel oil heaters with individual space thermostatic control. Equipment shall be listed and labeled for type of fuel consumed and marked for intended use.

PART 3 EXECUTION

3.01 CONTRACTOR'S FIELD OFFICE

A. Provide a temporary field office(s) for the CONTRACTOR's use for the duration of the project. An authorized representative of the CONTRACTOR shall be present at all times while the WORK is in progress. Instructions received at the CONTRACTOR's field office from the ENGINEER shall be considered delivered to the CONTRACTOR.

B. Locate field office(s) in accordance with approved shop drawings and as directed by the OWNER.

C. Establish and occupy field office within 30 days of the Notice to Proceed, unless otherwise approved by the ENGINEER or OWNER.

3.02 TEMPORARY POWER AND LIGHT

A. CONTRACTOR shall furnish temporary light and power, including 220 Volt service for welding, complete with wiring, lamps and similar equipment as required to adequately light all work areas and with sufficient power capacity to meet the project needs. Make all necessary arrangements with the local electric company for temporary electric service and pay all expenses in connection therewith.

B. Provide connections to existing facilities sized to provide service required for power and lighting. CONTRACTOR shall pay the costs of power used.

C. Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 Volt plugs into higher voltage outlets. For connection of power tools and equipment, provide outlets equipped with ground-fault circuit interrupters, reset button and pilot light.

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D. Provide grounded extension cords. Use heavy duty cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if more than one length is required.

E. Provide general service incandescent lamps as required for adequate illumination. Provide guard cages or tempered glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.

3.03 WEATHER PROTECTION

A. The CONTRACTOR shall furnish temporary heating units (UL or FM listed) to maintain reasonable temperatures within temporary enclosures.

3.04 TEMPORARY AIR AND WATER

A. The CONTRACTOR and each subcontractor shall provide all air and water including piping and appurtenances required for testing pipelines and equipment installed by them. Remove temporary piping and appurtenance on completion of testing.

3.05 SANITARY FACILITIES

A. Provide self-contained, single occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed in a fiberglass or other approved non-absorbent shell.

3.06 CONSTRUCTION AIDS

A. Provide temporary elevators, hoists, cranes, scaffolding and platforms as necessary to perform the WORK. Provide temporary stairs where ladders are not adequate. Protect permanent stairs from damage from construction operations.

3.07 VEHICLE ACCESS AND PARKING

A. Provide temporary access roads, parking areas, traffic control devices and staging areas as approved by the ENGINEER and OWNER.

B. Provide minimum 12-ft by 24-ft by 6-in deep dense graded crushed stone or paved parking area adjacent to CONTRACTOR's field office for the duration of the project.

3.08 TEMPORARY FENCE

A. Provide temporary fence as specified herein, and as the CONTRACTOR requires for site security.

1. Provide 6-ft high chain link fence with at least two vehicle and two pedestrian access gates. Gates shall be equipped with locking hardware and padlocks. Furnish two sets of keys to OWNER. Coordinate with local first responders for access during non-work hours.

2. Fence installation shall comply with ASTM F567. Post spacing shall not exceed 8-ft on center. Posts shall be set plumb in concrete footings.

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3. Perform daily inspections of fence and immediately repair or replace damaged or compromised sections and as directed by the ENGINEER.

3.09 WASTE MANAGEMENT

A. Provide covered dumpster, minimum 4-cubic yards, dedicated for field office waste. Provide separate covered dumpster of adequate size for construction debris. Empty dumpsters on a regular basis and as directed by the ENGINEER. Dumpsters shall not exceed their capacities at any time.

3.10 PROJECT SIGNS

A. Furnish and install the project signs indicated in the Contract Documents. Signs shall be placed as directed by the ENGINEER; and, shall remain maintained in good condition for the life of the construction period.

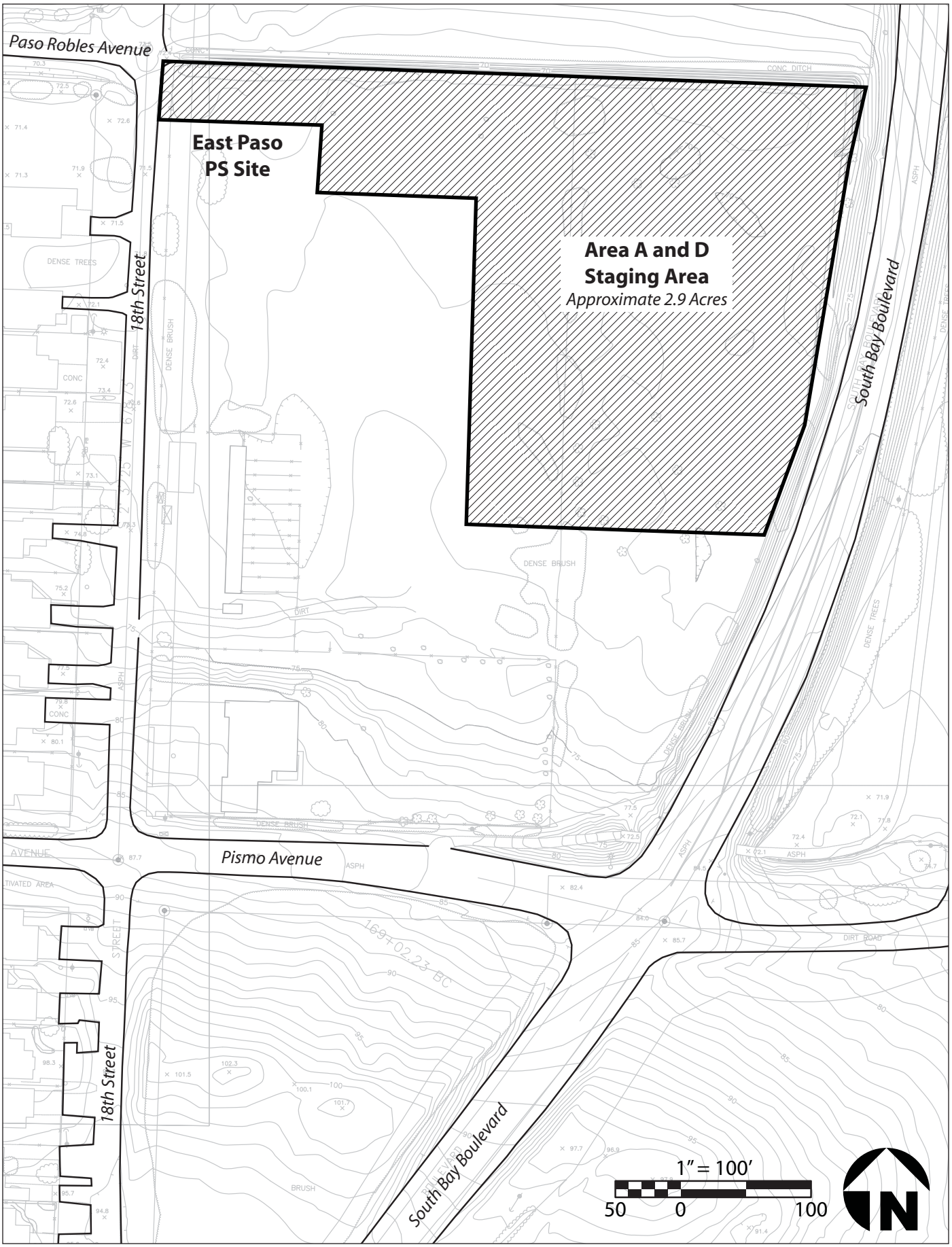
B. Remove signs at final acceptance, unless otherwise directed.

3.11 REMOVAL AND RESTORATION

A. Remove each temporary facility complete when need for its service has ended and as approved by the ENGINEER. Coordinate removal of temporary facilities with authorities having jurisdiction.

B. Restore all improvements damaged by the installation, operation, and removal of the temporary facilities. Obtain prior approval from OWNER and ENGINEER for restoration work. Comply with the restoration requirements of Section 01046.

END OF SECTION



W:\REPORTS\San Luis Obispo\Figures\Figure 1_Staging Area for A and D.ai 03/01/12 JJT

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Figure 1
Staging Area for A and D

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SECTION 01561

BIOLOGICAL AND CULTURAL RESOURCES ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 BIOLOGICAL RESOURCES

A. The CONTRACTOR shall conform to the Conditions of Approval for the California Coastal Commission, Coastal Development Permit CDP A-3-SLO-09-055/069 (appended to these Specifications). The CONTRACTOR's attention is also directed to the Final Environmental Impact Report (EIR) for the Los Osos Wastewater Project Report dated March 2009 (EIR is located at http://www.slocounty.ca.gov/PW/LOWWP/DOCS/Environmental_Documents/Final_EIR_1_0.htm).

B. The CONTRACTOR shall conform to the applicable requirements of the Federal Endangered Species Act and California Environmental Species Act as it relates to the protection of threatened and endangered species and special status species, see Biological Opinion (appended to these Specifications)

C. The CONTRACTOR's onsite personnel shall participate in an environmental awareness training session provided by OWNER's Environmental Monitor and adhere to guidelines and directions provided in the session.

D. The CONTRACTOR's attention is directed to Environmental Resource Drawings included in Contract Drawings, General Drawings for locations of sensitive biological resources within the Project area.

E. The CONTRACTOR shall adhere to OWNER protocol concerning Special-Status Species outlined in Part 3 Section 3.01.

F. The CONTRACTOR shall identify a Project Liaison to consult with OWNER's Environmental Monitors during construction.

1.02 CULTURAL RESOURCES

A. The CONTRACTOR shall conform to the applicable requirements of the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800, which provides for the preservation of potential historical architectural, archaeological, or cultural resources (hereinafter called "cultural resources").

B. The CONTRACTOR shall conform to the applicable requirements of Historic Resources Evaluation and Treatment Plan prepared by Far Western Anthropological Research Group Inc., March 2010 (available prior to construction) by the State Historic Preservation Office (Condition 28).

C. The CONTRACTOR shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources. The entire Project Area as described in the Cultural Resources Treatment Plan shall be considered an area

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of archaeological sensitivity and the CONTRACTOR shall assume that all areas of subsurface construction have a high likelihood of encountering significant archaeological resources. (Condition 73)

D. The CONTRACTOR shall adhere to OWNER protocol concerning Archaeological Resources outlined in Part 3 Section 3.02.

E. The CONTRACTOR's onsite personnel shall participate in an environmental awareness training session provided by OWNER's Environmental Archaeological Monitor and adhere to guidelines and directions provided in the session.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 SPECIFIC BIOLOGICAL RESOURCES REQUIREMENTS

A. The CONTRACTOR shall attend a meeting prior to construction that will describe in detail the protocol and CONTRACTOR responsibilities concerning sensitive species. The OWNER's Environmental Monitor will advise the CONTRACTOR if the protocol changes as more information is received and project permits from the US Fish and Wildlife Service are obtained.

General conditions of the protocol are:

1. CONTRACTOR shall attend a pre-construction meeting to review the protocol.

2. All CONTRACTOR workers shall attend pre-construction biological training session and be able to recognize sensitive species and understand and employ proper protocol if any are encountered.

3. The CONTRACTOR shall obtain approval from the OWNER or OWNER's Environmental Monitor in advance of construction for activity areas in vegetated, sandy or otherwise unimproved portions of the construction area including areas of proposed disturbance, equipment storage, stockpiles and access roads and areas. The CONTRACTOR shall consult with the OWNER's Environmental Monitor prior to removal of vegetation.

4. The CONTRACTOR shall submit a schedule to the OWNER or OWNER's Environmental Monitor at least four weeks prior to construction. The schedule shall indicate proposed construction dates and locations. The CONTRACTOR shall provide written weekly updates on construction progress to the ENGINEER and OWNER's Environmental Monitor.

5. The CONTRACTOR shall post signs in neighborhoods where construction equipment and/or activities would obstruct travel at least one week prior to start of construction. The CONTRACTOR shall identify alternate access in consultation with the OWNER and/or OWNER's Environmental Monitor in accordance with a construction traffic mitigation program. The OWNER shall provide signs to the CONTRACTOR at least two weeks prior to start of construction.

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6. The OWNER or the OWNER's Environmental Monitor shall conduct pre-construction surveys of construction areas and/or materials stockpiles in sensitive areas including but not limited to coastal scrub, wetlands and chaparral where required. Refer to Environmental Resource Drawings included in Contract Drawings, General Drawings, and Appendix Drawings for general locations of sensitive areas. The CONTRACTOR shall be responsible for following the OWNER's Environmental Monitor's recommendations that include but are not limited to limiting access to an area, limiting disturbance of an area, suggest alternate routing or areas for materials stockpiling and limiting activity to designated access routes and construction areas.

7. The CONTRACTOR shall temporarily halt construction on an unimproved right-of-way or in vegetated areas during rainy or foggy weather at the direction of the OWNER or OWNER's Environmental Monitor..

8. The CONTRACTOR shall not bring road base or other materials for deposition onto sandy areas of the construction areas, roads or stockpile areas until approved by the OWNER and/or the OWNER's Environmental Monitor.

9. CONTRACTOR shall clearly mark construction areas with high visibility flagging or fencing. Construction equipment and personnel will be restricted to the marked areas.

B. WINTERING MONARCH BUTTERFLY ROOST SITES. The ENGINEER will provide a map to the CONTRACTOR prior to construction outlining potential wintering monarch butterfly roost sites based upon preconstruction surveys conducted during the months of October to February within 500 feet of the Broderson construction site, and on Rosina Avenue and Pecho Road. The OWNER's Environmental Monitor shall fence these potential roost sites and avoid disturbance of these areas if butterflies are present. The CONTRACTOR shall be responsible for any damage to these fenced areas resulting from physical disturbance and/or dust originating from its operations. The CONTRACTOR's responsibility to protect these fenced areas shall be continued until the CONTRACTOR is relieved of further responsibility by the ENGINEER. Refer to Environmental Drawings included in Contract Drawings, General Drawings, and Appended Drawings for preliminary locations. (Condition 58)

C. MORRO SHOULDERBAND SNAIL MONITORING. The ENGINEER will provide to the CONTRACTOR a map showing the location of habitats for the Morro shoulderband snail on or within the Project Area. The OWNER's Environmental Monitor shall monitor all construction activities that will take place within suitable habitat for the Morro shoulderband snail. Monitoring activities shall be required daily until completion of initial disturbance at each construction area. The OWNER's Environmental Monitor shall be granted full authority to stop work at his or her discretion. The OWNER's Environmental Monitor shall be responsible for implementing avoidance and minimization measures during construction. The OWNER's Environmental Monitor shall stop work if project-related activities occur outside the demarcated boundaries of the construction footprint. The OWNER's Environmental Monitor shall stop work if any Morro shoulderband snails are detected within the proposed construction footprint, and shall implement measures to relocate them to suitable habitat out of harm's way prior to construction activities resuming. If no suitable habitat opportunities are available in the immediate vicinity of the construction footprint, salvaged and relocated specimens may also be transported to an offsite location approved by the USFWS. (Condition 63)

D. CALIFORNIA RED-LEGGED FROG MONITORING. The OWNER's Environmental Monitor shall be present at the active work sites until such time that the initial survey for

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California red-legged frogs, instruction of workers, and (upland) habitat disturbance have been completed. After this time, the CONTRACTOR shall designate a qualified person to monitor on-site compliance with all minimization measures. The OWNER's Environmental Monitor shall ensure that this individual receives appropriate training as to the identification of frogs, potential hazards to the species, inappropriate and allowable work monitor on-site compliance with all minimization measures. The OWNER's Environmental Monitor shall ensure that this individual receives appropriate training as to the identification of frogs, potential hazards to the species, inappropriate and allowable work activities, and appropriate contacts for immediate, professional biological support.

During work activities, all trash that may attract predators shall be properly contained, removed from the work site and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas. All fueling and maintenance of vehicles and other equipment and staging areas shall occur a minimum of 100 feet from all open water, stream, wetland, and riparian habitat. The CONTRACTOR shall ensure that contamination of habitat does not occur during such operations. (Condition 64)

Prior to the onset of work near any riparian habitat, the CONTRACTOR shall prepare and submit a plan to the ENGINEER for prompt and effective response to any accidental spills.

E. NESTING BIRD SURVEY. The ENGINEER will provide to the CONTRACTOR a map showing the location of nest trees and other areas where nesting birds or species protected by State and/or Federal laws are present on or within the Project Area. The areas will be identified during preconstruction surveys (February through August) and also possibly during winter surveys. All potentially suitable nesting trees identified will be removed prior to or after the breeding season as feasible. The nest trees and areas identified in the spring and early summer preconstruction surveys will be fenced or otherwise demarcated by the OWNER's Environmental Monitor and a 250-foot non-disturbance buffer or a buffer area will be established. This no-disturbance buffer will be established until the nesting activity is completed and young have fledged, CONTRACTOR is responsible to ensure construction activities do not encroach upon the buffer area. Construction in the area of the buffer and nest trees will be allowed to resume only after nesting activities have been completed as indicated by the OWNER's Environmental Monitor. (Condition 69)

F. NESTING RAPTOR survey. The ENGINEER will provide to the CONTRACTOR a map showing the location of nest trees and other areas where nesting raptors or species protected by State and/or Federal laws are present on or within the Project Area. The areas will be identified during preconstruction surveys (February through August) and also possibly during winter surveys. All potentially suitable nesting trees identified will be removed prior to or after the breeding season as feasible. The nest trees and areas identified in the spring and early summer preconstruction surveys will be fenced or otherwise demarcated by the OWNER's Environmental Monitor and a 500-foot non-disturbance buffer or a buffer area will be established. This no-disturbance buffer will be established until the nesting activity is completed and young have fledged, CONTRACTOR is responsible to ensure construction activities do not encroach upon the buffer area. Construction in the area of the buffer and nest trees will be allowed to resume only after nesting activities have been completed as indicated by the OWNER's Environmental Monitor. (Condition 70)

G. RELOCATION OF SENSITIVE SPECIES. Prior to construction the CONTRACTOR shall provide access and allow adequate time for the OWNER's Environmental Monitors to remove

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as many Morro shouldered snails as practicable from any area of proposed disturbance. (Condition 63)

H. CONTROL OF INVASIVE EXOTIC PLANTS. To control introduction of invasive exotic plants on site, the CONTRACTOR shall implement the following measures during construction and incorporate into the design guidelines of the proposed percolation fields, as appropriate.

1. Use only clean fill material (free of weed seeds) within the construction zone of the proposed project.

2. Thoroughly clean all construction equipment prior to being moved onto and used at the site.

3. Prohibit planting or seeding of disturbed areas with nonnative plant species.

4. Control the establishment of invasive exotic weeds in all disturbed areas. Remove existing stands of invasive exotic plants, including but not limited to veldt grass, pampas grass and ice plants, in order to limit their spread.. (Condition 81)

I. WORKER EDUCATION PROGRAM. The OWNER's Environmental Monitor shall provide construction personnel specific instruction on general detection and avoidance of sensitive resources during construction. The worker education program shall include: descriptions and pictures of listed species; the provisions of the Endangered Species Act; those specific measures being implemented to avoid and minimize take or impacts to listed or otherwise sensitive species (e.g. conserve listed and sensitive species as they relate to the project); and the project boundaries within which the work will occur. (Condition 68)

J. LOS OSOS CREEK ENVIRONMENTAL REQUIREMENTS. All construction activities across Los Osos Creek shall be restricted to low-flow periods of June 15 through November 1. Construction work must be conducted when Los Osos Creek is dry, and can occur as early as June 1. Restricting construction activities to this work window will minimize impacts to migrating adult and smolt steelhead, if present. The OWNER's Environmental Monitor shall be on site during all stream crossing activities associated with Los Osos Creek. The OWNER's Environmental Monitor will be authorized to halt construction if impacts to steelhead are evident. Prior to construction, a spill prevention plan for potentially hazardous materials shall be prepared by the CONTRACTOR and implemented. The plan shall include the proper handling and storage of all potentially hazardous materials, as well as the proper procedures for cleaning up and reporting of any spills. If necessary, containment berms shall be constructed to prevent spilled materials from reaching the creek channel. CONTRACTOR to provide specific construction methodology to ENGINEER for permit evaluation. Allow up to six (6) months for OWNER to obtain environmental permits.

Prior to construction, silt fencing shall be installed in all areas where construction occurs within 100 feet of known or potential steelhead habitat. All silt fencing, erosion control and landscaping specifications shall only include natural fiber, biodegradable products for meshes and coir rolls to minimize impacts to species and the environment during use.

During construction, spoil sites shall be restricted to upland locations so they do not drain directly into Los Osos Creek. If a spoil site drains into a water body, catch basins shall be constructed to intercept sediment before it reaches the channels. If required, spoil sites shall be graded to reduce the potential for erosion.

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During construction, equipment and materials shall be stored at least 50 feet from Los Osos Creek. No debris such as trash and spoils shall be deposited within 100 feet of waterways. Staging and storage areas for equipment, materials, fuels, lubricants and solvents, shall be restricted to locations outside of the stream channel and banks. Stationary equipment such as motors, pumps, generators, compressors and welders, located within or adjacent to the stream shall be positioned over drip pans at all times. Any equipment or vehicles driven and/or operated within or adjacent to the stream shall be checked and maintained daily to prevent leaks of materials that if introduced to water could be deleterious to aquatic life. Vehicles shall be moved away from the stream prior to refueling and lubrication.

During construction, proper and timely maintenance for all vehicles and equipment used shall be provided to reduce the potential for mechanical breakdowns leading to a spill of materials into or around the creek. Maintenance and fueling shall be restricted to safe areas away from Los Osos Creek that meet the criteria set forth in the spill prevention plan.

Immediately following construction, all construction work areas shall be restored to preconstruction channel conditions, including streambed composition, compaction, and gradient. If required, channel banks shall be returned to original grade slope and appropriate bank stabilization techniques shall be implemented to reduce the potential for erosion and sedimentation. A plan describing pre-project conditions and restoration methods shall be prepared prior to construction by the CONTRACTOR.

Immediately following construction, all appropriate construction work areas will be re-vegetated with an appropriate assemblage of native upland vegetation, and if necessary, riparian vegetation, suitable for the area. A plan describing pre-project conditions, restoration and monitoring success criteria shall be prepared prior to construction by the CONTRACTOR and submitted to the ENGINEER for approval. (Condition 82)

3.02 SPECIFIC CULTURAL RESOURCES REQUIREMENTS

A. The CONTRACTOR shall provide a construction plan and schedule to the ENGINEER who shall provide the plan to the OWNER's Archaeological Environmental Monitor for development of the cultural resources monitoring schedule.

B. In the event potential cultural resources are discovered during subsurface excavations at the site of construction (Condition 28), the following procedures shall be instituted:

1. The OWNER's Archaeological Environmental Monitor will inform the ENGINEER of the find and the ENGINEER will issue a Field Order directing the CONTRACTOR to cease all construction operations at the location of such potential cultural resources find.

2. Such Field Order shall be effective until such time as the OWNER's Archaeological Monitor assesses the significance of these potential cultural resources and make recommendations to the State Historic Preservation Office.

C. In the event human remains are discovered during subsurface excavations at the site of construction (Condition 73), the following procedures shall be instituted:

1. The CONTRACTOR shall stop work. The OWNER's Archaeological Environmental Monitor will inform the ENGINEER of the find and the ENGINEER shall issue a Field

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Order directing the CONTRACTOR to cease all construction operations at the location of the human remain.

2. Such Field Order shall be effective until such time as the Archaeological Environmental Monitor consults with the County Coroner and provisions in the California Public Resources Code (Section 5097.98 and 5097.99 and Health and Safety Code Section 7050.5, as amended by Assembly Bill 2641) are completed and if Native American Remains are found, recommendations of the Most Likely Descendent as designated by the Native American Heritage Commission are completed.

D. If the OWNER's Archaeological Environmental Monitor determines that the potential find is a bona fide cultural resource, at the direction of the OWNER's Archaeological Monitor and State Historic Preservation Office, or a human remain at the direction of the Coroner or Native American Heritage Commission, the CONTRACTOR shall suspend work at the location of the find. The CONTRACTOR shall resume work upon direction of the OWNER and/or Archaeological Environmental Monitor.

E. Preemptive Backhoeing – In the areas noted on the Archaeological Sensitivity Map (appended) CONTRACTOR shall remove asphalt and carefully excavate the trench section to a depth up to 4 feet at the direction of Archaeological Environmental Monitor to allow Archaeological Environmental Monitor to conduct a survey of the materials that are carefully excavated prior to the CONTRACTOR's normal operations of installing the pipelines. CONTRACTOR shall coordinate with ENGINEER and Archaeological Environmental Monitor to develop a schedule for the preemptive backhoeing excavations. CONTRACTOR's preemptive backhoeing work and coordination with the Archaeological Environmental Monitor in the areas shown on the Archaeological Sensitivity Map shall be considered incidental to the work and no additional payment will be allowed therfor.

F. Pre-excavation Archaeological Surveys – CONTRACTOR shall saw cut, remove and dispose of asphalt pavement to allow Archaeological Environmental Monitor to conduct site surveys for a period of up to 10 days at the locations shown on plan sheets A-PP-181 and A-PP-183. The CONTRACTOR shall incorporate the survey time into the Construction Schedule, shall provide trench plates over trench at end of each work day, and shall provide traffic control during survey period. CONTRACTOR's coordination with the Archaeological Environmental Monitor for Pre-excavation Archaeological Surveys shall be considered incidental to the work and no additional payment will be allowed therfor.

END OF SECTION

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SECTION 01562

DUST CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Perform dust control operations, in an approved manner, whenever necessary or when directed by the ENGINEER, even though other work on the project may be suspended. Dust control shall be generally accomplished by the use of water; however, the use of calcium chloride may be used when necessary as approved by ENGINEER to control dust nuisance.

B. Calcium chloride shall conform to AASHTO M144, Type I except the requirements for "total alkali chlorides" and other impurities shall not apply.

C. Methods of controlling dust shall meet all air pollutant standards as set forth by Federal and State regulatory agencies, and in compliance with the Coastal Development Permit.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 SPECIFIC REQUIREMENTS

A. Reduce the amount of the disturbed area where possible,

B. Use water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site. Increased watering frequency will be required whenever wind speeds exceed 15 mph. Dewatering water should be used whenever possible.

C. All dirt stockpile areas will be sprayed daily as needed,

D. Permanent dust control measures identified in the re-vegetation and landscape plans will be implemented as soon as possible following completion of any soil disturbing activities.

E. Exposed ground areas that are planned to be reworked at dates greater than one month after initial grading will be covered with fiber, mulch, mats or other erosion control material.

F. All disturbed soil areas not subject to revegetation will be stabilized using approved chemical soil binders, jute netting, or other methods approved in advance by the APCD. Any erosion and sedimentation control netting or other erosion and sedimentation control devises used for temporary or permanent erosion and sedimentation control, shall be limited to biodegradable mesh or other biodegradable products.

G. All roadways, driveways, sidewalks, etc. to be paved will be completed as soon as possible. In addition, building pads will be laid as soon as possible after grading unless seeding or soil binders are used.

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H. Vehicle speed for all construction vehicles will not exceed 15 mph on any unpaved surface at the construction site.

I. All trucks hauling dirt, sand, soil, or other loose materials are to be covered or will maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with CVC Section 23114.

J. Install wheel washers where vehicles enter and exit unpaved roads onto streets, or wash off trucks and equipment leaving the site.

K. Sweep streets at the end of each day if visible soil material is carried onto adjacent paved roads. Water sweepers with reclaimed water should be used where feasible.

L. If visible emissions of fugitive dust persist beyond a distance of 200 feet from the boundary of the construction site, all feasible measures shall be implemented to eliminate potential nuisance conditions at off-site receptors (e.g., increase frequency of watering or dust suppression, install temporary wind breaks where appropriate, suspend excavation and grading activity when winds exceed 25 mph).

M. The CONTRACTOR will designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties will include holidays and weekend periods when work may not be in progress. The name and telephone number of such persons will be provided to the SLOAPCD prior to the start of construction.

N. If the above mitigation measure do not bring the construction emissions below the thresholds, the ENGINEER reserves the right to assess damages to the CONTRACTOR to secure emission reductions from other projects in close proximity to the construction site.

END OF SECTION

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SECTION 01566

PUBLIC INFORMATION PROGRAM

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The OWNER has committed to provide useful information regarding the Project to the public on a regular and timely basis.

B. The CONTRACTOR shall support the public information program and conform to its requirements.

1.02 PUBLIC INFORMATION PROGRAM

A. The ENGINEER shall develop a comprehensive public information program for the construction phase of the Project. The program shall include the following components.

1. Community outreach

2. Communication with the public

3. Media relations.

1.03 PROGRAM OBJECTIVES

A. The Public Information Program shall include following communications objectives.

1. Ensure the public receives timely information regarding construction activity.

2. Establish policies and procedures to ensure proper communications during unexpected or emergency situations.

3. Establish policies and procedures to collect, document and respond to all Project related questions, concerns or other inquiries.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 CONTRACTOR RESPONSIBILITIES

A. The CONTRACTOR shall provide the following services.

1. The CONTRACTOR shall support the public information program and provide information regarding its construction activities to the ENGINEER.

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2. The CONTRACTOR shall refer any and all inquiries from the public, media, and all others to the ENGINEER's designated Community Liaison. The Community Liaison shall serve as the single point of contact for all public inquiries, complaints, and disputes, and for contact with and statements to the press.

3. The CONTRACTOR shall be required to place door hanger notices provided by the ENGINEER at each residence and business a minimum of 72 hours in advance of any ground disturbing construction activities. Door hangers shall not be placed in mail boxes. This work shall be under the control of the Contractor and subject to Section 00700 Article 12.03 E.

END OF SECTION

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SECTION 01570

STORM WATER POLLUTION PREVENTION PLAN

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The CONTRACTOR shall implement a site-specific Storm Water Pollution Prevention Plan (SWPPP) for this Project pursuant to the requirements of the National Pollution Discharge Elimination System (NPDES) General Permit [Order No. 2009-0009-DWQ] for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit). CONTRACTOR shall implement the SWPPP as shown and as specified by the document in Appendix C to these Specifications prior to start of construction and shall amend the SWPPP as necessary to ensure compliance. The CONTRACTOR shall submit an amended SWPPP to the ENGINEER for review, acceptance, and forwarding to other County and/or regulatory agencies, as appropriate as, no later as 30 days after NTP.

B. The project has been assigned a Risk Level Type 2 LUP (LUP2). The water quality sampling points necessary for the compliance with the risk based system shall be as shown or as amended and approved. CONTRACTOR will be fully responsible for compliance with, execution and implementation of the SWPPP.

C. The CONTRACTOR will provide both a Qualified SWPPP Developer (QSD) and a Qualified SWPPP Practitioner (QSP) for this Project. The QSD and QSP shall both meet the requirements listed in section 1.5 below.

D. The CONTRACTOR shall perform all necessary erosion control and storm water management measures in compliance with all federal, state and local requirements for erosion control and pollution prevention, including all requirements set forth in the SWPPP. Requirements for erosion control and disposal of surface water during construction may include, but are not limited to, conducting a sampling, monitoring and reporting program, construction of sedimentation ponds, ditches, culverts, silt fences, straw wattles, pumping, draining and other measures required for the removal or exclusion of water from the excavations, stockpile, and other incidental work areas.

E. The CONTRACTOR QSP shall conduct the water quality monitoring, sampling, analysis, and reporting program required by the General Permit. This program includes a minimum of 3 samples per day at each discharge location, including characterization for a minimum, but not limited to, turbidity, pH, and suspended sediment concentrations. The sampling program will be governed by the project's risk level, LUP2, in accordance with the General Permit, the CONTRACTOR shall ensure that all storm water sample collection preservation and handling requirements are in accordance with the "Storm Water Sample Collection and Handling Instructions" and the General Permit.

F. The CONTRACTOR QSP shall ensure that photographs of the site are taken before, during, and after storm events during inspections, and submitted through the State Water Board's SMARTS website once every three rain events.

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G. The CONTRACTOR QSP shall conduct daily inspections and observations during working hours or in after hour emergency storm events and at least once each 24-hour period during extended storm events. CONTRACTOR QSP shall conduct visual inspections to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended and correct any deficiencies within a 24 hours time period.

H. The CONTRACTOR shall install a rain gauge on-site at an accessible and secure location with readings made during all rainfall events. When readings are unavailable, data from the closest rain gauges may be used for nearby sites for example as listed in these links (http://cdec.water.ca.gov/cgiprogs/staMeta?station_id=lso) or other data as approved by the ENGINEER.

I. The CONTRACTOR QSD shall develop and implement Rain Event Action Plans (REAP) designed to protect all exposed portions of their sites within 48 hours prior to any likely precipitation event in accordance with the General Permit.

J. CONTRACTOR will be fully responsible for compliance with, execution and implementation of the SWPPP and all related requirements, including any fines or penalties assessed for non-compliance of the General Permit.

K. All work included in this Section and necessary to comply with the General Permit is deemed incidental work and shall be included in CONTRACTOR's Total Bid Price.

1.02 RELATED SECTIONS

A. Document APPENDIX: Permits and Agreements to be obtained by the OWNER

B. Section 01060: Environmental Requirements

C. Section 01300: Submittal Requirements

D. Section 01500: Temporary Facilities

E. Section 02270: Erosion and Sedimentation Control

F. Section 02140: Dewatering

G. Section 02200: Earthwork

1.03 REFERENCES

A. National Pollution Discharge Elimination System (NPDES) General Permit [Order No. 2009-0009-DWQ] for Storm Water Discharges Associated with Construction and Land Disturbance Activities

B. Project Environmental Impact Report.

C. SWPPP, Section 01570/APPENDIX XX.

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1.04 REGULATORY REQUIREMENTS

A. The Clean Water Act (CWA), as amended in 1972, prohibits the discharge of pollutants into the waters of the United States from storm water. No debris, soil, ash, silt, sand, cement or concrete, or washing thereof, oil or petroleum products or other organic materials from CONTRACTOR's operation shall be allowed to enter or be placed where it may be washed by rainfall or runoff directly into creek or other waters of the United States.

B. As part of the permitting process for working within a creek or waterway, the OWNER will obtain a 404 permit from the U.S. Army Corps of Engineers, a 1602 Streambed Alteration Agreement from CDFG, and a 401 Certification from the Regional Water Quality Control Board, as applicable. See Document 01060 for Permits and Agreements to be obtained by the OWNER.

C. National Pollution Discharge Elimination System (NPDES) General Permit [Order No. 2009-0009-DWQ] for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit).

D. CONTRACTOR shall comply with all provisions of the SWPPP and comply with the Central Coast Water Board's Basin Plan water quality objectives.

E. Any governing provisions related to storm water pollution prevention, erosion and sediment control and water quality which are in conflict for this specification shall be guided by the terms of the General Permit, the Central Coast Water Board and the State Water Resources Control Board.

F. CONTRACTOR shall avoid or minimize impacts on the seasonal wetland and creeks:

1. CONTRACTOR shall stabilize exposed slopes and stream banks immediately on completion of construction/installation activities.

2. CONTRACTOR shall restore the banks of creeks in a manner that encourages vegetation to reestablish to its pre-project condition and reduces the effects of erosion on the drainage system.

G. Under no circumstances shall a creek or natural waterway be disturbed, filled in, dammed or altered.

H. CONTRACTOR shall report any serious sediment release immediately to the ENGINEER so that his appropriate public agencies are notified. CONTRACTOR will be responsible for payment of all fines, cleanup and restoration efforts related to such sediment release.

1.05 SWPPP CERTIFICATION REQUIREMENTS

A. Qualified SWPPP Developer: The CONTRACTOR shall provide a Qualified SWPPP Developer (QSD). The CONTRACTOR shall submit qualifications for the QSD including one of the following registrations or certifications, and appropriate experience, as required for and provide the required information:

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1. A California registered professional civil engineer, California registered professional geologist or engineering geologist, California registered landscape architect, professional hydrologist registered through the American Institute of Hydrology, Certified Professional in Erosion and Sediment Control (CPESC)TM registered through Enviro Cert International, Inc, Certified Professional in Storm Water Quality (CPSWQ) TM registered through Enviro Cert International, Inc, or professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies (NICET). Proof of QSD credentials shall be included in the SWPPP.

2. Effective September 1, 2011, the QSD shall have completed a State Water Board-sponsored or approved QSD training course as specified in the General Permit and shall include proof of approved coursework in the SWPPP.

3. The CONTRACTOR shall list the name and telephone number of the currently designated QSD in the SWPPP including a 24-hour emergency telephone number.

4. The CONTRACTOR shall ensure that the SWPPP is written and amended by a QSD, as needed, to address the specific circumstances for each construction site covered by this General Permit prior to commencement of construction activity for any stage.

B. Qualified SWPPP Practitioner: The CONTRACTOR shall provide a Qualified SWPPP Practitioner (QSP) to ensure that all elements of any SWPPP for each project will be implemented. The CONTRACTOR assigned QSP is a person responsible for non-storm water and storm water visual observations, sampling and analysis, and for ensuring full compliance with the permit and implementation of all elements of the SWPPP. The CONTRACTOR shall ensure that the QSP shall be either a QSD or have one of the following certifications and provide the required information:

1. A certified erosion, sediment and storm water inspector registered through Certified Professional in Erosion and Sediment Control, Inc. or certified inspector of sediment and erosion control registered through Certified Inspector of Sediment and Erosion Control, Inc. Proof of QSP credentials shall be included in the SWPPP.

2. Effective September 1, 2011, a QSP shall have completed a State Water Board-sponsored or approved QSP training course and shall include proof of approved coursework in the SWPPP.

3. The CONTRACTOR shall list the name and telephone number of the currently designated QSP in the SWPPP including a 24-hour emergency telephone number.

4. The CONTRACTOR shall ensure that the SWPPP include a list of names of all contractors, subcontractors, and individuals who will be directed by the QSP, and who is ultimately responsible, as assigned by the CONTRACTOR for implementation of the SWPPP. The SWPPP shall include a list contacts, telephone numbers and work addresses for all of these parties. Specific areas of responsibility of each subcontractor and 24-hour emergency contact numbers shall also be included.

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1.06 SWPPP AMENDMENTS, ANNUAL COMPLIANCE CERTIFICATION AND QUARTERLY REPORTING REQUIREMENTS

A. When changes in the SWPPP are required during the course of the Project, CONTRACTOR QSD shall prepare, certify and sign an amendment to the SWPPP and submit it to the ENGINEER for review and forwarding to the Central Coast Water Board. CONTRACTOR QSD shall prepare an amendment to the SWPPP when one or more of the following conditions exist:

1. No later than 30 days after execution of the Contract.

2. Whenever there is a change in construction or operations which may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system.

3. Annually, prior to the defined rainy season, if required by the Project's Contract Documents or when deemed necessary by the ENGINEER or governing resource agency.

B. CONTRACTOR shall include the following information with each proposed amendment to the SWPPP:

1. Describe who requested the proposed amendment.

2. Describe the location of the proposed change.

3. Describe reason for change.

4. Describe the new BMP proposed.

C. All proposed amendments to the SWPPP shall be submitted electronically to the ENGINEER in accordance with Section 01300. All proposed amendments shall include a completed SWPPP Certification and Approval form signed by CONTRACTOR and the CONTRACTOR’s QSD. CONTRACTOR shall include a listing of the date of initial preparation and the date of each amendment in the SWPPP.

D. CONTRACTOR shall insert all accepted amendments into the CONTRACTOR's SWPPP. CONTRACTOR shall also record all accepted amendments in the SWPPP amendment log.

E. In no event will CONTRACTOR be entitled to increases in the Contract Sum or the Contract Time for SWPPP amendments and resulting Work caused by CONTRACTOR's failure to comply with the General Permit, the SWPPP, or the requirements set forth in this Specification.

F. CONTRACTOR QSD shall annually report and certify that the site is in compliance with the requirements of the General Permit. The CONTRACTOR will be required to provide information and submit an annual report no later than August 1 of each year using the Storm water Multi-Application Reporting and Tracking System (SMARTS). The Annual Report must include a summary and evaluation of all sampling and analysis results, original laboratory reports, chain of custody forms, a summary of all corrective actions taken during

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the compliance year, and identification of any compliance activities or corrective actions that were not. The CONTRACTOR is required to retain paper or electronic copies of all records required by the project's General Permit for a period of at least three years from the date generated or the date submitted to the State Water Board or Central Coast Water Board. The CONTRACTOR must retain records for a period beyond three years as directed by Regional Water Board.

G. The CONTRACTOR shall perform Quarterly Reporting requirements in accordance with the General Permit.

H. The CONTRACTOR will not be entitled to increases in the Contract Price or the Contract Time for SWPPP amendments and/or work caused by CONTRACTOR's failure to comply with the General Permit, the SWPPP, or the requirements set forth in this Specification.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use certified, weed free, natural/biodegradable imported erosion control materials (e.g. straw wattles, hay bales).

B. Fiber or sediment roll consisting of biodegradable (plastic monofilament netting shall not be allowed because of potential entanglements of wildlife in these materials) fibers.

C. Erosion control mat (plastic monofilament netting shall not be allowed because of potential entanglements of wildlife in these materials).

D. Filter fabric, filter mesh and filter bags

E. General use of more environmentally safe, biodegradable materials on construction sites to minimize the potential risk to water quality.

PART 3 EXECUTION

3.01 EROSION AND STORM WATER CONTROL, HOUSEKEEPING, CLEAN UP AND DISPOSAL

A. The CONTRACTOR shall implement the SWPPP, amend and maintain the SWPPP document to be made available at the Project Site at all times. The SWPPP shall be made available to the OWNER and the Central Coast Water Board during normal working hours and on a 24-hour basis during emergencies or non-compliances. The CONTRACTOR shall abide by all SWPPP requirements contained therein.

B. CONTRACTOR shall arrange to have sediment catch basins cleaned on a routine basis so that sediment does not enter receiving bodies of water, storm drains and reservoirs.

C. The CONTRACTOR shall remove all erosion and sediment control devices and material, equipment, and temporary structures used for the control and disposal of storm water from the Site once work is completed.

END OF SECTION

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SECTION 01571

TRAFFIC CONTROL

PART 1 GENERAL

1.01 REQUIREMENTS

A. The CONTRACTOR shall provide all traffic control required to construct the Work, to ensure public safety, and to minimize traffic impacts and delays. Traffic control shall be as required in the California Manual on Uniform Traffic Control Devices, 2012 Edition (CA MUTCD), the 2010 State Standard Specifications (Caltrans) Section 7, Section 12, and other sections as well as with Caltrans traffic control manuals and plans, as applicable.

B. CONTRACTOR shall conform with all requirements of these provisions, including but not limited to, preparation of Traffic Control Plans; construction and maintenance of temporary pavement (if any); placement of signs, barricades, and safety devices; providing flag person, providing and placement of temporary striping, traffic cones, and other channelizing devices; and all activities to conform to requirements of the State Standard Specifications and these specifications.

C. The CONTRACTOR shall be responsible for the safety of vehicular traffic within the Project limits and on the approaches to the Project. The CONTRACTOR shall be responsible for the safety of pedestrians, cyclists, and animals within the Project limits.

1.02 TRAFFIC CONTROL PLAN

A. The traffic control plans and specifications included in these Contract Documents are guidelines for the CONTRACTOR. The CONTRACTOR shall prepare and submit its own Traffic Control Plan for review and approval by the ENGINEER prior to construction.

B. If the CONTRACTOR's Traffic Control Plan deviates from the Contract Documents' traffic control plans and specifications and/or the CA MUTCD or 2010 State Standard Plans and Specifications, traffic control manuals and plans, the CONTRACTOR's Traffic Control Plan shall be prepared by a California Registered Civil Engineer.

C. The CONTRACTOR shall submit 8 copies of its Traffic Control Plan to the ENGINEER for review a minimum of 14 days prior to construction.

D. The ENGINEER shall observe the execution of the approved Traffic Control Plan during construction and may request changes as field conditions warrant. Said changes shall be performed at no additional cost/time to the Contract.

1.03 STREET DESIGNATIONS

A. The streets within the Project are designated as arterial, collector, and minor as follows:

1. Arterial Streets

    a. Los Osos Valley Road

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b. South Bay Boulevard

2. Collector Streets

a. Nipomo Avenue

b. Binscarth Road

c. Ramona Avenue

d. El Moro Avenue (between 2nd Street and 12th Street)

e. Santa Ysabel Avenue

f. Pecho Road

g. Pecho Valley Road

h. Pine Avenue

i. Bayview Heights Drive

j. 2nd Street (between El Moro and Santa Ysabel Ave)

k. 7th Street

l. 9th Street (between Los Osos Valley Road and Ramona Ave)

m. 11th Street

3. Minor Streets

a. All remaining streets not designated as arterial streets or collector streets.

B. Business Street Segments. In addition to the above designations, the following street segments shall be identified as business street segments:

1. Los Osos Valley Road between Palisades Avenue and South Bay Boulevard.

2. Los Olivos Avenue between 9th Street and Fairchild Way.

3. Santa Ynez Avenue between 9th Street and 11th Street.

4. 9th Street between Los Osos Valley Road and Santa Ynez Avenue.

5. 10th Street between Los Osos Valley Road and Santa Ynez Avenue.

6. 2nd Street between El Moro Avenue and Santa Ysabel.

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1.04 STREET RESTRICTIONS

A. Arterial Streets

1. Two lanes of through traffic shall be maintained at all times in all arterial streets.

2. Only one construction activity at a single location shall be allowed on all arterial streets at any given time.

B. Collector Streets

1. Two lanes of through traffic, or a single lane of through traffic with flagpersons, shall be maintained at all times on collector streets.

2. Only one construction activity at a single location shall be allowed in one east-west collector street and in one north-south collector street at any given time.

C. Minor Streets

1. A minor street segment, limited to the distance between two adjacent street intersections, may be closed to through traffic for the Area construction of various pipelines during working hours.

2. The CONTRACTOR shall maintain at least one minimum 11-feet wide lane for local traffic to accommodate residents, visitors, and deliveries to properties in the subject segment and for emergency vehicles during the working hours.

D. Business Street Segments

1. The CONTRACTOR shall maintain vehicular access to business driveways and parking areas for business customers at all times.

2. Where compliance with the above is not possible, and with the ENGINEER's approval, access may be interrupted for a period not to exceed four hours per day for a maximum of two days per business.

3. The CONTRACTOR shall provide temporary signs to advise potential customers that the subject business remains open during construction and indicates the location of the alternative access.

E. Street Intersections

1. Major street intersection traffic control shall be performed in accordance with the specific traffic control plans included in the Contract Drawings. The CONTRACTOR shall use these drawings as the basis for developing its own staged traffic control plans.

2. All other street intersection traffic control shall be performed in accordance with the traffic control typical details included in the Contract Drawings.

F. Traffic Restoration. All streets shall be restored through traffic at the close of working hours by either backfilling and compacting the excavation (including providing temporary or permanent

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pavement) and/or covering with steel plates, as specified herein. Likewise, access shall be restored to all residence and business driveways at the end of each day.

1.05 CONSRUCTION LIMITATIONS

A. No equipment or material shall be parked or stored within any traffic lanes or within 8 feet from the edge of traveled way at any time of day or night, including holidays and weekends, without an approved lane or road closure unless otherwise approved by the County of San Luis Obispo. Road closures and detours will be authorized only in special circumstances and must be approved by the County of San Luis Obispo a minimum of two weeks in advance.

B. Working Hours

1. Working hours for arterial streets shall be limited from 8:30 A.M. until 3:00 P.M., Monday through Friday. With a minimum of 48 hours advance notification by the CONTRACTOR, Saturday work may be approved by the ENGINEER on a case by case basis. With a minimum of two weeks advance notification by the CONTRACTOR, night work on arterial streets or weekend work may be approved by the ENGINEER on a case by case basis.

2. Working hours for collector streets shall be limited from 7:00 A.M. until 6:00 P.M., Monday through Friday.

3. Construction activities within one block of any school during student drop-off or pick-up hours, which are generally 7:30 A.M. until 8:30 A.M. and 2:30 P.M. until 3:30 P.M. respectively, Monday through Friday, shall be precluded.

C. No activities that interfere with public traffic during the holiday season (defined as the four-day Thanksgiving weekend and December 18 through January 1) shall be conducted on the following streets:

1. Los Osos Valley Road

2. 9th Street

3. 10th Street

4. 11th Street

5. 2nd Street between El Moro Avenue and Santa Ysabel Avenue

6. South Bay Boulevard.

D. Either Los Osos Valley Road between South Bay Boulevard and Turri Road or South Bay Boulevard north of Los Osos Valley Road shall be open, with no traffic restrictions, at all times.

E. Lane closures on Los Osos Valley Road and South Bay Boulevard are not permitted on Friday afternoons preceding three-day Federal Holiday weekends.

F. No lane closures shall be permitted on Los Osos Valley Road from 7:00 am to 8:30 am, or from 3:00 pm to 6:00 pm on any weekday.

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G. No lane closures shall be permitted on South Bay Boulevard from 7:00 am to 8:30 am, or from 3:00 pm to 6:00 pm on any weekday.

H. No lane closures shall be permitted on Santa Ysabel Avenue from 7:00 am to 8:30 am, or from 5:00 pm to 6:00 pm on any weekday.

I. Traffic Signal Coordination and Detection: When work shall be done within 300 feet of any intersection with an existing traffic signal, the CONTRACTOR shall comply with the following conditions.

1. Roadway Approaches with Video Detections Systems – The CONTRACTOR shall provide in the Traffic Control Plan the specific lane dimensions and configurations for the roadway during various construction phases to the ENGINEER and alert the ENGINEER a minimum of ten working days prior to commencement of work. Engineer will then coordinate review with the County Traffic Engineer to assess impacts for traffic detection at the intersection. The County Traffic Engineer will then adjust the video detection system to apply to the approved Traffic Control Plan and only after this is coordinated may work commence within 300 feet of the intersection. Any alterations to the approved Traffic Control Plan or other agreed phases of work will need to be processed as indicated to account for intersection video detection.

2. Roadway Approaches without Video Detection Systems – The CONTRACTOR shall be aware that all other approaches to existing traffic signals have in pavement loop detection systems that will need to remain in operation during the construction operations. Submitted Traffic Control Plans will need to indicate whether these systems will be disturbed during construction. Any disruption of the loop detectors shall be indicated to the ENGINEER at least ten working days prior to commencement of work. If the system is removed during construction, the CONTRACTOR shall provide a temporary detection system for the roadway approach which will be operational at all times during the intersection construction.

   a. A temporary detection system shall consist of the placement of preformed loop detection, as described in this specification, and have the induction loops connected to the traffic signal control system. The preformed loop detection loop shall be anchored into place through grinding existing pavement and repaving the road surface to secure the loop detection system. The CONTRACTOR shall be responsible for the continuous operation of the diction system during the construction phase.

   b. The CONTRACTOR may propose alternative methods for signal detection to the ENGINEER at least fifteen working days prior to commencing work. ENGINEER will review alternatives with the County Traffic Engineer. No system shall be deployed without the consent of the ENGINEER.

   c. At the conclusion of the project, the CONTRACTOR shall be responsible for replacement of the original loop detection system to its pre-construction layout and operation. Replacement loop detection system shall comply with the requirements of the CA MUTCD and 2010 State Standard Plans and Specification. The CONTRACTOR may leave the temporary preformed loop system in place if it meets the intent of the pre-construction condition and is approved by the ENGINEER.

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1.06 ACCESS

A. The CONTRACTOR shall provide emergency services access to all residences and businesses at all times. The CONTRACTOR shall have an adequate number of steel traffic plates and equipment to place the plates or shall backfill the trench and make it passable for emergency vehicles.

B. The CONTRACTOR shall be responsible for maintaining local property access and access to existing public cross-streets within the limits of this Contract. CONTRACTOR shall perform road closures on half block increments or alternating streets.

C. The CONTRACTOR shall contact the South Bay Fire Department that maintains a list of disabled persons in Los Osos and shall incorporate a plan to accommodate their special access needs.

1.07 NOTIFICATION

A. The CONTRACTOR shall provide written notice at least three working days in advance of construction work to South Bay Fire Department, County Sheriff Department, California Highway Patrol, and Regional Transit (if applicable) and other emergency services including ambulance/paramedics.

B. The CONTRACTOR shall provide written notification to residences and businesses a minimum of 72 hours in advance of performing any construction work. Notifications shall be by written notice to the resident placed on or near the building entrance or the property access point to be closed. Refer to Section 01566 – Public Information Program for additional requirements.

C. The CONTRACTOR shall provide, place and maintain all construction signage in accordance with the Caltrans standard specifications and plans. The CONTRACTOR shall also provide portable electronic changeable message signs at the beginning and end of each pipeline heading/work area to inform the community of the anticipated work duration, that traffic is subject to delays and other pertinent information. The CONTRACTOR's Public Liaison shall coordinate the foregoing with the OWNER's Public Information Program (PIP) Consultant.

D. General advisory signs shall be posted 10 days in advance of construction activities.

E. The CONTRACTOR shall provide 72 hour advance notice with a CMS of lane closures on arterial roads.

F. The CONTRACTOR shall notify all public agencies (post offices, sheriff, California Highway Patrol, ambulance services, mass transit, trash/sanitation, etc.) of all road closures at least three working days in advance of each closure.

G. The CONTRACTOR shall notify residents of Sunny Oaks Mobile Home Park at least thirty days in advance by U.S. mail of any construction activities at the Sunny Oaks Pump Station. Construction activities shall be conducted in a manner to maintain driveway ingress and egress to the Mobile Home Park at all times. The CONTRACTORS's access to the site shall be developed from Los Osos Valley Road and shall not use the Mobile Home Park driveway. The CONTRACTOR may temporarily remove the Sunny Oaks Mobile Home Park entrance sign and associated lighting for the duration of construction activities. If removed, the sign and lighting shall be restored to original condition after construction activities are completed.

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H. The CONTRACTOR shall notify adjoining property owner, Dr. Knighton, 2239 Bayview Heights Dr., Los Osos, CA 93402, at least thirty days in advance by U.S. mail of any construction activities at the Mountain View Avenue Standby Power Facility site. The CONTRACTOR shall complete all work in the temporary construction easement within a six month period. All fencing, landscaping, and irrigation improvements within the temporary and permanent easement shall be stored to original condition. The description of the temporary and permanent easement will be furnished by the ENGINEER by request of the CONTRACTOR.

PART 2 – PRODUCTS

2.01 TEMPORARY CRASH CUSHION MODULE

A. The CONTRACTOR shall furnish, install, and maintain sand filled temporary crash cushion modules in groupings or arrays at each location shown the Drawings, as specified herein, or where designated by the ENGINEER. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in conformance with the detail shown on the Drawings and these Specifications and/or the 2010 State Standard Plans and Specifications.

B. Whenever the work or the CONTRACTOR's operations established a fixed obstacle, the exposed fixed obstacle shall be protected with a and filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

C. Sand filled temporary crash cushions shall be maintained in lace at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 15 feet or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the ENGINEER, sand billed temporary crash cushions shall be removed from the site of the work.

D. Sand filled temporary crash cushion modules shall be from the Caltrans Pre-Qualified Products List available online at http://www.dot.ca.gov/hq/esc/approved_products_list/pdf/highway_safety_features.pdf .:

E. Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard color, as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new, but must be manufactured after March 31, 1997. Good used undamaged modules conforming to color and quality of the types specified herein may be used. If used Fitch modules requiring a seal are furnished, the top edge of the shall be securely fastened to the wall of the module by a continuous strip heavy duty tape.

F. Modules shall be filled with sand in conformance with the directions, and to the sand capacity in pounds for each module shown on the Drawings. Sand for filling the modules shall be clean washed concrete sand commercial quality. At the time of placing in the modules, the sand shall contain no more than 7 percent water as determined by California Test 226.

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G. A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the Drawings, when the closest point of the crash cushion array is within 12 feet of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods determined by the ENGINEER.

H. At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the CONTRACTOR and shall be removed from the site of the work, Temporary crash cushion modules shall not be installed in the permanent work,

I. Temporary crash cushion modules placed in conformance with Section 7 and 12 of the 2010State Standard Specifications will not be measured nor paid for.

2.02 FLASHING ARROW BOARDS

A. All trailer-mounted flashing arrow boards shall meet or exceed the physical and operational requirement of the "California Manual on Uniform Traffic Control Devices".

B. The unit shall have been evaluated by the NTPEP.

C. The display housing shall meet the minimum size requirements of a Type C panel with a 15- or 25-lamp configuration.

2.03 PREFORMED LOOP DETECTION

A. Preformed inductive loops shall be the type shown as required under this specification and detailed in the approved Traffic Control Plan.

B. The loop shall be 6-foot square at a minimum. The loop shall consist of 4 turns of No. 16, or larger, wire with Type THWN or TFFN insulation.

C. The loop wires shall be encased in 3/8 inch, minimum, Schedule 40 or Schedule 80 PVC or polypropylene conduit. The conduit shall be sealed to prevent the entrance of water and the movement of wires within the conduit.

D. The loop wires from the preformed loop to the adjacent pull box shall be twisted together into a pair (at least 2 turns per foot) and encased in Schedule 40 or Schedule 80 PVC or polypropylene conduit between the preformed loop and the adjacent pull box or detector handhole. The lead-in conduit shall be sealed to prevent the entrance of water at the pull box or handhole end.

E. In existing pavement, preformed loop installation shall conform to the following:

1. Preformed loops and lead-in conduits shall be placed in slots, 1-1/4 inches, minimum width, cut into the existing pavement. The top of the conduit shall be 2 inches, minimum, below the top of pavement.

2. Slots in hot mix asphalt pavement shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant.

F. ENGINEER shall approve the manufacture of the Preformed Loop prior to installation.

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PART 3 – EXECUTION

3.01 STREET USE

A. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the Work. The CONTRACTOR shall conduct its operations to prevent interference with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas.

B. No street shall be closed to the public without first obtaining permission of the ENGINEER.

C. The CONTRACTOR shall maintain two 10-foot or one 11-foot wide traffic lane(s) at all times. For single lane traffic provide signage and flagpersons at all times.

3.02 PROTECTION

A. During the CONTRACTOR's operations that require aerial work over vehicle lanes, the CONTRACTOR shall close such lanes to public traffic. Lane closure shall be subject to the restrictions of this Section. The CONTRACTOR may use flagpersons if the work is intermittent.

B. All street traffic plates shall be provided with raised weld bead or non-skid coating. Plates placed on arterial roads shall be recessed to be flush with top of pavement, all plates on other streets shall be pinned, wedged, or otherwise secured. Provide cold or hot mix pavement around the edges of the plate for smooth passage of traffic.

C. Toe boards shall be provided to retain excavated material if required by the ENGINEER or the OWNER.

D. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times.

E. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, drain inlets, and other drainage facilities.

F. The CONTRACTOR shall install and maintain temporary Type K railing and/or fencing around the construction areas.

G. At the conclusion of each work day, all paved traveled-way surfaces shall be restored to an all-weather, traversable condition. There shall not be a drop-off along the edge of traveled way greater than 0.15-feet. "Low Shoulder" signs shall be placed along the traveled way where there is any drop-off. Drop-offs greater than 0.15-feet shall require either:

1. Backfilling the drop-off to a minimum 4:1 slope.

2. Providing appropriate steel plates over excavation.

3. Providing temporary concrete railing along the work zone in conformance with the 2010 State Standard Plans and Specifications.

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H. The CONTRACTOR shall provide temporary crash cushion modules for end treatments as shown on the Drawings in accordance with this Specification.

I. All flaggers shall hold current certifications. As defined under Cal OSHA Construction Safety Order Section 1599, all flaggers on the roadway shall be trained by qualified and experienced personnel to the aspects noted in Section 1599. The CONTRACTOR shall use trained personnel only. All workers within the roadway shall wear Type 2 CAL-OSHA high-visibility vests.

3.03 TRAFFIC CONTROL

A. For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, place and maintain all necessary barricades, traffic cones, warning signs, lights and other safety devices in accordance with the requirements of the CONTRACTOR's Traffic Control Plan and "California Manual on Uniform Traffic Control Devices" or the Standard Plans.

B. Construction area signs shall be furnished, installed, maintained and removed when no longer required in accordance with Section 12 of the State Standard Specifications.

C. Prior to initiating work, the CONTRACTOR shall install all required traffic control devices. In addition to these signs, the CONTRACTOR shall install barricades with steady burn flashers at 200-feet O.C. minimum and post-delineators at 50-feet O.C. minimum.

D. Attention is directed to Section 7-1.08 "Public Convenience", Section 7-1.09 "Public Safety", Section 12-3.04 "Portable Delineators" of the State Standard Specifications.

E. The CONTRACTOR shall cooperate with local authorities relative to handling traffic through the area and shall make arrangements relative to keeping the work area clear of parked vehicles.

F. All trenches shall be protected during the hours work is not in progress so that no person or animal could fall into or be injured by an open trench.

G. The CONTRACTOR shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night and all lights shall be turned on from sunset until sunrise. The CONTRACTOR shall station such guards or flagpersons and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of CAL-OSHA and Sub-part B, Part 1926, of the OSHA Safety and Health Standards for Construction.

H. Traffic control devices shall be placed and maintained at all times during and after working hours of each day until the next phase of construction traffic control is being placed. At the end of the construction, all signing and striping shall be restored to the existing conditions, except that existing thermoplastic striping and payment markings shall be replaced with painted striping and markings. The roadway is defined as "that area of the highway used for vehicular, pedestrian, and bicycle travel".

3.04 PEDESTRIAN REQUIREMENTS

A. The CONTRACTOR shall maintain pedestrian access at all times. Where sidewalks or shoulder areas are closed by construction, an alternate route shall be provided. The alternate route shall

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consist of a smooth surface a minimum of 48 inches in clear width. The surface may consist of asphalt concrete, aggregate base, or compacted earth. Signs and barricades shall be installed at the limit of construction to direct pedestrians to the alternate route.

B. Fences or railings shall be placed adjacent to areas utilized by pedestrians when a vertical difference in excess of 6 inches exists between the elevation of the pedestrian walkway and the elevation any excavation adjacent to the walkway.

C. The CONTRACTOR shall provide access to bus stops at all times or provide temporary bus stop location and signage. When access to existing bus stops is not practical due to construction activities, the CONTRACTOR shall provide a nearby temporary bus stop location until the existing location is accessible. The CONTRACTOR shall verify location of existing bus stops, confirm the current bus schedule, and coordinate the location of temporary bus stop location with the Transit Authority and School District. The CONTRACTOR shall provide signage at the existing bus stop and at the temporary bus stop.

D. The CONTRACTOR shall not close a bike lane unless approved by the ENGINEER or Public Works Director.

3.05 DRIVEWAY ACCESS

A. Except as provided below, the CONTRACTOR shall maintain access to all driveways. All materials and equipment shall be stored in such a manner as to not block access or egress to any driveway.

B. The CONTRACTOR shall notify the property owner or occupant (if not property owner-occupied) of the pending closure of any driveway for more than one 8-hour work day at least three working days in advance of such closure. The CONTRACTOR shall minimize the inconvenience and the time period that the driveway will be closed. The CONTRACTOR will fully explain to the property owner or occupant the start and duration of the closure.

C. Arrangement for access to the construction site over private property shall be mutually agreed upon by the CONTRACTOR and the property owner before start of construction. CONTRACTOR shall provide the property owner with a copy of the written arrangement or agreement.

3.06 PAVEMENT RESTORATION

A. The CONTRACTOR shall provide and maintain roadway until permanent pavement is installed. All trench excavation within improved areas shall be restored in accordance with the pavement restoration details shown in the Contract Drawings and Section02460 – Full Depth Restoration, Section 02576 – Pavement Repair and Resurfacing, and Section 02577 – Hot Mix Asphalt Pavement. Pavement shall be installed within 45 days of initiating excavation.

B. Temporary pavement or all-weather surface is limited to a maximum of 45 days prior to final pavement repair..

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3.07 COORDINATION WITH PROJECT LIAISON

A. It is understood and agreed that proper traffic control is necessary to minimize public impacts and to ensure their safety. The CONTRACTOR shall on a daily basis communicate all traffic control notifications to the ENGINEER including necessary changes in anticipated traffic control measures.

END OF SECTION

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SECTION 01614

WIND DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Wind design criteria for the following:

1. Equipment located around the project site, associated with the Work.

B. Related Sections:

1. Section 01300 – Submittals.

1.02 REFERENCES

A. California Building Standards Commission (CBSC):

1. California Building Code (CBC) – 2010 Edition.

B. American Society of Civil Engineers (ASCE):

1. SEI/ASCE 7, Minimum Design Loads for Buildings and Other Structures – 2005 Edition.

C. American Concrete Institute (ACI):

1. ACI 318, Building Code Requirements for Structural Concrete and Commentary.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Design in accordance with the requirements of the CBC and ASCE 7.

1. Fastest Mile Wind Speed (3 second gust): 85 miles per hour.

2. Wind Exposure: D.

3. Importance Factor: 1.15.

4. Use cast-in anchors wherever practical for resisting wind forces on components. Post-installed anchors, where used, shall have current ICC Evaluation Service Reports.

a. Determine capacities for cast-in-place and post-installed anchors in accordance with ACI 318, Appendix D and any appropriate ICC

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Evaluation Service Reports. Capacities shall account for provided anchor spacing and edge distance.

b. ICC Evaluation Service Reports shall indicate the anchors are adequate to resist seismic loads in cracked concrete.

c. Shallow anchors (embedment length/diameter <8) shall not be allowed unless approved in writing by the ENGINEER.

d. Post-installed anchor embedment shall not be less than the manufacturer's recommended minimum embedment and with consideration of slab thickness.

e. Anchor design shall be controlled by yielding of the steel anchor as opposed to shear failure of the concrete whenever practical.

5. For attachment of items to concrete, or masonry construction use only anchors, bolts or other commonly used fasteners which rely on direct bearing or tension developed by properly designed bearing plates for resisting wind loads.

a. Fasteners shall be designed using only commonly accepted design methodologies, current design codes, and ICC Evaluation Service Reports, where available.

1.04 SUBMITTALS

A. All submittals shall be in accordance with Section 01300.

B. Calculations: Submit anchorage design calculations for all equipment and other wind resisting systems not completely detailed in the Drawings. Calculations shall be prepared and sealed by a Professional civil or structural engineer registered in the State of California.

PART 2 PRODUCTS

2.01 ANCHORS – GENERAL

A. For components weighing 400 pounds or more using cast-in-place anchors, the minimum anchor size shall be 5/8-inch with minimum 5-inch embedment and as required by submitted seismic calculations.

B. For components weighing 400 pounds or more using post-installed anchors, the minimum anchor size shall be as required by submitted seismic anchorage calculations.

C. For all components weighing less than 400 pounds, the minimum anchor size shall be 3/8-inch diameter with minimum 3-inch embedment.

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D. All anchors securing components to be grouted shall be furnished with leveling nuts, the faces of which shall be tightened against flat surfaces to not less than 10 percent of the bolt's safe tensile stress.

E. See Section 05500 for anchor products.

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01615

SEISMIC DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes seismic requirements for all components to be furnished under this contract.

B. Design anchorage for components and install them in conformance with the seismic requirements contained in the California Building Code, its referenced standards, and as amended in this Section. Components shall be restrained such that the component forces are transferred to the structure.

C. A continuous load path of sufficient strength and stiffness between the component and structure shall be demonstrated through analysis.

D. Components associated with the Work, include but are not limited to:

1. Mechanical equipment

2. Electrical equipment

E. Perform seismic anchorage calculations for all components except those with an operating weight less than 400 pounds and mounted 4 ft or less above floor level. However, calculation-exempted components shall still meet any anchorage requirements set forth in ASCE 7 or these Specifications.

1.02 REFERENCES

A. California Building Standards Commission:

1. California Building Code – 2010 Edition

B. American Society of Civil Engineers (ASCE):

1. SEI/ASCE 7, Minimum Design Loads for Buildings and Other Structures – 2005 Edition

C. American Concrete Institute (ACI):

1. ACI 318, Building Code Requirements for Structural Concrete and Commentary – 2008 Edition

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1.03 SYSTEM DESCRIPTION

A. Component seismic design parameters:

1. Seismic Design Category: D

2. Importance Factor: $I_p = 1.5$

3. Maximum design spectral response acceleration factors:

a. $S_{DS} = 0.984$

b. $S_{D1} = 0.894$

4. Apply horizontal and vertical seismic forces in accordance with ASCE 7 Section 13.3.

5. Apply nonstructural component amplification and response modification factors (a_p and R_p) using ASCE 7-05 Tables 13.5-1 and 13.6.1-1.

B. Anchorage:

Use cast-in anchors wherever practical for resisting seismic forces on components. Post-installed anchors, where used, shall have current ICC Evaluation Service Reports.

1. Determine capacities for cast-in-place and post-installed anchors in accordance with ACI 318, Appendix D and any appropriate ICC Evaluation Service Reports. Capacities shall account for provided anchor spacing and edge distance.

2. ICC Evaluation Service Reports shall indicate the anchors are adequate to resist seismic loads in cracked concrete.

3. Shallow anchors (embedment length/diameter < 8) shall not be allowed unless approved in writing by the ENGINEER.

4. Post-installed anchor embedment shall not be less than the manufacturer's recommended minimum embedment and with consideration of slab thickness.

5. Anchor design shall be controlled by yielding of the steel anchor as opposed to shear failure of the concrete whenever practical.

C. Do not use frictional resistance produced by the effects of gravity to resist seismic forces.

1.04 SUBMITTALS

A. Calculations: Submit seismic restraint calculations for all components identified in this Specification. Calculations shall be prepared and sealed by a Professional Civil or Structural Engineer registered in the State of California. The anchorage selection in the

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calculations shall reflect what is shown in the appropriate component shop drawing. See Section 3.02 of this Specification for additional requirements.

B. Seismic Qualification Certification: Submit certification by the supplier that the mechanical or electrical components identified in this Specification will remain operable following the design level earthquake in accordance with ASCE 7 Section 13.2.2. Such certification shall be based on approved shake table testing or experience data. Seismic qualification certification need not be submitted for pre-qualified structurally rugged equipment as listed in Table 01615-1:

Table 01615-1 Pre-qualified structurally rugged equipment
Valves
Generators
Horizontal and vertical pumps
Hydraulic and pneumatic operators
Motor operators
Compressors
Transformers with anchored internal coils
Air handling equipment and fans (without internal or external vibration isolators)
Low and medium voltage switchgear (<13.8 kV)
Instrumentation cabinets
Distribution panels
Battery chargers
Motor control centers
Instrument racks
Batteries
Inverters

C. In addition to the above requirements, where equipment with complex component structural systems (i.e., systems involving components with multiple degrees of freedom and higher order modes of vibration) contains low weight components (e.g., circuit boards, relays, or solenoids), an empirical evaluation for such low weight components shall be certified in writing by a Professional Civil or Structural Engineer registered in the State of California, to satisfy the functionality requirements set forth above. At a minimum, such certification shall be based on an empirical evaluation of direct on-site observation by such equipment as installed, including physical “hand” shake and pull tests, and general calculations (if required to verify capacity overload) necessary to satisfy such engineer of compliance with the above functionality requirements. Certification shall be in the form of a letter from the registered engineer incorporating the nature of the observations and/or calculations performed including the registered engineer’s seal.

1.05 QUALITY ASSURANCE

A. Testing and special inspection of anchorage installation shall be performed in accordance with Chapter 17 of the CBC.

B. Testing and special inspection will be paid for by the OWNER.

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C. The Special Inspector shall keep a record of inspections and furnish inspection reports to the OWNER and ENGINEER. The reports shall indicate that work inspected was performed in conformance with the Contract Documents. Discrepancies shall be brought to the immediate attention of the CONTRACTOR for correction. Discrepancies not corrected shall be brought to the attention of the ENGINEER. A final report of inspections documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted periodically at a frequency agreed upon at the start of work.

D. Test for new Post-Installed Anchoring System:

1. When directed by the Engineer, anchors shall be tested as follows:

a. The testing of post-installed anchors and dowels shall be performed in the presence of the Special Inspector, and a report of the test results shall be submitted to the Engineer. The Special Inspector shall randomly select anchors to be tested. Testing will be paid for by the OWNER.

b. Test minimum 50 percent of bolts and dowels in a group.

c. Anchors and dowels shall be tested to 125% of their tension design strength (as defined in ACI 318 Section D.3.3.3 with strength reduction factors as defined in ACI 318 Section D.4.4) and the relevant International Code Council - Evaluation Service Report (ICC-ESR). Tension test load will vary based on each anchor's or dowel's product data, embedment, and edge distance. Tension test load need not exceed 80% of the nominal yield strength of the anchor element (0.8 times A_{se} times f_{ya}).

d. If any anchor or dowel fails in testing, all anchors or dowels of the same type (i.e., installed by the same trade but not previously tested) shall be tested until twenty (20) consecutive anchors pass. Initial test frequency may then be resumed.

e. Test new anchors and dowels by any method approved by the Engineer that will effectively measure the testing tension - such as direct pull with a hydraulic jack or calibrated spring-loaded devices. Test load shall be maintained for a minimum of 15 seconds and shall exhibit no discernable movement during the test (including loosening of the washer under the nut).

f. Failed anchors and dowels shall be replaced as directed by the Engineer.

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PART 2 PRODUCTS

2.01 ANCHORS – GENERAL

A. For components weighing 400 pounds or more using cast-in-place anchors, the minimum anchor size shall be 5/8-inch with minimum 5-inch embedment and as required by submitted seismic calculations.

B. For components weighing 400 pounds or more using post-installed anchors, the minimum anchor size shall be as required by submitted seismic anchorage calculations.

C. For all components weighing less than 400 pounds, the minimum anchor size shall be 3/8-inch diameter with minimum 3-inch embedment.

D. All anchors securing components to be grouted shall be furnished with leveling nuts, the faces of which shall be tightened against flat surfaces to not less than 10 percent of the bolt's safe tensile stress.

E. See Section 05500 for anchor products.

PART 3 EXECUTION

3.01 GENERAL

A. All components designed to be fixed in position shall be securely fastened in place in conformance with the 2010 CBC, ASCE 7-05, and as specified in this section. For other components the component manufacturer shall provide recommended anchorage information to the CONTRACTOR for use in component installation.

3.02 STRUCTURAL INTEGRITY AND ANCHORAGE

A. It shall be the responsibility of the component manufacturer/supplier to provide the engineering anchorage calculations and figures to the CONTRACTOR for submission to the ENGINEER. As a minimum, the component manufacturer/supplier shall determine the supplier, type, number, dimensions, material, location, embedment, and installation conditions of all anchors to be installed in accordance with these Specifications and Drawings.

B. Engineering anchorage calculations and figures shall be prepared and sealed by a Professional Civil or Structural Engineer registered in the State of California. Calculations shall include the following steps as a minimum:

1. Indicate parameters used to determine demand lateral loads including a_p, R_p, z, h_r, S_{DS}, importance factor, operating weight and component center-of-mass.

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2. Determine the component shear and moment due to application of the seismic force at the component's centroid.

3. Determine the shear and tension forces at each anchor due to application of the seismic force at the component’s centroid.

4. Where anchoring to concrete, determine anchor capacities in accordance with ACI 318 Appendix D, any applicable ICC Evaluation Service Reports, while accounting for concrete compressive strength, thickness of member, edge distance, and anchor spacing.

5. Where anchoring to masonry, determine anchor capacities in accordance with ACI 530, and any applicable ICC Evaluation Service Reports, while accounting for masonry compressive strength, thickness of wall, edge distance, and anchor spacing.

6. Selection of anchors based upon the maximum shear and tension forces calculated above.

7. Include details indicating number of bolts, materials, diameter, total length, embedded length, required edge distance, and bolt dimensions. The embedded length of bolts shall be suitable to develop the ultimate tensile capacity of the anchorage for ductile failure.

8. Where vibration isolation devices are used, include manufacturer’s product information indicating class and type. Indicate load ratings as published in manufacturer’s data or shop drawings. Indicate proper orientation of devices in plan.

C. Anchors shall be designed to resist the lateral seismic force in at least two orthogonal directions in combination with component service loads, as appropriate.

D. Include vertical seismic effects in accordance with ASCE 7 Section 13.3.1 in the anchor design. However, neglect vertical seismic effects where inclusion of vertical loads results in a less conservative design.

END OF SECTION

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SECTION 01630

SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish and install products specified, under options and conditions for substitutions stated in this Section.

B. Whenever a product, material or item of equipment is specified or described by using the name of a proprietary product or the name of a particular manufacturer or vendor, followed by the phase "or equal," the specific item mentioned shall be the basis upon which bids are to be prepared, and shall be understood as establishing the type, function, dimension, appearance and quality desired. Other manufacturer's or vendor's products not named will be considered as substitutions, provided the required information is submitted in the manner set forth in this section and provided the substitution will not require substantial revision to the Contract Documents.

1.02 RELATED WORK

A. Substitutions during the Bidding Period are included in Article 11 of Section 00200.

B. Bid Form is included in Section 00410.

1.03 SUBMITTAL OF LIST OF PROPOSED SUBSTITUTIONS

A. Bidders shall submit their list of proposed substitutions and the proposed monetary changes associated therewith to the ENGINEER on the standard form provided together with their bids.

1.04 CONTRACTOR'S OPTIONS

A. For Products specified only by reference standard, select product meeting that standard, by any manufacturer.

B. For Products specified by naming several products or manufacturers, select any one of products and manufacturers named which complies with Specifications.

C. For products specified by naming one or more products or manufacturers and stating "or equal," submit a request as for substitutions, for any product or manufacturer which is not specifically named.

D. For products specified by naming only one product and manufacturer, there is no option and no substitution will be allowed.

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1.05 SUBSTITUTIONS

A. In order for substitutions to be considered, the CONTRACTOR shall submit, within 30 days of issuance of Notice of Award, complete data as set forth herein to permit complete analysis of all proposed substitutions noted on his substitutions list. No substitution shall be considered unless the CONTRACTOR provides the required data in accordance with the requirements of this Section within the 30 day period.

B. Submit separate request for each substitution. Support each request with:

1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:

a. Product identification, including manufacturer's name and address.

b. Manufacturer's literature; identify:

1) Product description.

2) Reference standards.

3) Performance and test data.

4) Operation and maintenance data.

c. Samples, as applicable.

d. Name and address of similar projects on which product has been used, and date of each installation.

2. Itemized comparison of the proposed substitution with product specified; List significant variations. Substitution shall not change design intent and shall perform equal to that specified.

3. Data relating to impact on construction schedule occasioned by the proposed substitution.

4. Any effect of substitution on separate contracts.

5. List of changes required in other work or products.

6. Accurate cost data comparing proposed substitution with product specified.

a. Amount of any net change to Contract Sum.

7. Designation of required license fees or royalties.

8. Designation of availability of maintenance services, sources of replacement materials.

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C. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on shop drawings or product data submittals without a formal request from Contractor.

2. They are requested directly by a subcontractor or supplier.

3. Acceptance will require substantial revision of Contract Documents.

D. Requests for substitutions submitted after Notice of Award will not be considered unless evidence is submitted to the ENGINEER that all of the following circumstances exist:

1. The specified product is unavailable for reasons beyond the control of the CONTRACTOR. Such reasons shall consist of strikes, bankruptcy, discontinuance of manufacturer, or acts of God.

2. The CONTRACTOR placed, or attempted to place, orders for the specified products within 10 days after Notice of Award.

3. Request for substitution is made in writing to the ENGINEER within 10 days of the date on which the CONTRACTOR ascertains that he cannot obtain the item specified.

4. Complete data as set forth herein to permit complete analysis of the proposed substitution is submitted with the request.

E. The ENGINEER's decision regarding evaluation of substitutions shall be considered final and binding. Requests for time extensions and additional costs based on submission of, acceptance of, or rejection of substitutions will not be allowed. All approved substitutions will be incorporated into the Agreement by Change Order.

1.06 CONTRACTOR'S REPRESENTATION

A. In making formal request for substitution, CONTRACTOR represents that:

1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.

2. He will provide same warranties or bonds for substitution as for product specified.

3. He will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.

4. He waives claims for additional costs caused by substitution which may subsequently become apparent.

5. Cost data is complete and includes related costs under his Contract, but not:

a. Costs under separate contracts.

b. ENGINEER's costs for redesign or revision of Contract Documents.

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1.07 ENGINEER DUTIES

A. Review CONTRACTOR's requests for substitutions with reasonable promptness.

B. Notify CONTRACTOR, in writing, of decision to accept or reject requested substitution.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

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SECTION 01658

TELEVISION INSPECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Where indicated on the Drawings or other Specifications, pipelines shall be inspected by means of a closed-circuit television (CCTV). The inspection will be done one section at a time and the section being inspected will be suitably isolated from the remainder of the sewer line as required.

PART 2 PRODUCTS

2.01 MATERIALS

A. A self propelled television camera shall be used for the inspection of pipelines. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100 percent humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing a minimum 500 line resolution video picture. Picture quality and definition shall be to the satisfaction of the ENGINEER. The Lighting System shall minimize reflective glare.

PART 3 EXECUTION

3.01 PERFORMANCE

A. The camera shall be moved through the line in either direction at a uniform rate, stopping when necessary to insure proper documentation of the sewer's condition but in no case will the television camera be pulled at a speed greater than 30 fpm. Manual winches, power winches, TV cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation the television camera will not pass through the entire mainline section, the CONTRACTOR shall notify the ENGINEER and re-set up his/her equipment in a manner so that the inspection can be performed from the opposite manhole

B. Documentation of the television results shall be as follows:

1. Television Inspection Logs sheets shall be provided to the ENGINEER.

2. Video recordings of the data on the television monitor shall be made by the CONTRACTOR copies of which, in a digital format playable in Windows Media Player (*.avi or *.mov), shall be provided to the ENGINEER.

END OF SECTION

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SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section specifies administrative, verification and procedural requirements for project closeout, including but not limited to:

1. Final cleaning is included in Section 01710.

2. Project Record Documents is included in Section 01720.

4. Spare parts and maintenance materials, paint, lubricants, and special tools are included in applicable Sections in Divisions 2 through 16.

5. Record Shop Drawings included in Section 01300.

6. Warranties, guarantees, and bonds Section 01740 and applicable Sections in Technical Divisions 2 through 16.

7. Reconciliation of final accounting, final change order, final payment application included in General Conditions.

8. Permit close-outs including Certificate of Occupancy or Certificate of Completion.

1.02 RELATED WORK

A. Operation and Maintenance (O&M) data and manuals in applicable Sections in Technical Divisions.

B. Certified Surveyor documentation submittals in Section 01050.

1.03 CLOSEOUT PROCEDURES

A. Provide all deliverables as specified, prior to submitting the final payment application.

B. Provide submittals to ENGINEER that are required by governing or other authorities having applicable jurisdiction including but not limited to permit close out information, certificates of occupancy, etc.

C. Submit Application for Final Payment identifying total adjusted Contract Sum, previous payments and sum remaining due, following submittal and approval of Record Documents and Record Drawings.

D. Submit CONTRACTOR's Final Release and Release of Liens with final payment application.

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1.04 FINAL CLEANING

A. CONTRACTOR to complete final cleaning prior to submittal of the final application for payment.

B. CONTRACTOR to comply with requirements as specified in Section 01710.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

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SECTION 01710

CLEANING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Execute cleaning, during progress of the work, and at completion of the WORK, as required by General Conditions.

1.02 DISPOSAL AND CLEANING

A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, permits, and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

A. Execute periodic cleaning to keep the work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

B. Provide on-site containers for the collection of waste materials, debris and rubbish.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

C. Prior to final completion, conduct an inspection of all work areas, to verify that the entire WORK is clean.

END OF SECTION

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SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SCOPE

A. The CONTRACTOR shall keep and maintain, at the job site, a copy of contract documents, marked up to indicate all changes made during the course of a project, as specified herein.

1.02 REQUIREMENTS INCLUDED

A. CONTRACTOR shall maintain a record copy of the following documents, marked up to indicate all changes made during the course of a project:

1. Contract Drawings

2. Specifications

B. CONTRACTOR shall assemble copies of the following documents for turnover to the ENGINEER at the end of the project, as specified.

1. Field Orders, Change Orders, Design Modifications, and RFIs

2. Field Test records

3. Permits and permit close-outs (final approvals)

4. Certificate of Occupancy or Certificate of Completion, as applicable

5. Laboratory test reports

6. Certificates of Compliance for materials and equipment

7. Record Shop Drawings

8. Samples

C. RECORD DRAWINGS

1. The CONTRACTOR shall annotate (mark-up) the Contract Drawings to indicate all project conditions, locations, configurations, and any other changes or deviations that vary from the original Contract Drawings. This requirement includes, but is not limited to, buried or concealed construction, and utility features that are revealed during the course of construction. Special attention shall be given to recording the locations (horizontal and vertical) and material of all buried utilities that are encountered during construction – whether or not they were indicated on the Contract Drawings. The record information added to the drawings may be supplemented by detailed sketches, if necessary, clearly indicating, the WORK, as constructed.

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2. These annotated Contract Drawings constitute The CONTRACTOR's Record Drawings and are actual representations of as-built conditions, including all revisions made necessary by change orders, design modifications, requests for information and field orders.

3. Record drawings shall be accessible to the OWNER and ENGINEER at all times during the construction period.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS AND SAMPLES

A. Store documents and samples in CONTRACTOR's field office apart from documents used for construction.

1. Provide files and racks for storage of the record documents.

2. Provide locked cabinet(s) or secure storage space for storage of samples.

B. File documents and samples in accordance with Construction Specifications Institute (CSI) format.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and sample available for inspection by the ENGINEER or OWNER at all times.

E. Up-to-date Record Drawings may be a pre-requisite of processing periodic monthly pay applications.

3.02 MARKING METHOD

A. Use the color *Red* (indelible ink) to record information on the Drawings and Specifications,

B. Label each document "PROJECT RECORD" in neat large printed letters.

C. Unless otherwise specified elsewhere, notations shall be affixed to hardcopies of documents.

D. Record information contemporaneously with construction progress.

E. Legibly mark drawings with as-built information:

1. Elevations and dimensions of structures and structural elements.

2. All underground utilities (piping and electrical), structures, and appurtenances

a. Changes to existing structure, piping and appurtenance locations.

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b. Record horizontal and vertical locations of underground structures, piping, utilities and appurtenances, referenced to permanent surface improvements.

c. Record actual installed pipe material, class, size, joint type, etc

3.03 RECORD INFORMATION COMPILATION

A. Do not conceal any work until the required information is acquired.

B. Items to be recorded include, but are not limited to:

1. Location of buried utilities and appurtenances – referenced to visible and accessible features.

2. Field changes of dimensions and/or details

C. Changes made by Field Order, Change Order, design modification, and RFI.

D. Details not indicated on the original Contract Drawings.

E. Specifications - legibly mark each Section to record:

1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed.

2. Changes made by Field Order, Change Order, RFI, and approved shop drawing.

3.04 SUBMITTAL

A. If specified under the section for progress payments, monthly applications for payment will be contingent upon up-to-date Record Drawings. If requested by the ENGINEER or OWNER, CONTRACTOR shall provide a copy of the Record Drawings, or present them for review prior to processing monthly applications for payment.

B. Upon substantial completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of Record Drawings to the ENGINEER conforming to the construction records of the CONTRACTOR. The set of drawings shall consist of corrected and annotated drawings showing the recorded location(s) of the WORK. Unless specified otherwise elsewhere, Record Drawings shall be in the form of a set of full-size drawings with annotations carefully and neatly superimposed on the drawings in red.

C. Upon substantial completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of Record Documents to the ENGINEER conforming to the construction records of the CONTRACTOR. The set of documents shall consist of corrected and annotated documents showing the as-installed equipment and all other as-built conditions not indicated on the Record Drawings.

D. The information submitted by the CONTRACTOR into the Record Drawings and Record Documents will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and shall bear the costs resulting from the correction of incorrect data.

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E. Delivery of Record Drawings and Record Documents to the ENGINEER will be a prerequisite to Final payment.

F. The CONTRACTOR shall maintain a copy of all books, records, and documents pertinent to the performance under this Agreement for a period of five years following completion of the contract.

END OF SECTION

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SECTION 01730

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section includes procedural requirements for compiling and submitting operation and maintenance data required to complete the project.

1.02 RELATED WORK

A. Submittals are included in Section 01300

B. Contract closeout is included in Section 01700.

C. Warranties and Bonds are included in Section 01740.

1.03 OPERATING MANUALS

A. Provide operation and maintenance instructions for all electrical, mechanical, and instrumentation & controls equipment furnished under various technical specifications Sections.

B. Separate manuals shall be provided for each type of equipment, or each Section number. Each manual shall contain the following:

1. Format and Materials

a. Binders:

1) Commercial quality three ring binders with durable and cleanable plastic covers

2) Maximum ring width capacity: 3 inches

3) When multiple binders are used, correlate the data into related consistent groupings/volumes.

b. Identification: Identify each volume on the cover and spine with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". Include the following:

1) Title of Project.

2) Identify the general subject matter covered in the manual

3) Identify structure(s) and/or location(s), as applicable

4) Specification Section number

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c. 20 lb loose leaf paper, with hole reinforcement

d. Page size: 8-1/2 inch by 11 inch

e. Provide heavy-duty fly leafs (section separators), matching the table of contents, for each separate product, each piece of operating equipment, and organizational sections of the manual.

f. Provide reinforced punched binder tab; bind in with text.

g. Reduce larger drawings and fold to the size of text pages - but not larger than 11 inches x 17 inches - or provide a suitable clear plastic pocket (with drawing identification) for such folded drawings/diagrams.

2. Contents:

a. A table of contents/Index

b. Specific description of each system and components

c. Name, address, telephone number(s) and e-mail address(es) of vendor(s) and local service representative(s)

d. Specific on-site operating instructions (including starting and stopping procedures)

e. Safety considerations

f. Project specific operational procedures

g. Project specific maintenance procedures

h. Manufacturer's operating and maintenance instructions – specific to the project

i. Copy of each wiring diagram

j. Copy of approved shop drawing(s) and CONTRACTOR's coordination/layout drawing(s)

k. List of spare parts and recommended quantities

l. Product Data: Mark each sheet to clearly identify specific products and component parts and data applicable to installation. Delete inapplicable information.

m. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams

n. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified.

o. Warranties and Bonds, as specified in the General Conditions

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3. Transmittals

   a. Prepare separate transmittal sheets for each manual. Each transmittal sheet shall include al least the following: the CONTRACTOR's name and address, OWNER's name, project name, project number, submittal number, description of submittal and number of copies submitted.

   b. Submittals shall be transmitted or delivered directly to the office of the ENGINEER, as indicated in the Contact Documents or otherwise directed by the ENGINEER.

   c. Provide copies of transmittals (only, i.e., without copies of the respective submittal) directly to the Resident Project Representative.

C. Manuals for Equipment and Systems - In addition to the requirements listed above, for each System, provide the following:

1. Overview of system and description of unit or system and component parts. Identify function, normal operating characteristics and limiting conditions. Include performance curves, with engineering data and tests and complete nomenclature and commercial number of replaceable parts.

2. Panelboard circuit directories including electrical service characteristics, controls and communications and color coded wiring diagrams as installed.

3. Operating procedures: include start-up, break-in and routine normal operating instructions and sequences; regulation, control, stopping, shut-down and emergency instructions; and summer, winter and any special operating instructions.

4. Maintenance Requirements

   a. Procedures and guides for trouble-shooting; disassembly, repair, and reassembly instructions

   b. Alignment, adjusting, balancing and checking instructions

   c. Servicing and lubrication schedule and list of recommended lubricants

   d. Manufacturer's printed operation and maintenance instructions

   e. Sequence of operation by instrumentation and controls manufacturer

   f. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance

5. Control diagrams by controls manufacturer as installed (as-built)

6. CONTRACTOR's coordination drawings, with color coded piping diagrams, as installed (as-built)

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7. Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams. Include equipment and instrument tag numbers on diagrams.

8. List of original manufacturer's spare parts and recommended quantities to be maintained in storage

9. Test and balancing reports, as required

10. Additional Requirements as specified in individual product specification

11. Design data for systems engineered by the CONTRACTOR or its Suppliers

D. Electronic Transmission of O&M Manuals

1. Unless otherwise approved by the ENGINEER, O&M manuals may not be transmitted by electronic means other than by CD-ROM. Electronic O&M manuals shall meet the following conditions:

   a. The above-specified transmittal form is included.

   b. All other requirements specified above have been met, including, but not limited to, coordination by the CONTRACTOR, review and approval by the CONTRACTOR.

   c. The submittal contains no pages or sheets large than 11 x 17 inches.

   d. With the exception of the transmittal sheet, the entire submittal is included in a single file.

   e. Files are Portable Document Format (PDF) – with the printing function enabled.

2. When electronic copies are provided, transmit two hard-copy (paper) originals to the ENGINEER with an electronic copy on CD-ROM.

3. The electronic copy of the O&M manual must be identical in organization, format and content to the hard copies of the manual.

1.04 SERVICES OF MANUFACTURERS' REPRESENTATIVE

A. All electrical, mechanical, and instrumentation & controls equipment furnished under various technical specifications Sections shall include the cost of a competent representative of the manufacturers of all equipment to supervise the installation, adjustment and testing of the equipment; and, to instruct the OWNER's operating personnel on operation and maintenance. This supervision may be divided into two or more time periods to suit the CONTRACTOR’s schedule and/or the OWNER’s personnel availability.

B. See the detailed specifications for additional requirements for furnishing the services of manufacturer's representatives.

C. The manufacturer’s representative shall certify that the installation of the equipment is satisfactory; that the unit has been satisfactorily tested; that the equipment is ready for operation;

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and, that the operating personnel have been suitably instructed in the operation, maintenance, care, and safe operation of the equipment. The *Equipment Manufacturer's Certificate of Installation, Testing, and Instruction* attached to this Section shall be used for this certification.

D. For other materials furnished under other specification Sections, furnish the services of approved representative(s) of the manufacturer when, in the opinion of the ENGINEER, some evident product failure or malfunction makes such services necessary.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SUBMITTAL SCHEDULE

A. Operation and maintenance manuals shall be delivered directly to the office of the ENGINEER, as follows:

1. Three preliminary copies of manuals shall be submitted to the office of the ENGINEER, no later than 30 days following approval of the respective shop drawings.

2. Provide six final copies of complete manuals prior to testing and start-up.

B. The ENGINEER will review Operation and Maintenance manuals submittals on operating equipment for conformance with the requirements of the applicable specification Section. The review will generally be based on the *O&M Manual Review Checklist* appended to this Section.

C. If during test and start-up of equipment, any changes were made to the equipment, provide copies (the number specified in paragraph 3.01.A.2) of as-built drawings or any other amendments for insertion in the final manuals. Submit the required number within 30 days of start-up and testing of the facility.

3.02 VENDOR TRAINING/INSTRUCTIONS (TO OWNER's PERSONNEL)

A. Before final initiation of operation, CONTRACTOR's vendors shall train/instruct OWNER's designated personnel in the operation, adjustment, and maintenance of products, equipment and systems at times convenient to the OWNER.

B. Unless specified otherwise under the respective equipment specification section, vendor training/instruction shall consist of eight hours of training for each type of equipment. Such training/instruction shall be scheduled and held at times to accommodate the work schedules of OWNER's personnel, including splitting the required training/instruction time into separate sessions and/or presented at reasonable times other than the CONTRACTOR's "normal working hours" or the OWNER's normal day shift.

C. Use operation and maintenance manuals as basis for instruction. Train/instruct the OWNER's personnel, in detail, based on the contents of manual explaining all aspects of operation and maintenance of the equipment. If the respective equipment is inter-related to the operation of other equipment, all interlock, constraints, and permissives shall be explained.

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D. At least two weeks prior to the schedule for vendor training, a detailed lesson plan, representative of the material to be covered during instruction, shall be submitted to the ENGINEER for approval. Lesson plans shall consist of in-depth outlines of the training material, including a table of contents, resume of the instructor, materials to be covered, start-up procedures, maintenance requirements, safety considerations, and shut-down procedures.

E. Prepare and insert additional data in each Operation and Maintenance Manual when the need for such data becomes apparent during training/instruction.

F. Vendor's training/instruction will be considered acceptable based on the completed *OWNER's Acknowledgement of Manufacturer's Instruction* as indicated on the Equipment Manufacturer's Certification of Installation, Testing, and Instruction appended to this Section.

3.03 VIDEOGRAPHY OF VENDOR TRAINING/INSTRUCTION

A. Audio/video (A/V) record (in DVD format) training/instructions as they are being provided to the OWNER's personnel. Such recording shall include the entire training/instruction session(s) as well as all questions and answers. A/V recording shall be performed by a professional organization experienced in the production of such recordings. Self-recording by the CONTRACTOR may be considered, provided that CONTRACTOR can demonstrate, in advance, proficient examples of such recordings.

B. To avoid audio problems, training/instruction shall be held in a location sufficiently removed from construction activity, insulated from the noise of construction activity, or during a time when construction activity is not occurring in the vicinity.

C. The audio portion of the A/V recording should be done with a microphone (wired or wireless) attached to the trainer/instructor to maximize the quality of speech.

D. Each A/V recording should have "chapters" to segregate the distinct portions of the training/instruction, or have visual cues at the start of a change in subject.

E. Two copies of the A/V recordings shall be submitted to the ENGINEER on DVD disk(s). The DVDs will become the property of the OWNER.

END OF SECTION

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EQUIPMENT MANUFACTURER'S CERTIFICATE OF INSTALLATION, TESTING AND INSTRUCTION

Owner: _____

Project: _____

Contract No. _____

CDM Smith Project No._____

EQUIPMENT SPECIFICATION SECTION_____

EQUIPMENT DESCRIPTION_____

I_____, Authorized representative of
(Print Name)

_____
(Print Manufacturer's Name)

hereby CERTIFY that_____
(Print equipment name and model with serial No.)

installed for the subject project [has] [have] been installed in a satisfactory manner, [has] [have] been satisfactorily tested, [is] [are] ready for operation, and that OWNER assigned operating personnel have been suitably instructed in the operation, lubrication, and care of the unit[s] on Date: _____ Time: _____.

CERTIFIED BY: _____ DATE: _____
(Signature of Manufacturer's Representative)

OWNER'S ACKNOWLEDGMENT OF MANUFACTURER'S INSTRUCTION

[I] [We] the undersigned, authorized representatives of the _____ and/or Plant Operating Personnel have received classroom and hands on instruction on the operation, lubrication, and maintenance of the subject equipment and [am] [are] prepared to assume normal operational responsibility for the equipment:

_____ DATE: _____

_____ DATE: _____

_____ DATE: _____

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O&M Manual Review Checklist

Submittal No.: _____

Project No.: _____

Manufacturer: _____

Equipment Submitted: _____

Specification Section: _____

Date of Submittal: _____

General Data

_____ 1. Are the area representative's name, address, e-mail address and telephone number included?

_____ 2. Is the nameplate data for each component included?

_____ 3. Are all associated components related to the specific equipment included?

_____ 4. Is non-pertinent data crossed out or deleted?

_____ 5. Are drawings neatly folded and/or inserted into packets?

Operations and Maintenance Data

_____ 6. Is an overview description of the equipment and/or process included?

_____ 7. Does the description include the practical theory of operation?

_____ 8. Does each equipment component include specific details (design characteristics, operating parameters, control descriptions, and selector switch positions and functions)?

_____ 9. Are alarm and shutdown conditions clearly identified? Does it describe possible causes and recommended remedies?

_____ 10. Are step procedures for starting, stopping, and troubleshooting the equipment included?

_____ 11. Is a list of operational parameters to monitor and record for specific equipment included?

_____ 12. Is a proposed operating log sheet included?

_____ 13. Is a spare parts inventory list included for each component?

_____ 14. Is a lubrication schedule for each component included - or does it clearly state “No Lubrication Required"?

_____ 15. Is a maintenance schedule for each component included?

_____ 16. Is a copy of the warranty information included?

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Review Comments

Is the submittal fully approved (yes/no)?

If not, see the following are the points of rejection that must be addressed and require resubmittal by the CONTRACTOR:

Item No.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14, _____
15. _____

Reviewed By: _____ Date: _____

Legend

1 = OK

2 = Not Adequate

3 = Not Included

Note: This submittal has been reviewed for compliance with the Contract Documents.

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SECTION 01740

WARRANTIES AND BONDS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1.02 RELATED WORK

A. Specific requirements for warranties for the work and products and installations that are specified to be warranted are included in the individual Sections.

1.03 SUBMITTALS

A. Submit written warranties to the ENGINEER prior to the date fixed by the ENGINEER for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the work, or a designated portion of the work, submit written warranties upon request of the ENGINEER.

B. When a designated portion of the work is completed and occupied or used by the OWNER, by separate agreement with the CONTRACTOR during the construction period, submit properly executed warranties to the ENGINEER within 15 days of completion of that designated portion of the WORK.

C. When a special warranty is required to be executed by the CONTRACTOR, or the CONTRACTOR and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the ENGINEER for approval prior to final execution.

D. Refer to individual Sections for specific content requirements, and particular requirements for submittal of special warranties.

E. At Final Completion compile two copies of each required warranty and bond properly executed by the CONTRACTOR, or by the CONTRACTOR, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1.04 WARRANTY REQUIREMENT

A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

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C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The CONTRACTOR is responsible for the cost of replacing or rebuilding defective work regardless of whether the OWNER has benefited from use of the work through a portion of its anticipated useful service life.

D. OWNER's Recourse: Written warranties made to the OWNER are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the OWNER can enforce such other duties, obligations, rights, or remedies.

E. Rejection of Warranties: The OWNER reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the contract Documents.

F. The OWNER reserves the right to refuse to accept work for the project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

G. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the CONTRACTOR of the warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the CONTRACTOR.

1.05 MANUFACTURERS CERTIFICATIONS

A. Where required, the CONTRACTOR shall supply evidence, satisfactory to the ENGINEER, that the CONTRACTOR can obtain manufacturers' certifications as to the CONTRACTOR's installation of equipment.

1.06 DEFINITIONS

A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the OWNER.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the OWNER.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

Division 2 Site Construction

Division 2 Site Construction

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SECTION 02100

SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials and equipment required and perform all site preparation, complete as shown on the Drawings and as specified herein.

B. Obtain all permits required for site preparation work prior to proceeding with the work, including clearing, and tree removal.

C. The areas to be cleared, grubbed and stripped within public rights-of-way and utility easements shall be minimized to the extent possible for the scope of pipeline work and in consideration of the actual means and methods of construction used. No unnecessary site preparation within these areas shall be performed.

1.02 RELATED WORK

A. Biological and Cultural Resources Environmental Controls is included in Section 01561.

B. Earthwork is included in Section 02200.

C. Revegetation is included in Section 02930.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, copies of all permits required prior to clearing, grubbing, and stripping work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEARING

A. Cut and remove all timber, trees, stumps, brush, shrubs, roots, grass, weeds, rubbish and any other objectionable material resting on or protruding through the surface of the ground.

B. Preserve and protect trees and other vegetation larger than 3-inches in diameter at the base as directed by the ENGINEER to remain as specified below.

3.02 GRUBBING

A. Grub and remove all stumps, roots in excess of 1-1/2-in in diameter, matted roots, brush, timber, logs, concrete rubble and other debris encountered to a depth of 18-in below original grade or 18-in beneath the bottom of roadway subbase, whichever is deeper.

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B. Refill all grubbing holes and depressions excavated below the original ground surface with suitable materials and compact to a density conforming to the surrounding ground surface in accordance with Section 02200.

3.03 STRIPPING

A. Strip topsoil from all areas to be excavated or filled.

B. Topsoil shall be free from brush, trash, large stones and other extraneous material. Avoid mixing topsoil with subsoil.

C. Stockpile and protect topsoil until it is used in landscaping, loaming and seeding operations. Dispose of surplus topsoil after all work is completed.

3.04 DISPOSAL

A. Cut tree trunks and limbs exceeding 4-in in diameter shall be cut into 4-ft lengths.

B. Dispose of material and debris from site preparation operations by hauling such materials and debris to an approved offsite disposal area. No rubbish or debris of any kind shall be buried on the site.

C. Burning of cleared and grubbed materials or other fires for any reason will not be permitted.

D. At the Broderson site, chip eucalyptus and stockpile to be used as mulch.

3.05 PROTECTION

A. Trees and other vegetation larger than 3-inches at the base as directed by the ENGINEER to remain, shall be protected from damage by all construction operations by erecting suitable barriers, guards and enclosures, or by other approved means. Conduct clearing operations in a manner to prevent falling trees from damaging trees and vegetation designated to remain and to the work being constructed and so as to provide for the safety of employees and others.

B. Maintain protection until all work in the vicinity of the work being protected has been completed.

C. Do not operate heavy equipment or stockpile materials within the branch spread of existing trees.

D. Immediately repair any damage to existing tree crowns, trunks, or root systems. Roots exposed and/or damaged during the work shall immediately be cut off cleanly inside the exposed or damaged area.

E. When work is completed, remove all dead and downed trees. Live trees shall be trimmed of all dead and diseased limbs and branches. All cuts shall be cleanly made at their juncture with the trunk or preceding branch without injury to the trunk or remaining branches.

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F. Restrict construction activities to those areas within the limits of construction designated on the Drawings, within public rights-of-way, and within easements provided by the ENGINEER. Adjacent properties and improvements thereon, public or private, which become damaged by construction operations shall be promptly restored to their original condition, to the full satisfaction of the property owner.

END OF SECTION

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SECTION 02140

DEWATERING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and remove and dispose of all surface water and ground water entering excavations.

B. The CONTRACTOR is hereby advised that the presence of sands and other permeable materials and extensive and shallow groundwater at the project sites present an appreciable construction challenge. The CONTRACTOR shall plan, include all costs in its bid and execute the project construction accordingly

1. Groundwater conditions are shallow in many areas of the project site. In some areas of the project site groundwater daylights on the surface resulting in areas of ponding, springs, and seeps. Certain project areas are prone to flooding.

2. Groundwater and surface conditions along the coastal areas of the project site (southern shore of Morro Bay) are likely influenced by tidal fluctuations. Groundwater level will also fluctuate seasonally and with variation in storm water runoff, irrigation schedules, rainfall, and other factors.

3. Although the soil conditions encountered generally consist of sandy materials, layers of moderately cemented, dense sand and clay were encountered in some of the geotechnical investigation explorations at depth. These types of conditions can perch groundwater and subsequently reduce the effectiveness of dewatering wells constructed at depth to drawdown the water table.

C. The CONTRACTOR shall obtain and abide by all permits necessary for dewatering including from the Regional Water Quality Control Board (RWQCB). See also Section 01060 – Regulatory Agency and Utility Requirements.

D. An NPDES Construction Authority Storm Water Permit has been obtained by the OWNER. The CONTRACTOR shall modify the permit prior to beginning construction activities (see SWPPP requirements in Section 01570). The CONTRACTOR's dewatering water disposal activities shall be in compliance with the requirements of the same.

E. The CONTRACTOR shall thoroughly review the project Geotechnical Report prior to developing the dewatering approach and plan.

F. The CONTRACTOR shall thoroughly review the Dewatering Plan Technical Memorandum provided as an attachment to these specifications prior to developing the dewatering approach and plan.

1.02 RELATED WORK

A. Storm Water Pollution Prevention Plan is included in Section 01570.

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B. Earthwork is included in Section 02200.

1.03 SUBMITTALS

A. Submit for ENGINEER's review, in accordance with Section 01300, shop drawings showing details of dewatering system including proposed areas for drainage disposal. At the time of the first excavation, the CONTRACTOR shall 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.

B. Submit copies of all permits obtained for or related to the disposal of water.

1.04 QUALITY CONTROL

A. The CONTRACTOR shall have the sole responsibility to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.

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 that may develop. The responsibility for conducting the dewatering operation in a manner that will protect adjacent structures and facilities rest solely with the CONTRACTOR. The cost of repairing structures and restoration of facilities shall be the responsibility of the CONTRACTOR.

PART 2 PRODUCTS

2.01 MATERIALS

A. Piping, pumping equipment and all other materials required to provide dewatering of excavations shall be suitable for the intended purpose. Standby pumping units shall be maintained at the site to be used in case of failure of the normal pumping units.

B. The CONTRACTOR shall provide a dewatering system failure alarm with auto dialer or a person to monitor the system during working and non-working hours.

PART 3 EXECUTION

3.01 DEWATERING AND DRAINAGE SYSTEM

A. At all times during construction, provide and maintain proper equipment and facilities to remove all water entering excavations, and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural levels.

B. Conduct dewatering in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation. Construct well or sump installation with proper sand filters to prevent drawing of finer grained soil from the surrounding ground.

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C. Collect water entering the excavation from surface runoff in shallow ditches around the perimeter of the excavation, drain to sumps and pump from the excavation to maintain a bottom free from standing water.

D. Take all additional precautions to prevent uplift of any structure during construction. All such arrangements shall be subject to the approval of the ENGINEER.

E. Dispose of drainage so that flow or seepage back into the excavated area damage to adjacent property is to be prevented. Disposal area shall be approved by the ENGINEER. CONTRACTOR shall be responsible for obtaining any permits that may be necessary for disposal of water.

F. Prevent flotation by maintaining a positive and continuous operation of the dewatering system. If for any reason the dewatering system is found to be inadequate, make additions, changes and replacements, as necessary, to provide a satisfactory system at no additional cost to the OWNER. All damage resulting from failure to properly dewater excavations shall be repaired to the satisfaction of the ENGINEER at no additional cost to the OWNER.

G. Dewatering facilities shall be designed with filters such that sand and fine grained materials are not removed from the soil during dewatering. All dewatering water shall be desilted to discharge.

3.02 DISPOSAL OF DEWATERING WATER

A. The CONTRACTOR shall dispose of dewatering water removed from the WORK in a suitable manner without damage to adjacent property. The CONTRACTOR shall be responsible to obtain any permits that may be necessary to dispose of the water. The CONTRACTOR shall be responsible to furnish all temporary equipment, piping, valves, and appurtenances to accomplish the acceptable disposal of dewatering water.

B. The CONTRACTOR shall include a description of the dewatering water disposal approach with locations and methods of dewatering water collection, conveyance, and discharge in the dewatering plan submittal specified in Paragraph 1.03.A herein. The description shall also include a summary of the monitoring and reporting approach.

C. The CONTRACTOR may utilize the collection system sewer mains for conveyance of dewatering water from excavations to pump station wet wells and selected manholes, and pumped conveyance of dewatering water from the pump station wet wells and selected manholes to disposal sites and subject to the following requirements:

1. The dewatering water shall be pretreated, if necessary, to remove any sediments and silts prior to discharge to the sewer mains. The water shall be settled or filtered to remove sand and fine-sized soil particles. The dewatering water discharge to the sewer mains shall not exceed 3 ml/l of settleable solids.

2. Dewatering pumps shall be furnished by the CONTRACTOR. The use of wastewater pumps to be installed as part of the WORK shall not be used for conveyance of dewatering water.

3. The dewatering pumps shall be electric motor driven and served by the local electrical utility for normal operation. The CONTRACTOR may provide for portable engine-generator sets to provide standby electrical power in the event of a power outage. The engine-generator sets

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shall not operate when service from the electrical utility is available to minimize noise propagation to residential neighborhoods.

4. Upon completion of dewatering operations that utilize the gravity collection system sewer mains, manholes, and pump station wet wells, the system shall be cleaned, tested, and television inspected in accordance with Section 01455 – Pipeline Testing and Clearing and Section 01658 —Television Inspection.

D. The CONTRACTOR is directed to plan and develop the methods of disposal for dewatering water in the following order of priority:

1. Dewatering water, when available, shall be used for auxiliary construction activities such as earthwork compaction and dust control to conserve the use of potable water and to minimize the disposal volume of dewatering water.

2. Dewatering water may be routed to the stormwater infiltration basin near the Mid-Town Pump Station. This new publically owned stormwater infiltration basin is located east of the Mid-Town Pump Station near the intersection of Los Osos Valley Road and Palisades Avenue.

3. Dewatering water may be routed to other publically owned stormwater retention basins. Existing publically owned stormwater retention basins are located south of the East Ysabel Pump Station near the intersection of South Bay Boulevard and Santa Ysabel Avenue and southeast of the intersection of Santa Ynez Avenue and Fairchild Way.

4. The CONTRACTOR may seek the use of privately owned retention basins and/or open lots to develop percolation or irrigation fields for disposal where feasible. If used, the CONTRACTOR shall furnish written confirmation from the property owner of the retention basin or field that such use is acceptable. Such use is subject to the approval of the ENGINEER pending a determination of whether the use of each proposed site is within the provisions of project environmental permits and agreements.

5. Use outfalls from stormwater drainage pump stations or stormwater channels are permissible, subject to water quality monitoring and treatment requirements. Possible combinations of new pump station wet well locations and existing stormwater drainage pump station outfalls or stormwater channel are listed as follows:

a. Dewatering water that is conveyed to the Lupine Pump Station wet well may be discharged to the outfall of the stormwater drainage pump station located at the intersection of Don Avenue and Mitchell Drive.

b. Dewatering water that is conveyed to the Baywood Pump Station or the East Paso Pump Station may be discharged to the outfall of the stormwater drainage pump station located at the intersection of 8th Street and El Moro Avenue.

c. Dewatering water that is conveyed to the East Paso Pump Station may be discharged to the Walker Ditch, a reinforced concrete channel located at the intersection of 18th Street and Paso Robles Avenue.

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E. The discharge of dewatering water shall not be allowed during storm events and any subsequent runoff periods when stormwater flow is entering the stormwater drainage facilities.

F. If dewatering water is disposed of to any location that is tributary to surface waters, including existing outfalls from stormwater drainage pump stations or stormwater channels, the CONTRACTOR shall be required to monitor and report the status of each dewatering location and discharge location. Representative grab samples of dewatering water at each discharge location shall be obtained and analyzed for the parameters and at the frequency shown below. Samples will be required to meet the following water quality objectives:

Parameter	Sample Frequency	Water Quality Objective
Fecal Coliform	Weekly	14 MPN/100ml median; no more than 10% exceed 43 MPN/100ml
Settleable Solids	Weekly	250 NTU (NAL)/500 NTU (NEL)
Ammonia	Monthly	24 mg/L (as N)
pH	Monthly	6.5 to 8.5 (NAL)

The monthly report shall also include the locations and duration (date and time) of construction dewatering sources and the estimated volumes of construction dewatering water discharges. A description of any corrective actions shall be included with the report if noncompliance with any water quality objective occurs.

G. If disinfection is required to meet the water quality objectives, the CONTRACTOR shall provide suitable disinfection to meet the fecal coliform limitation. The disinfection facilities shall include liquid hypochlorite storage and feed equipment, disinfection tank with minimum 30-minute detention time at the dewatering flow rate, liquid sodium bisulfite dechlorination storage and feed equipment, and ancillary controls and instrumentation for automated operation, monitoring, and alarms. Liquid chemical facilities shall include suitable spill containment and safety devices. Alternative disinfection methods such as UV disinfection may be used, subject to the review and acceptance of the ENGINEER, except that the use of gaseous chlorine and/or sulfur dioxide shall not be allowed. The cost of disinfection shall be included in the lump sum price of the Dewatering bid item and no additional payment will be allowed therefor.

END OF SECTION

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SECTION 02151

JACKING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, supplies and incidentals required and install casing pipe and carrier pipe by jacking at the location(s) shown on the Drawings and as specified herein.

B. Boring and jacking in areas with groundwater shall not proceed until the groundwater is removed in an approved manner in accordance with Specification Section 02140. Boring and jacking equipment shall be equipped with provisions to address flowing or loose sands and other unstable materials, and shall be performed with jacking heads with closeable doors or other means ("closed heading" boring machines) to prevent the uncontrolled entry of material into the head, loss of ground and surface settlement.

C. Work shall be done in strict accordance with the details shown on the Drawings and as specified herein and in accordance with all State and local laws, regulations and requirements. Work shall also comply with the requirements of public agencies, and owners of public utilities, or other facilities for the safeguarding of traffic and improvements that might be endangered by the boring and jacking operations. Approach trenches in public streets will not be permitted to remain open for extended periods of time.

D. The work shall include, but not be limited to, the following: steel casing pipe, skids, casing seals, coatings, location markers and miscellaneous appurtenances as required to complete the installation.

E. Furnish the services of a licensed professional engineer registered in the State of California, to prepare jacking designs and submittals.

1.02 RELATED WORK

A. Site Preparation is included in Section 02100.

B. Dewatering and Drainage is included in Section 02140.

C. Earthwork is included in Section 02200.

D. Erosion and Sedimentation Control is included in Section 02270.

E. Settlement Monitoring is included in Section 02445

F. Ductile Iron Pipe is included in Section 02616.

G. High Density Polyethylene Pipe and Fittings are included in Section 02623.

H. Polyvinyl Chloride (PVC) Pressure Pipe and Fittings are included in Section 02622.

I. Revegetation is included in Section 02930.

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J. Concrete work is included in Division 3.

K. Surface Preparation and Shop Prime Painting are included in Section 09901.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, complete shop drawings and product data for casing pipe, carrier pipe, fittings and related appurtenances. Submit a lay schedule showing stationing, elevations, pipe classes and class coding.

B. Jacking system designs shall be prepared by a licensed professional engineer, registered in the State of California, having a minimum of 5 years of professional experience in the design and construction of jacking systems. Submit an original and three copies of the licensed professional engineer's certification, on the PE form specified in Section 01300, stating that the jacking system designs have been prepared by the professional engineer and that the professional engineer will be responsible for their execution. Do not submit jacking designs or drawings unless requested in writing.

C. At least 30 days prior to the scheduled start of any jacking operations, submit in accordance with Section 01300 the proposed methods of jacking. Review will be for information only. Remain responsible for adequacy and safety of construction means, methods and techniques. Submittals shall consist of design drawings, calculations and related supplemental information describing in detail the design concept for all jacking operations. Submittals shall be prepared by a licensed professional engineer, registered in the State of California, having a minimum of 5 years of professional experience in the design and construction of jacking systems. Submittals shall include as a minimum the following:

1. Shop drawings showing size, location and design calculations for reaction blocks and jacking pits.

2. Number and capacities of jacks.

3. Size, arrangement and installation of soil stabilization and dewatering equipment with details of locations where groundwater will be directed during construction.

4. Detailed descriptions of equipment, materials, sequence and procedures for jacking steel sleeve with shield including provisions for standby and backup equipment.

5. Revisions to shop drawings, as necessary, to accommodate field conditions and/or compliance as specified herein.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A36 - Standard Specification for Carbon Structural Steel.

2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

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3. ASTM A139 - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4-in and over).

4. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.

5. ASTM C150 - Standard Specification for Portland Cement.

6. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.

B. American Water Works Association (AWWA)

1. AWWA C200 - Steel Water Pipe - 6-in (150 mm) and Larger.

2. AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied.

3. AWWA C206 - Field Welding of Steel Water Pipe.

C. American Railway Engineering and Maintenance of Right-of-Way Association (AREMA)

1. AREMA Manual for Railroad Engineering, Volume 1: Track Chapter 1, Roadway and Ballast.

D. American Welding Society (AWS)

E. Where reference is made to one the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. Steel casing pipe shall be the product of a single domestic manufacturer. Pipe shall be tested and inspected at the foundry as required by the standard specifications to which the material is manufactured. Submit in accordance with Section 01300 sworn certificates of such tests, results and satisfactory approvals.

B. All pipe to be installed under this Contract may be inspected at the site of manufacture for compliance with this Section by an independent laboratory selected by the OWNER. The manufacturer's cooperation shall be required in these inspections. The cost of any inspection requested by the OWNER of all pipe approved for this Contract shall be borne by the OWNER. The cost of inspection of any disapproved pipe shall be borne by the CONTRACTOR.

C. Welders shall be certified in accordance with standards of the AWS. Submit current certifications prior to the start of field work.

1.06 SYSTEM DESCRIPTION

A. The completed installation shall be suitable in all respects for transporting waste water without affecting the stability and integrity of the overlying roadways or railroads.

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1.07 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe or coatings. Pipe shall not be dropped. Any damage to the pipe coatings shall be repaired in accordance with the procedures specified in Section 09901.

B. All pipe shall be subjected to a careful inspection prior to being installed. If any pipe fails to meet the requirements specified herein, it shall be removed and replaced with satisfactory pipe.

1.08 PROJECT/SITE REQUIREMENTS

A. Discharge from dewatering operations shall be directed as specified in Section 02140.

B. Furnish all maintenance of traffic and establish and maintain all safety procedures on adjacent highways during the jacking operation.

C. Inspect the locations where jacking operations will be conducted and the casing pipe is to be installed, verify the conditions under which the work will be performed, and provide all necessary details, whether shown or specified on the Drawings or not, for the orderly prosecution of the work.

D. CONTRACTOR shall be prepared to work at night and on weekends, if required, to complete the work. Request and obtain written authorization in accordance with these Specifications prior to working nights and weekends.

E. Jacking operations shall not result in measurable settlement, movement, or cracking of roadways, railroads or adjacent structures. If any movement or settlement occurs which causes or might cause damage to roadways or structures over, along, or adjacent to the work, jacking operations shall stop immediately except for those activities which will assist in making the work secure and prevent further movement, settlement, or damage. Jacking operations may resume only after all necessary precautions have been taken to prevent further movement, settlement, or damage.

F. Roadways, railroads and structures damaged by jacking operations shall be repaired or replaced as necessary to restore them to their condition prior to beginning jacking operations.

G. CONTRACTOR shall obtain all permits as required by Section 01060 – Regulatory Agency and Utility Requirements.

1.09 DEFINITIONS

A. Casing pipe shall mean the outer sleeve that is installed by the bore and jack method.

B. Carrier pipe shall mean the pipe inserted within the casing pipe and which acts as the conveyor of liquid.

C. Jacking pit shall mean the pit in which the boring and jacking equipment is installed and from which both the casing pipe and carrier pipe are launched.

D. Exit pit or receiving pit shall mean the pit located at the end of the casing pipe remote from the jacking pit at the point where the carrier pipe emerges from the casing pipe.

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PART 2 PRODUCTS

2.01 GENERAL

A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

2.02 MATERIALS

A. Steel Casing Pipe

1. Steel casings shall be of leakproof construction and shall conform to the requirements of ASTM A53 (ASTM A139 Grade "B") and shall be protected inside and outside by a black bituminous coating a minimum of 5 mils thick. Steel casing pipe shall have a minimum yield strength of 35,000 psi, shall be equipped with grout holes as specified herein, and shall be designed to withstand H-20 traffic or Coopers E-80 Railroad loading depending on the crossing.

2. Casing pipes shall have the inside diameter, minimum nominal diameters and wall thicknesses as shown on the Drawings.

B. Carrier Pipe

1. All carrier pipe joints within the casing pipe shall be restrained or harnessed.

2. Ductile iron pipe and fittings shall be as shown on the Drawings and as specified in Section 02616.

3. Polyvinyl Chloride (PVC) pressure pipe, including Fusible PVC, and fittings shall be as shown on the Drawings and as specified in Section 02622.

4. High density polyethylene pipe shall be as shown on the Drawings and as specified in Section 02623.

2.03 MIXES

A. Sand fill shall be of such sizes that when dry, 100 percent by weight shall pass a No. 20 sieve and not over 5 percent by weight shall pass a No. 100 sieve.

B. Mortar shall consist of 1 part cement, 1/4 part lime and 2 parts sand. Sand shall comply with ASTM C144. Lime shall comply with ASTM C207, Type S. Cement shall comply with ASTM C150, Type II.

C. Cement grout shall consist of a mixture of about 1 part cement to 6 parts sand. The amount of cement may be increased or decreased as necessary and as permitted to provide good flowing characteristics.

2.04 SURFACE PREPARATION AND SHOP COATINGS

A. Surface preparation of steel casing pipe shall be in accordance with Section 09901.

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B. Steel casing pipe shall be protected inside and outside by a black bituminous coating with a minimum thickness of 5 mils.

PART 3 EXECUTION

3.01 PREPARATION

A. Notify ENGINEER as appropriate at least 7 days in advance of the planned start of work within the road or railroad right-of-way.

B. Jacking pit subgrades shall be kept continuously free from ground and surface waters during jacking operations. Additional groundwater controls may be ordered on short notice and shall be implemented as directed. Observed water levels prior to construction are to be below the invert elevation of the jacking pits. Groundwater control along and at the face of the jacking casing shall include chemical grout stabilization as required.

3.02 INSTALLATION

A. Dimensions of jacking and receiving pits shall be determined by the CONTRACTOR, subject to the approval of the ENGINEER.

B. Excavate jacking pit and provide excavation supports as required. Excavation support shall extend a sufficient depth below the invert of the steel casing pipe to resist any pressure developed by the soil outside the jacking pit. Excavation support shall extend at least 3-ft-6-in above existing grade.

C. Furnish a level concrete slab at the bottom of the jacking pit. Steel rails or beams shall be embedded in the concrete slab for placement and alignment of each piece of casing pipe or carrier pipe during installation operations.

D. Furnish, install and remove, to the extent required, thrust blocks or such other provisions as may be required in driving the casing pipe or carrier pipe forward.

E. Maintain proper alignment and elevation of the casing pipe consistently throughout the jacking operation.

F. Tolerances for installation of the casing pipe shall be as follows:

1. Elevation: to grade or a maximum of 9-in below grade.

2. Plan Location: plus or minus 1-ft.

G. Jacking operations for the casing pipe shall be continuous and precautions shall be taken to avoid interruptions which might cause the pipe to "freeze" in place.

H. Carrier pipe shall be supported within the casing pipe so that pipe bells do not rest directly on the casing. The load of the carrier pipe shall be distributed along the casing by the method of support as shown on the Drawings and as specified herein.

I. Dewatering through the casing pipe during construction will not be permitted.

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J. Steel casing pipe sections shall have beveled ends with a single v-groove and shall be full penetration butt welded on the outside of the casing in accordance with the applicable portions of AWWA C206 and AWS D7.0 for field welded water pipe joints. All joints of the steel casing shall be butt welded prior to being subjected to the jacking operation. The welded joints shall be wire brushed and painted with bitumastic enamel coating in accordance with AWWA C203.

K. Jacking shall be performed in a manner to prevent voids from developing outside the jacking sleeve. A jacking shield shall be used to minimize the amount of voids produced during excavating in the forward end of the jacking sleeve. Voids which occur shall be filled with cement grout.

L. Furnish and install, and later remove to the extent required, thrust blocks or other provisions for backing up the jacks employed in driving the casing pipe forward.

M. Immediately following the jacking operation, pressure grout the jacked section to fill all voids existing outside of the jacked casing. Grouting shall be from the interior of the casing through the grouting holes.

N. After the casing pipe has been completely installed, thoroughly clean the interior of the casing pipe and remove all excess material leaving a smooth interior throughout.

O. The exit pit shall be excavated up to the casing pipe. Excavation support shall be provided as required. Sufficient room shall be provided to continue installation of carrier pipe, fittings and all necessary connections to the system.

P. The carrier pipe shall be installed within the casing using skids as specified above. Carrier pipe shall be installed from the jacking pit end of the casing. Each joint shall be thoroughly checked prior to being inserted into the casing.

Q. Upon completion of installation of the carrier pipe inside the casing pipe, provide suitable restrained caps or plugs at each joint outside the end of the casing pipe and hydrostatically test the carrier pipe in accordance with Section 02622 for 30 minutes. There shall be no allowable leakage. Remove the carrier pipe from the casing and remake leaking joints. Repeat hydrostatic test until there are no leaks in the carrier pipe within the casing.

R. Construct an 8-in thick brick bulkhead after the carrier pipe has been installed and successfully hydrostatically tested. The portion of the carrier pipe passing through the brick bulkhead shall be wrapped with three layers of 15 lb asphalt impregnated felt before the bulkhead is constructed.

S. Fill void between casing pipe and carrier pipe completely with sand in one continuous uninterrupted operation in a manner to prevent the occurrence of any voids between the casing pipe and the carrier pipe.

T. Furnish concrete markers installed flush with grade at each end of the casing pipe showing size of casing pipe, depth from grade to top of casing pipe and located on the center line of the casing.

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3.03 SITE RESTORATION

A. At the conclusion of all jacking operations, remove excavation support systems for jacking pits. If withdrawal should damage or disturb the roadway subgrade, leave supports in place and cut off 36-in below finished grade.

B. Following pipe installation and backfill operations, restore the profile of the right-of-way to its original condition. Construct sidewalks and fencing, if applicable, to match existing. Install sodding or seeding to match existing, as required.

C. Remove all equipment, supplies, excess excavation materials and miscellaneous items associated with the jacking operation and leave the site in a clean and tidy condition.

D. If required by the owner of the right-of-way, coordinate and schedule a final inspection of the work by the owner of the right-of-way.

END OF SECTION

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SECTION 02158

HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Provide all materials, equipment and incidentals necessary for the construction of new recycled effluent water piping by horizontal directional drilling as shown on the Drawings and as specified herein. Horizontal Directional Drilling (HDD) is meant as a method of trenchless pipe installation using a steerable drilling operation which directly installs a pipe along a linear alignment (not necessarily horizontal) without an open hole or open face.

B. Furnish all survey including layout, inspection and record-keeping incidental to the drilling and pipe installation.

C. Drilling shall be conducted at the locations shown on the Drawings.

D. Drilling shall either be conducted from a pit or as a sacrificial tangent curve to intersect the alignment. Should a pit be used, all work to construct and maintain the pit will be part of this work.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. PVC pipe is included in Section 02622

C. High density polyethylene pipe is included in Section 02623.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, letters, shop drawings and product data showing materials of construction, installation equipment and details of installation for the HDD operation including:

1. Qualifications of the HDD CONTRACTOR

   a. Name, business, address and telephone number of the CONTRACTOR.

   b. Experience in successfully constructing directional drilling operations.

   c. List of similar projects performed over the last two years including the name of contact person and telephone number.

   d. Certification of workman training.

   e. Name(s) of all supervisory personnel to be directly involved with the project.

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f. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel for the HDD operations will be directly involved with this project.

2. Construction Procedures

a. Written descriptions of the construction method and equipment to be used, and access pit sizes and locations required for equipment and material access.

b. Grouting techniques to be used for overexcavation if any, including equipment, pumping procedures, grout types, and mixtures.

c. Description of line and grade control.

d. Proposed procedures, materials and equipment for lubricating the exterior of the pipe during pulling.

e. Details of spoil removal system, including equipment type, number and disposal location.

f. Proposed methods, materials and equipment for removing and clearing obstructions so that the HDD can advance forward.

g. Procedures for locating and controlling the direction of the drilling operation.

1.04 QUALIFICATIONS

A. HDD CONTRACTOR

1. The HDD CONTRACTOR shall be trained and certified to operate the Horizontal Directional Drilling equipment with at least 5 years experience in directional drilling obtained over the last five years. Perform HDD operations under the constant direction of a drilling supervisor who shall remain on site and be in responsible charge throughout the drilling operation. The supervisor shall have performed or supervised directional drilling of a minimum of 5,000 linear feet of pipe.

1.05 PERMITS

A. Obtain all permits required by Section 01060 – Regulatory Agency and Utility Requirements.

1.06 PROJECT/SITE REQUIREMENTS

A. Geotechnical memoranda are available on request. The geotechnical technical memoranda are made available to the CONTRACTOR for his information to be used at his own risk. The CONTRACTOR is responsible for any conclusions to be drawn from the boring including the character of the materials to be encountered and the degree of difficulty to be expected in the performance of the work. The CONTRACTOR is encouraged to perform his own subsurface investigation.

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B. Do not assume that materials other than those disclosed by the borings will not be encountered or that the proportions and character of the various materials will not vary from those indicated in the boring logs.

PART 2 PRODUCTS

2.01 MATERIALS

A. Carrier pipe shall be 6-inch interior diameter high density polyethylene or fusible PVC pipe with the dimension ratios as shown on the drawings and as specified in Section 02622 and Section 02623.

B. Cement grout shall consist of a mixture of 1 part cement to 6 parts sand. The amount of cement may be increased or decreased as necessary and as permitted by the ENGINEER to provide good flowing characteristics.

C. Lubricant shall be bentonite or polymer based slurry.

2.02 EQUIPMENT

A. The drill rig and associated equipment shall be in good condition and capable of completing the project without significant delays.

B. The drill bit and reamers shall have a closed face and shall be capable of supporting the excavated area (face) during excavation and shutdown. The bit shall be full directional in both the horizontal and vertical directions from the drill rig so that the alignment can be maintained during the entire drilling operation.

C. The drill bit shall be capable of drilling though all materials encountered including sand, gravel, cobbles, organics and marine clay.

PART 3 EXECUTION

3.01 ACCESS PITS/PREPARATION

A. Excavation, trenching, dewatering, sheeting, shoring and bracing shall comply with all applicable requirements of OSHA and these Specifications.

B. Locate and protect existing utilities as required. Coordinate utility protection with the respective utility companies.

3.02 HDD OPERATIONS

A. Though the installation process may be licensed or proprietary in nature, the CONTRACTOR shall not change any material, thickness, design, values or procedural matters stated in the submittals, without the prior knowledge and approval of the ENGINEER. The CONTRACTOR shall submit, in writing, full details about component materials, their properties and installation procedures and abide by them fully during the entire course of the work.

B. Ream the pilot hole to a diameter which is sufficiently sized to reduce forces applied to the pipe during pull back. Intermediate temporary pipes may be used as required to install final pipe.

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C. If pulling equipment is not capable of monitoring pulling forces imposed upon the pipe, a weak link shall be between the pipe and the molehead/reamer in order not to exceed the safe pulling strength as prescribed by the pipe manufacturer.

D. Install a swivel between the molehead/reamer and pipe connection to minimize torsional stresses imposed on the pipe.

E. Pressure grout the annular space around the final pipe if the final ream produces a theoretical annular space of more than 0.02 cu ft per linear foot of pipe.

F. Directly install the recycled effluent water line in locations shown on the Drawings by making either a single or multiple passes with a directional drill to the lines and grades indicated.

G. Install the pipe with no interruption in traffic.

H. Install the pipe from either a pit that allows the pipe installation along the proposed grade directly or by drilling an initial sacrificial tangent section outside the limits of the alignment that is then excavated and cut-off or turned down to make the pipe connection at the grades indicated.

I. Provide remote sensing at the drill rig to maintain alignment of the drilling operation and provide a profile and plan locations of the as-installed pipe.

J. Install final pipe as one continuous fused string. Install final pipe in a continuous operation without allowing the pipe to set in the ground unmoved.

K. Pull pipe into place without damaging the pipe joints or pipe sections. Replace any pipe damaged during installation at no additional cost to the OWNER.

L. Maintain proper lubrication during pipe installation to reduce the exterior friction and possibility of the pipe seizing in place.

M. Submit a written record of each drive for daily review by the ENGINEER.

3.03 MONITORING

A. Surface Settlement Monitoring

1. Make a visual inspection of the roadway from the each shoulder to look for signs of settlement on a hourly basis during the time of active drilling.

2. Establish surface settlement monitoring points on the shoulders of the roadway and at any intermediate points which may be accessible or as directed by San Luis Obispo County. Establish surface settlement monitoring points along the centerline of the pipe. Install additional monitoring points at locations deemed necessary.

3. Record location of settlement monitoring points with respect to construction baselines and elevations. Record elevations to an accuracy of 0.01 feet for each monitoring point location. Establish monitoring points at locations and by methods that protect them from damage by construction operations, tampering, or other external influences.

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4. Monitor ground settlement directly above and 10-ft before and after any utility or pipeline intersection.

B. Reporting Frequency

1. Submit records of readings daily from the various surface settlement monitoring points and visual observations of the creek along the centerline of the pipe.

2. Report any loss of ground, roadway cracking, depression or settlement or other unusual activities immediately.

C. HDD operations shall limit vibrations transmitted to surrounding structures so as not to cause damage.

D. Disposal of Wastes and Groundwater

1. The CONTRACTOR shall dispose of all waste soils, slurries and other wastes in accordance with applicable regulations. No waste shall be left on-site following completion of the work.

2. The CONTRACTOR shall dispose of all groundwater generated by dewatering operations and any surface water entering access pits in accordance with Section 02140.

3.04 GROUND SURFACE MOVEMENTS AND TOLERANCES

A. Ground Surface Movement. Settlement or heave of the ground surface along the HDD alignment shall not exceed 0.5-in.

B. Tolerances.

1. No more than 3-in horizontal and 3-in vertical deviation from design location shall be permitted in the position of the carrier pipe.

2. When the initial bore deviates from the design line or grade by amounts greater than that specified, return the pipe to design line or grade plus or minus the specified tolerance at a rate of not more than 1-in per 25 feet.

3. If either pipe is off design line or grade by an amount that requires redesign of the pipeline or associated structures, the CONTRACTOR shall do so at no additional cost to the OWNER.

END OF SECTION

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SECTION 02200

EARTHWORK

PART 1 GENERAL

1.00 STATUTORY REQUIREMENTS

A. All excavation, trenching, sheeting, bracing, etc shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P), State and local requirements. Where conflict between OSHA, State and local regulations exists, the most stringent requirements shall apply.

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and perform all excavation work and grading; place and compact backfill and fill; and dispose of unsuitable, waste and surplus materials as shown on the Drawings and as specified herein.

B. Provide the services of a licensed professional engineer registered in the State of California, to prepare temporary excavation support system designs and submittals.

C. Furnish and install temporary excavation support systems, including sheeting, shoring and bracing, to insure the safety of personnel and protect adjacent structures, piping, etc, in accordance with Federal, State and local laws, regulations and requirements.

1.02 RELATED WORK

A. Site Preparation is included in Section 02100.

B. Dewatering is included in Section 02140.

C. Trenching, Backfilling and Compaction is included in Section 02221.

D. Revegetation are included in Section 02930.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, the proposed methods of construction, including excavation, excavation support systems designs, backfilling and filling and compaction for the various portions of the work. Excavation support system designs shall be prepared by a licensed professional engineer, registered in the State of California, having a minimum of 5 years of professional experience in the design and construction of excavation support systems. Review will be for information only. CONTRACTOR shall remain responsible for adequacy and safety of construction means, methods, and techniques.

B. The CONTRACTOR shall submit a copy of the excavation permit issued by the California Department of Industrial Safety.

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1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C33 – Standard Specification for Concrete Aggregates

2. ASTM D422 – Standard Test Method for Particle-Size Analysis of Soils

3. ASTM D806 - Standard Test Method for Cement Content of Hardened Soil-Cement Mixtures

4. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

5. ASTM D1633 – Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

6. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

7. ASTM D3786 - Standard Test Method for Bursting Strength of Textile Fabrics, Diaphragm Bursting Strength Tester Method

8. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

9. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity

10. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

11. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile

12. ASTM D5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles

13. ASTM D5982 – Standard Test Method for Determining Cement Content of Fresh Soil-Cement (Heat of Neutralization Method)

B. California Test Methods (CTM)

1. CTM 216 – Method of Test for Relative Compaction of Untreated and Treated Soils

2. CTM 217 – Method of Test for Sand Equivalent

3. CTM 229 – Method of Test for Durability Index

4. CTM 231 – Method of Test for Relative Compaction of Untreated/Treated Soils and Aggregates

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5. CTM 301 – Method of Test for Determining the Resistance "R" Value of Treated and Untreated Bases, Subbases and Basement Soils by the Stabilometer

6. CTM 422 – Method of Testing Soils and Waters for Chloride Content

7. CTM 643 – Method for Determining Field and Laboratory Resistivity and pH Measurements for Soil and Water

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. Prior to and during the placement of backfill and fill coordinate with the soils testing laboratory to perform in-place soil density tests to verify that the backfill/fill material has been compacted in accordance with the compaction requirements specified elsewhere. The ENGINEER may designate areas to be tested.

1.06 DEFINITIONS

A. Where the phrase "in-the-dry" is used in this Section, it shall be defined to mean a soil condition such that the in-place moisture content of the soil at that time is no more than two percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction.

B. Where used in this Section "structures" refers to all buildings, wet wells, manholes and below grade vaults. Stormwater structures and duct banks are not considered structures in this context.

PART 2 PRODUCTS

2.01 SUITABLE FILL AND BACKFILL MATERIAL REQUIREMENTS

A. Fill, backfill, and embankment materials shall be selected or processed clean, fine earth, rock, or sand, free from grass, roots, brush, or other vegetation.

B. Fill and backfill materials to be placed within 6 inches of any structure or pipe shall be free of rocks or unbroken masses of earth materials having a maximum dimension larger than 3 inches.

C. Suitable Materials: Materials not defined as unsuitable below are defined as suitable materials and may be used in fills, backfilling, and embankment construction subject to the indicated limitations. In addition, when acceptable to the ENGINEER, some the material listed as unsuitable may be used when thoroughly mixed with suitable material to form a stable composite.

D. Suitable materials may be obtained from on-site excavations, may be processed on-site materials, or may be imported. If imported materials are required by this Section or to meet the quantity requirements of the project, the CONTRACTOR shall provide the imported materials at no additional expense to the OWNER.

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E. The following types of suitable materials are defined.

1. Type A. (three-quarters inch minus granular backfill): Crushed rock or gravel, and sand with the gradation requirements below. The material shall have a minimum sand equivalent value of 28 and a minimum R-value of 78. If the sand equivalent value exceeds 35 the R-value requirement is waived.

Sieve Size	Percentage Passing
3/4-inch	100
No. 4	30 - 50
No. 200	0 - 12

2. Type B (Class 1 crushed stone): Manufactured angular, crushed stone, crushed rock, or crushed slag with the following gradation requirements. The materials shall have a minimum sand equivalent value of 75.

Sieve Size	Percentage Passing
3/4-inch	100
No. 4	30-50
No. 200	0-5

3. Type C (sand backfill): Sand with 100 percent passing a 3/8-inch sieve, at least 90 percent passing a Number 4 sieve, and a sand equivalent value not less than 30.

4. Type D (sand): Native sand or import, material having a sand equivalent of at least 30, free from clay or organic material, and complying with the grading requirements shown in the following table:

Sieve Size	Percentage Passing
No. 4	90 - 100
No. 200	0-5

5. Type E (free-draining backfill): Crushed rock or gravel with the following gradation requirement (Size Number 8 in ASTM C 33 – Concrete Aggregates):

Sieve Size	Percentage Passing
½”	100
3/8”	85 - 100
No. 4	10 - 30
No. 8	0 - 10
No. 16	0 - 5

6. Type F (coarse drainrock): Crushed rock or gravel comprised of hard, durable particles that are free of slaking or decomposition under the action of alternate wetting or drying cycles. Drainrock shall have a durability index of at least 40 when tested according to California Test Method 229. The material shall meet the following gradation requirements:

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Sieve Size	Percentage Passing
2”	100
1 ½”	90 - 100
1”	30 - 70
¾”	0 - 15
No. 4	0 - 5

7. Type G (Class 2 aggregate base): Aggregate base material of such nature that it can be compacted readily by watering and rolling to form a firm, stable base for pavements. Aggregate may include material processed from reclaimed asphalt concrete, Portland cement concrete, lean concrete base, cement treated base, or a combination of any of these materials. The amount of reclaimed material shall not exceed 50 percent of the total volume of the aggregate used.

   At the option of the CONTRACTOR, the grading for either the 1-1/2-inch maximum size of ¾-inch maximum size gradation shall be used. The sand equivalent value shall not be less than 22, and the material shall meet the following gradation and quality requirements:

	Percentage Passing	
Sieve Size	1-1/2-inch Max. Gradation	3/4-inch Max Gradation
2-inch	100	-
1-1/2-inch	90 - 100	-
1-inch	-	100
¾-inch	50 - 85	90 – 100
No. 4	25 - 45	35 – 60
No. 30	10 - 25	10 – 30
No. 200	2 - 9	2 - 9

Quality Requirements

Test	Test Method	Minimum Value
Resistance (R-value)	Calif. 301	78
Sand Equivalent	Calif. 217	22
Durability Index	Calif. 229	35

8. Type H (graded drainrock): Drainrock shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternative wetting or drying. Graded drainrock shall have a durability index of at least 40 when tested according to California Test Method 229. The material shall meet the following gradation requirements (Size Number 57 in ASTM C 33):

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Sieve Size	Percentage Passing
1 ½”	100
1”	95 – 100
½”	25 – 60
No. 4	0 – 10
No. 8	0 – 5

The drainrock shall have a sand equivalent value not less than 75. The finish graded surface of the drainrock immediately beneath hydraulic structures shall be stabilized to provide a firm, smooth surface upon which to conduct reinforced concrete floor slabs.

:

9. Type I: Select Native Backfill, Retaining Wall Backfill, Embankment Fill, and General Fill. Suitable on-site or imported material that is free of organics, debris, oversized material greater than 3 inches, or other deleterious materials and meets the requirements of Paragraph 2.3.

10. Type K (topsoil): Stockpiled topsoil material which has been obtained at the site by removing soil to depth not exceeding 2 feet. Removal of the topsoil shall be done after the area has been stripped of vegetation and debris.

11. Type L (flowable fill): Flowable fill shall be in accordance with Section 02210 – Flowable Fill.

12. Type M (Aggregate Subbase): Aggregate subbase material that can be compacted readily by watering and rolling to form a firm stable base. Aggregate shall conform to the grading and quality requirements shown in the following tables:

Sieve Size	Percentage Passing
3”	100
2 ½”	90 to 100
No. 4 (4.75 mm)	35 to 70
No. 200 (0.075 mm)	0 to 20

Quality Requirements

Test	Method	Minimum Value
Sand Equivalent	Calif. 217	18
R-Value	Calif. 301	60

13. Type N (trench plug): Low permeable fill material, a non-dispersible clay material having a minimum plasticity index of 10. Alternatively, Flowable Fill may be used for trench plug construction.

14. Type O (bank-run gravel): Bank-run gravel shall consist of material obtained from a natural source that meets the following gradation requirements:

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Sieve Size	Percentage Passing
2-inch	100
1-1/2-inch	90 - 100
¾-inch	50 - 85
No. 4	25 - 45
No. 30	10 - 25
No. 200	2 - 9

2.02 UNSUITABLE MATERIAL

A. Unsuitable materials include the materials listed below.

1. Soils which, when classified under ASTM D 2487 – Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System), fall in the classifications of PT, OH, CH, MH, or OL.

2. Soils which cannot be compacted sufficiently to achieve the density specified for the intended use. Also see Paragraph 2.2.A.6.

3. Materials that contain hazardous or designated waste materials including petroleum hydrocarbons, pesticides, heavy metals, and any material which may be classified as hazardous or toxic according to applicable regulations.

4. Soils that contain greater concentrations of chloride or sulfate ions, or have a soil resistively or pH less than the existing on-site soils.

5. Topsoil, except as allowed below.

6. Soils that cannot be compacted because they are at greater than optimum moisture content are not unsuitable. The CONTRACTOR shall blade, aerate and/or mix with dry material such that optimum moisture is achieved.

2.03 USE OF FILL, BACKFILL, AND EMBANKMENT MATERIAL TYPES

A. The CONTRACTOR shall use the types of materials as designated herein for all required fill, backfill, and embankment construction hereunder.

B. Where these Specifications conflict with the requirements of any local agency having jurisdiction or with the requirements of a pipe material manufacturer, the ENGINEER shall be immediately notified. In case of conflict between types of pipe embedment backfills, the CONTRACTOR shall use the agency-specified backfill material if that material provides a greater degree of structural support to the pipe, as determined by the ENGINEER. In case of conflict between types of trench or final backfill types, the CONTRACTOR shall use the agency-specified backfill material if that material provides the greater in-place density after compaction.

C. Fill and backfill types shall be used in accordance with the following provisions:

1. Embankment fills and General Fill shall be constructed of Type I material, as defined herein.

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Fill materials to be placed within3 feet of finished grade in pavement areas shall have an R-value of at least 50 as determined by CTM 301.

Imported fill materials used in building areas shall have an Expansion Index of less than 20. Imported fill materials shall be reviewed by the ENGINEER prior to being brought to the site; however, imported fill material shall comply with all specifications for those materials as placed at the site.

2. Pipe zone backfill, as defined under "Pipe and Utility Trench Backfill" below, shall consist of the following materials.

   a. For dry trench conditions (i.e. non-groundwater areas) for pipelines up to 12 inches in diameter, the pipe zone material shall be Type D material obtained on-site. At the CONTRACTOR's option and cost imported materials may be used. Suitable imported materials are Types D, E, and G. If Type E is used, the CONTRACTOR shall wrap the bedding in geosynthetic filter fabric, also at its cost.

   b. For pipelines 12 inches and greater in diameter and for all pipelines in wet trench conditions (i.e. in groundwater areas with proper dewatering) the pipe zone from below the pipe to the pipe springline shall consist of Type E backfill wrapped in geosynthetic filter fabric..

3. Trench zone backfill for pipelines as defined under "Pipe and Utility Trench Backfill" shall be Type I backfill material. Trench zone backfill material shall have at least 85 percent of the material passing the No. 4 sieve. Type K material may be used for trench zone backfill in agricultural areas unless otherwise shown or specified.

4. Final backfill material for pipelines under paved areas, as defined under "Pipe and Utility Trench Backfill" shall be Type G backfill material. Final backfill under areas not paved shall be the same material as that used for trench backfill, except Type K material shall be used for the final backfill in agricultural areas unless otherwise indicated.

5. Trench backfill and final backfill for pipelines under structures shall be the same material as used in the pipe zone, except where concrete encasement is required by the Contract Documents.

6. Aggregate base materials under pavements shall Type G material constructed to the thickness indicated. Aggregate subbase shall be Type M material. Trench backfill materials placed within 3 feet of finished grade in pavement areas shall have an R-value of at least 50 as determined by Caltrans Test 301.

7. Backfill around structures shall be Type I material, except as shown.

8. Structural Fill shall be as follows:

   a. Drainrock materials under hydraulic structures or other water retaining structures with underdrain systems shall be Type H material.

   b. Under concrete hydraulic structures or other water retaining structures without underdrain systems, Types G or H materials shall be used.

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c. Under structures where groundwater must be removed to allow placement of concrete, Type F material wrapped in geotextile shall be used.

d. For all other Structural Fill applications, Type G or H material shall be used.

9. Backfill for disposal system vertical well and horizontal French drain type systems shall be Type E gravel.

10. Gravel backfill for the retaining wall chimney and collection drains shall be a Type H material.

11. Retaining wall backfill material shall consist of a Type I native or imported material conforming to Caltrans Standard Specifications for Structural Backfill, Section 19-3.06, and having a sand equivalent (SE) of at least 30.

12. The top 6 inches of fill on reservoir roofs, embankment fills around hydraulic structures, and all other embankment fill shall consist of Type K material, topsoil.

13. Geosynthetics used for filter fabric must be permeable and nonwoven. Filter fabric must be manufactured from polyester, polypropylene, or a combination thereof. The properties of filter fabric must have the values shown in the following table:

Property	Test	Value		
		Class A	Class B	Class C
Grab breaking load, 1-inch grip, lb (min. in each direction)	ASTM D4632	157		
Apparent elongation, percent (min. in each direction)	ASTM D 4632	50		
Min. hydraulic bursting strength, psi	ASTM D 3786	210		
Ultraviolet resistance, percent min retained grab breaking load, 500 hours	ASTM D 4355	70		
Permittivity, sec^{-1} min	ASTM D 4491	0.5	0.2	0.1
Max. apparent opening size, average roll value, U.S. standard sieve size	ASTM D 4751	40	60	70

14. Geotextile for Subgrade Stabilization: Geotextile to be used for subgrade stabilization in building areas shall fabric must be a permeable, nonwoven, needle-punched geotextile. The fabric must be manufactured from polyester, polypropylene, or a combination thereof. Polymers must be either virgin compounds or clean reworked material. Do not subject virgin compounds to use or processing other than required for initial manufacture. Clean reworked material must be previously processed material from the processor's own production that has been reground, pelletized, or solvated. The fabric must not contain more than 20 percent of clean reworked material by weight. Do not use recycled materials from either post-consumer or post-industrial sources. The properties of the geotextile must have the values shown in the following table:

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Property	Test	Value
Minimum mass, oz/sq yd	ASTM D 5261	7.5
Grab breaking load, lb, 1-inch grip (minimum in each direction)	ASTM D 4632	200
Apparent elongation, percent (minimum in each direction)	ASTM D 4632	50
Minimum permittivity, sec^{-1}	ASTM D 4491	1.0
Apparent opening size, U.S. Standard sieve size:	ASTM D 4751	70–100
Ultraviolet resistance, percent (minimum retained grab breaking load, 500 hours)	ASTM D 4355	70

2.04 MATERIALS TESTING

A. All soils testing of samples submitted by the CONTRACTOR will be done by a testing laboratory of the ENGINEER's choice and at the OWNER's expense. At its discretion, the ENGINEER may request that the CONTRACTOR supply samples for testing of any material used in the work. All materials shall comply with the specifications as-placed at the job site.

B. Particle size analysis of soils and aggregates will be performed using ASTM D 422 – Standard Test Method for Particle-Size Analysis of Soils.

C. Determination of sand equivalent value will be performed using CTM 217.

D. Unified Soil Classification System: References in the Section to soil classification types and standards shall have the meanings and definitions indicated in ASTM D 2487. The CONTRACTOR shall be bound by all applicable provisions of said ASTM D 2487 in the interpretation of soil classifications.

E. The testing for chloride, sulfate, resistively, and pH will be done in accordance with California Test Methods 417, 422, and 643 of the California Department of Transportation.

PART 3 EXECUTION

3.01 PREPARATION

A. Potholes

1. Perform exploratory excavation work (potholes) for the purpose of verifying the location of underground utilities and structures and to check for unknown utilities and structures, prior to commencing excavation work.

2. Potholes shall be backfilled as soon as the desired information has been obtained. Backfilled surfaces shall be stabilized in accordance with approved erosion and sedimentation control plans.

B. Dewatering and Drainage Systems

1. Temporary dewatering and drainage systems in accordance with Section 02140 shall be in place and operational prior to beginning excavation work.

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3.02 EXCAVATION SUPPORT

A. Furnish, install, monitor and maintain excavation support (e.g., shoring, sheeting, bracing, trench boxes, etc) as required by Federal, State or local laws, ordinances, regulations and safety requirements. Support the sides of excavation, to prevent any movement which could in any way reduce the width of the excavation below that necessary for proper construction and protect adjacent structures from undermining, settlement or other damage. Take care to prevent the formation of voids outside of sheeting. If voids occur behind sheeting, immediately backfill and compact the voids with General Fill material. Voids in locations that cannot be properly compacted upon backfilling shall be filled with lean concrete.

B. Install excavation supports outside the neat lines of foundations. Supports shall be plumb and securely braced and tied in position. Excavation support shall be adequate to withstand all pressures to which the supports will be subjected. Any movement or bulging of supports shall be corrected to provide the necessary clearances, dimensions and structural integrity.

C. Excavation Supports Left in Place

1. The OWNER or ENGINEER may direct that certain excavation supports remain in place, or be cut off at any specific elevation. If the CONTRACTOR believes that such a directive increases CONTRACTOR's cost and would thereby entitle CONTRACTOR to a change in contract cost, CONTRACTOR shall notify the ENGINEER in accordance with the applicable article(s) in the General Conditions pertaining to changes in the work.

2. The right of the OWNER or ENGINEER to direct that certain excavation supports remain in place shall not be construed as creating any obligation on the OWNER or ENGINEER to give such direction, nor shall failure to give such direction relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient excavation supports to prevent any movement of the ground or damage to adjacent structures.

D. Excavation supports shall be carefully removed in such manner so as not to endanger the WORK or other adjacent structures, utilities, or property. All voids left or caused by withdrawal of supports shall be immediately filled with sand and compacted.

3.03 STRUCTURAL EXCAVATION PROCEDURES

A. Excavations for structures shall be suitably wide for construction of the structures, including excavation supports, dewatering and drainage systems and working clearances.

B. Excavation shall be performed in-the-dry and shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Drainage and dewatering systems shall be in place and operational prior to beginning excavation work. In no case shall the earth be plowed, scraped or excavated by any means so near to the finished subgrade that would disturb the finished subgrade. Hand excavation of the final 3 to 6-in may be required to obtain a satisfactory, undisturbed subgrade. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering, or other construction methods shall be removed and replaced with lean concrete or structural fill as

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defined in paragraph 2.3.C.8, subject to prior approval by the ENGINEER, at no additional cost to the OWNER.

C. Subgrade Preparation

1. All structures unless otherwise shown on the Drawings or otherwise specified herein:

   a. Compact the top 12-in of subgrade to a minimum of 95 percent relative compaction (based on ASTM D1557 or CTM 216).

2. Where existing subgrade contains a significant amount of clay or cohesive soils, over-excavate sufficiently below the bottom of structure for placement of a lean concrete working mat. Prior to placing the lean concrete working mat, compact the top 12-in of existing subgrade to a minimum of 95 percent relative compaction (based on ASTM D1557 or CTM 216).

D. When excavations have reached the required subgrade, including any allowances for working mats or base materials, prior to the placement of working mats or base materials, notify the soils testing laboratory to verify the suitability of the existing subgrade soils for the anticipated foundation and structural loadings. If the existing subgrade soils are determined to be unsuitable, direction will be provided by the ENGINEER regarding removal and replacement with suitable materials. If CONTRACTOR believes that such direction would increase CONTRACTOR's cost and would thereby entitle CONTRACTOR to a change in Contract cost, CONTRACTOR shall notify the ENGINEER in accordance with the applicable article(s) in the General Conditions pertaining to changes in the work.

E. Over-excavation beyond the limits and depths required by the Contract Documents shall be replaced at no additional cost to the OWNER by lean concrete or other approved material subject to the prior approval of the ENGINEER.

3.04 GENERAL FILLING AND BACKFILLING PROCEDURES

A. Fill and backfill materials shall be placed in lifts to suit the specified compaction requirements to the lines and grades required, making allowances for settlement and placement of cover materials (i.e. topsoil, sod, etc). Soft spots or uncompacted areas shall be corrected.

B. Compaction in open areas may be accomplished by any of the following methods: compaction equipment, fully loaded ten-wheel trucks, tractor dozers weighing at least 30,000 lbs and operated at full speed, or heavy vibratory rollers. Compaction in confined areas (including areas within a 45 degree angle extending upward and outward from the base of a wall) and in areas where the use of large equipment is impractical, shall be accomplished by hand operated vibratory equipment or mechanical tampers. Lift thickness shall not exceed 6-in (measured before compaction) when hand operated equipment is used.

C. Fill and backfill shall not be placed and compacted when the in-place moisture content of the soil at that time is more than three percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction.

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3.05 FILL AND BACKFILL PROCEDURES

A. Fill required beneath foundations or slabs on grade (except sidewalks) shall be structural fill as defined in paragraph 2.3.C.8. Place and compact structural fill in even lifts having a maximum thickness (measured before compaction) of 8-in.

B. Fill and backfill material placed immediately adjacent to and within 10-ft of all structures shall be Type I fill. All structure water-tightness tests and dampproofing/waterproofing shall be completed prior to placing fill or backfill around structures. Place and compact fill in even lifts having a maximum thickness (measured before compaction) of 8-in uniformly around the structure.

C. General fill may be used in areas beyond those designated for select fill unless shown or specified otherwise. General fill shall be placed in even lifts having a maximum thickness (measured before compaction) of 12-in.

3.06 EMBANKMENT FILL PROCEDURES

A. Prior to placing embankment fill materials, all organic materials (including peat and loam) and loose inorganic silt material (loess) shall be removed from areas beneath the embankments. If the subgrade slopes are excessive, the subgrade shall be stepped to produce a stable, horizontal surface for the placement of embankment materials. The existing subgrade shall then be scarified to a depth of at least 6-in.

B. Embankment fill shall consist of material meeting the specifications in paragraph 2.3.C.1. and be placed and compacted in even lifts (measured before compaction) of 12-in.

C. Rock may be used in embankment fill only with prior, written approval of the ENGINEER.

3.07 IMPERVIOUS FILL

A. Impervious fill shall consist of Type N material and be placed in controlled, even lifts having a maximum thickness (measured before compaction) of 6-in. Compaction shall be sufficient to attain a permeability of less than $1x10^{-7}$ cm/sec.

B. Moisture content of impervious fill to be compacted shall be maintained at or near its optimum moisture content (minus 2 to plus 3 percent).

3.08 COMPACTION REQUIREMENTS

A. Beneath foundations and slabs on grade (except sidewalks): Compact the top 12-in of existing subgrade (and each layer of fill if applicable) to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

B. 10-ft around structures: Compact the top 12-in of existing subgrade and each layer of fill or backfill to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

C. Embankments (except under roadways), lawn or unimproved areas: Compact the top 6-in of existing subgrade and each layer of fill or backfill to a minimum of 90 percent modified protector (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

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D. Roads, paved areas and roadway embankments: Compact the top 12-in of existing subgrade and each layer of fill or backfill to a minimum of 90 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 1 to plus 4 percent). Compact fill in the upper 3 feet to a minimum of 95 percent modified proctor (ASTM D1557) at or near its optimum moisture content (minus 2 to plus 3 percent).

3.09 DISPOSAL OF UNSUITABLE, WASTE AND/OR SURPLUS EXCAVATED MATERIAL

A. Unsuitable, waste and surplus excavated material shall be removed and disposed of off-site. Materials may be temporarily stockpiled in an area within the limits of construction that does not disrupt construction activities, create any nuisances or safety hazards, or otherwise restrict access to the work site.

3.10 GRADING

A. Grading shall be performed to the lines and grades shown on the Drawings. All objectionable material encountered within the limits indicated shall be removed and disposed of. Subgrades shall be completely and continuously drained and dewatered throughout the grading process. Install temporary drains, drainage ditches, etc, to intercept or divert surface water which may affect the execution or condition of grading work.

B. If at the time of grading it is not possible to place any material in its proper section of the WORK, it shall be stockpiled in approved areas for later use. No extra payment will be made for the stockpiling or double handling of excavated material.

C. Stones or rock fragments larger than 4-in in their greatest dimensions will not be permitted within the top 6-in of the finished grade of fills and embankments.

D. In cut areas, all loose or protruding rocks in slopes shall be removed to line or finished grade of the slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings unless otherwise directed by the ENGINEER.

END OF SECTION

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SECTION 02210

FLOWABLE FILL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install all flowable fill complete as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Dewatering is included in Section 02140.

B. Earthwork is included in Section 02200.

C. Trenching, Backfill, and Compaction are included in 02221.

D. Cast-in-Place Concrete is included in Section 03300.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings and product data. Submittals shall include the following:

1. Constituent quantities per cubic yard of the flowable fill mix including water content, cement factor, type and amount of fly ash and type and manufacturer of cement.

2. Technical data on all materials and components.

3. If the CONTRACTOR proposes to use native aggregate, submittals shall include a testing program that will be used to control the variability of the aggregates. The testing program shall be approved by the ENGINEER.

B. Test Reports

1. Sieve analysis of aggregate.

2. Laboratory test results of the compressive strength of the proposed mix.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C33 - Standard Specification for Concrete Aggregates.

2. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

3. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

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4. ASTM C150 - Standard Specification for Portland Cement.

5. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

6. ASTM D4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength Material Test Cylinders.

B. American Concrete Institute (ACI).

1. ACI 301 - Standard Specification for Structural Concrete.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All testing and inspection services required, unless otherwise specified, shall be provided and paid for by the OWNER. Testing necessary to establish the mix shall be performed by and at the expense of the CONTRACTOR. Methods of testing shall comply with the latest applicable ASTM Methods except as specified herein.

1.06 DELIVERY, STORAGE AND HANDLING

A. Products shall be stored in conformity with the manufacturer's recommendations.

B. Fly ash, aggregate and cement shall be stored or stockpiled in conformity with the recommendations of ACI 301.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. Materials shall comply with this Section and any applicable State or local requirements.

2.02 MATERIALS

A. Cement shall be domestic portland cement conforming to ASTM C150, Type II.

B. Fly ash shall conform to ASTM C618, Class C or Class F.

C. Aggregate shall be inert natural native or imported sand conforming to the requirements of ASTM C33 or inert natural sand containing aggregate sizes not greater than 3/8-in and having given satisfactory flowability, strength and setting time when used in comparable flowable fill mixes. Aggregates shall not be expansive or reactive.

D. Water shall be clean and free from injurious amounts of oils, acids, alkalis, organic matter, or other deleterious substances. Chloride content shall be less than 50 ppm.

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E. Admixtures manufactured specifically manufactured for use in flowable fills will be considered for approval. Admixtures shall be free of chlorides and alkalis (except for those attributable to water). Admixtures shall be compatible with the mix and shall be suitable for use in contact with potable water after curing. Admixtures causing retarded or accelerated setting of the mix shall not be used without written approval from the ENGINEER.

2.03 MIXES

A. Select proportions of ingredients to meet the minimum design strength of 100 psi and to produce a fill having proper placability, durability and strength. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles without permitting materials to segregate.

B. Compression Tests: Furnish testing of the proposed mix to demonstrate compliance with the compression strength requirements.

C. Slump of the mix, as measured by ASTM C143, shall be approximately 8-in.

2.04 MEASURING, BATCHING, MIXING AND TRANSPORTING

A. Measuring, batching, mixing and transporting shall conform to ASTM C94 and the requirements herein or as otherwise approved in writing by the ENGINEER.

B. Ready-mixed flowable fill, whether produced by a concrete supplier or the CONTRACTOR shall conform to the requirements above. No hand mixing will be permitted.

C. The flowable fill shall be mixed until there is uniform distribution of the materials and shall be discharged completely before the mixer is recharged. Fill which has been remixed or retempered shall be rejected.

PART 3 EXECUTION

3.01 INSPECTION AND COORDINATION

A. The batching, mixing, transporting and placing and of the flowable fill shall be subject to the inspection of the ENGINEER at all times. No placement shall be made without the inspection and acceptance of the preparations by the ENGINEER.

3.02 APPEARANCE

A. The flowable fill shall have a homogeneous structure which, when hardened, will have the required strength and durability.

3.03 PLACING

A. No flowable fill shall be placed until the condition of subgrade and method of placement have been approved by the ENGINEER. Before depositing flowable fill, all debris and foreign matter shall be removed from the excavation. Flowable fill shall not be placed in water or submerged within 24 hours after placing, nor shall running water be permitted to flow over the surface of fresh flowable fill.

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B. Deposit the mix as near its final position as possible to avoid segregation due to rehandling or flowing. Pumping of the mix will be permitted when the approved design mix is based on pumping. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials.

3.04 CURING AND PROTECTION

A. Protect all flowable fill against injury from the elements and damage of any nature during construction operations.

B. Flowable fill placed during cold weather shall be protected against freezing. Salt, manure or other chemicals shall not be used for cold weather protection.

3.05 FIELD TESTS

A. Sets of 6-in by 12-in test cylinders will be taken of the work by the ENGINEER following the procedures given in ASTM D4832. The number of sets of test cylinders shall be at the discretion of the ENGINEER. The cylinders shall be capped with neoprene for testing. When the average compressive strength of the cylinders in any set falls below the required compressive strength; the ENGINEER may reject the fill represented by the set of cylinders or require modification of the proportions of the design mix to achieve the required strengths.

B. Cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated closed curing box for specimens, affording protection to the specimens against injury or loss through the operations and furnishing material and labor required for the purpose of taking test cylinder samples. All shipping of specimens will be paid for by the OWNER.

C. Slump tests will be made in the field by the construction manager in conformity with ASTM C143.

END OF SECTION

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SECTION 02221

TRENCHING, BACKFILLING AND COMPACTION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and perform all trenching for pipelines and appurtenances, including drainage, filling, backfilling, disposal of surplus material and restoration of trench surfaces and easements.

B. Excavation shall extend to the width and depth shown on the Drawings or as specified herein and shall provide suitable room for installing pipe, structures and appurtenances.

C. Furnish and place all sheeting, bracing and supports and remove from the excavation all materials which the ENGINEER may deem unsuitable for backfilling. The bottom of the excavation shall be firm, dry and in all respects, acceptable. If conditions warrant, deposit gravel for pipe bedding, or gravel refill for excavation below grade, directly on the bottom of the trench immediately after excavation has reached the proper depth and before the bottom of the trench has become softened or disturbed by any cause whatever. The length of open trench shall be related closely to the rate of pipe laying. All excavation shall be made in open trenches.

D. All excavation, trenching and related sheeting, bracing, etc, shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P) and State requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.

E. Wherever the requirement for 95 percent compaction is referred to herein it shall mean "at least 95 percent of maximum dry density as determined by ASTM D1557 or by CTM 216".

F. Prior to the start of work submit the proposed method of backfilling and compaction to the ENGINEER for review.

1.02 RELATED WORK

A. Dewatering is included in Section 02140.

B. Earthwork is included in Section 02200.

C. Flowable Fill is included in Section 02210.

D. Excavation Support and Protection is included in Section 02311.

E. Pavement repair and resurfacing is included in Section 02576.

F. Revegetation is included in Section 02930.

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PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Pipe bedding, pipe zone, and trench backfill materials shall be in accordance with Section 02200.

2.02 GEOTEXTILE FABRIC

A. The geotextile fabric shall comply with the requirements of Section 02200, paragraph 2.3.C.

B. Edges shall be salvaged or otherwise finished to prevent outer material form pulling away from geotextile.

2.03 BURIED WARNING AND IDENTIFICATION TAPE

A. Provide polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inches minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED RECYCLED WATER LINE BELOW", "CAUTION, BURIED SEWER LINE BELOW", or similar wording. Provide permanent color and printing, unaffected by moisture or soil

Warning Tape Color Codes

Purple: Reclaimed Water Systems
Green: Buried Sewer Systems

1. Warning Tape for Metallic Piping

Provide acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.003 inch and a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation

2.04 DETECTION WIRE FOR NON-METALLIC PIPING

A. Provide insulated single strand, solid copper detection wire with a minimum of 10 AWG for non-metallic piping as shown on the drawings.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION

A. Trench excavation shall include material of every description and of whatever substance encountered. Pavement shall be cut with a saw, wheel or pneumatic chisel along straight lines or ground on the edges before excavating.

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B. Strip and stockpile topsoil from grassed areas crossed by trenches. At the CONTRACTOR's option, topsoil may be otherwise disposed of and replaced, when required, with approved topsoil of equal quality.

C. While excavating and backfilling is in progress, traffic shall be maintained, and all utilities and other property protected as provided in the General Conditions and General Requirements.

D. Trenches shall be excavated to the depth indicated on the Drawings and in widths as defined on the Drawings. The bottom of the excavations shall be firm and dry and in all respects acceptable to the ENGINEER.

E. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. The trench may be excavated by machinery to, or just below the designated subgrade, provided that material remaining in the bottom of the trench is no more than slightly disturbed. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by Type F, G, or H fill as noted in Section 02200, paragraph 2.3.C.8, as required by the ENGINEER at the CONTRACTOR's expense.

F. Clay and organic silt soils are particularly susceptible to disturbance due to construction operations. Care should be taken to avoid disturbing these soils.

G. Where pipe is to be laid in screened gravel bedding, the trench may be excavated by machinery to the normal depth of the pipe provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

H. Where pipe is to be laid directly on the trench bottom, final excavation at the bottom of the trench shall provide a flat-bottom true to grade upon undisturbed material. Bell holes shall be made as required.

3.02 DISPOSAL OF MATERIALS

A. Excavated material shall be stacked without excessive surcharge on the trench bank or obstructing free access to hydrants and gate valves. Inconvenience to traffic and abutters shall be avoided as much as possible. Excavated material shall be segregated for use in backfilling as specified below.

B. It is expressly understood that no excavated material shall be removed from the site of the work or disposed of, except as directed by the ENGINEER. When removal of surplus materials has been approved by the ENGINEER, dispose of such surplus material in approved designated areas.

C. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided. When required, it shall be re-handled and used in backfilling the trench.

3.03 POTHOLES

A. Excavation of potholes may be required for the purpose of locating underground utilities or structures as an aid in establishing the precise location of new work.

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B. Potholes shall be backfilled as soon as the desired information has been obtained. The backfilled surface shall be maintained in a satisfactory condition for travel until resurfaced as specified.

3.04 EXCAVATION BELOW GRADE AND REFILL

A. Whatever the nature of unstable material encountered or the groundwater conditions, trench drainage shall be complete and effective.

B. If the CONTRACTOR excavates below grade through error or for the CONTRACTOR's own convenience, or through failure to properly dewater the trench, or disturbs the subgrade before dewatering is sufficiently complete, he may be directed by the ENGINEER to excavate below grade as set forth in the following paragraph, in which case the work of excavating below grade and furnishing and placing the refill shall be performed at his own expense.

C. If the material at the level of trench bottom consists of fine sand, sand and silt or soft earth, the subgrade material shall be removed to the extent directed and the excavation refilled with flowable fill.

3.05 BACKFILLING

A. As soon as practicable after the pipe has been laid and jointed, backfilling shall begin and thereafter be prosecuted expeditiously.

B. An impervious dam or bulkhead cutoff shall be constructed in the trench as shown on the drawings, to interrupt the unnatural flow of groundwater after construction is completed. The dam shall be effectively keyed into the trench bottom and sidewalls. Trench dams shall be trench plug material or flowable fill.

C. All backfill is to be placed and compacted per the requirements set forth in Section 02200, paragraphs 3.04 through 3.08.

D. Where a loam or gravel surface exists prior to cross-country excavations, it shall be removed, conserved and replaced to the full original depth as part of the work under the pipe items. In some areas it may be necessary to remove excess material during the clean-up process, so that the ground may be restored to its original level and condition.

E. To prevent longitudinal movement of the pipe, dumping backfill material into the trench and then spreading will not be permitted until selected material or screened gravel has been placed and compacted to a level 1-ft over the pipe.

F. Backfill shall be brought up evenly on all sides. Each layer of backfill material shall be thoroughly compacted by rolling, tamping, or vibrating with mechanical compacting equipment or hand tamping, to meet the compaction requirements of Section 02200. If rolling is employed, it shall be by use of a suitable roller or tractor, being careful to compact the fill throughout the full width of the trench.

G. Water jetting or puddling may be not used.

H. Where other methods are not practicable, compaction shall be by use of hand or pneumatic ramming with tools weighing at least 20 lbs and the material being spread and compacted in

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layers not over 6-in thick. If necessary, sprinkling shall be employed in conjunction with rolling or ramming.

I. Bituminous paving shall not be placed in backfilling.

J. All road surfaces shall be broomed and hose-cleaned immediately after backfilling. Dust control measures shall be employed at all times.

3.06 GEOTEXTILE INSTALLATION

A. Geotextile fabric shall be installed as shown on the drawings and in accordance with the manufacture's recommendations.

B. Overlaps shall be a minimum of 12 inches.

C. Maintain geotextile smooth and as free as practicable of tension, folds, wrinkles, or creases.

D. Fabric sections should be overlapped in accordance with the manufacturer's recommendations to reduce the potential for soil migration through the backfill.

3.07 RESTORING TRENCH SURFACE

A. Where the trench occurs adjacent to paved streets, in shoulders, sidewalks, or in cross-country areas, thoroughly consolidate the backfill and maintain the surface as the work progresses. If settlement takes place, immediately deposit additional fill to restore the level of the ground.

B. In and adjacent to streets, the trench backfill within 12 inches of the pavement subgrade shall consist of the following for the specified jurisdictions:

1. San Luis Obispo County – Structural Fill or compacted native material, compacted to 95% relative compaction.

C. The surface of any driveway or any other area which is disturbed by the trench excavation and which is not a part of the paved road shall be restored to a condition at least equal to that existing before work began.

D. In sections where the pipeline passes through grassed areas, and at the CONTRACTOR's own expense, remove and replace the sod, or loam and seed the surface to the satisfaction of the ENGINEER.

END OF SECTION

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SECTION 02270

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and perform all installation, maintenance, removal and area cleanup related to erosion and sedimentation control work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to; installation of temporary access ways and staging areas, silt fences, stone filter boxes, stone filter berms, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, excelsior matting installation and final cleanup.

1.02 RELATED WORK

A. Dust control is included in Section 01562.

B. Storm Water Pollution Prevention Plan is included in Section 01570.

C. Earthwork is included in Section 02200.

D. Revegetation is included in Section 02930.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, within 10 days after award of Contract, technical product literature for all commercial products, including straw mulch tackifier, to be used for erosion and sedimentation control.

1.04 QUALITY ASSURANCE

A. Be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to off site areas or into the stream system via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of the CONTRACTOR. No additional charges to the OWNER will be considered.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crushed stone for sediment filtration devices, access ways and staging areas shall conform to Caltrans Standard.

B. Berm structural stone shall be rip-rap as follows:

1. Rip-rap shall be sound, durable rock which is roughly rectangular shape and of suitable quality to insure permanence in the condition in which it is to be used. Rounded stones,

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boulders, sandstone or similar soft stone will not be acceptable. Material shall be free from overburden, spoil, shale and organic material, meet the ENGINEER's approval and be well graded within the following limits:

Weight of Stone	Percent Finer by Weight
40 lb	100
12 lb	50
3 lb	0

C. Sediment Fence

1. Sediment fence shall be a prefabricated commercial product made of a woven, polypropylene, ultraviolet resistant material such as “Envirofence” by Mirafi Inc., Charlotte, NC or equal.

D. 1/4-in woven wire mesh for filter boxes shall be galvanized steel or hardware cloth.

E. Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of sterile rice straw that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

F. Latex acrylic copolymer or organic tackifier shall be a commercial product specifically manufactured for use as straw mulch tackifier.

G. An asphalt tackifier shall only be used when temperatures are too low to allow the use of a latex acrylic copolymer and only with prior written approval from the ENGINEER.

H. Erosion control blanket shall be installed in all seeded drainage swales and ditches directed by the ENGINEER. Erosion control blanket shall be 100 percent agricultural straw matrix stitch bonded with degradable thread between two photodegradable polypropylene nettings, such as Model S150 Double Net Short-Term Blanket (10 months) by North American Green, Evansville, IN or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Sediment Fence Installation

1. Sediment fences shall be positioned as necessary to prevent off site movement of sediment produced by construction activities as directed by the ENGINEER.

2. Dig trench approximately 6-in wide and 6-in deep along proposed fence lines.

3. Drive stakes, 8-ft on center (maximum) at back edge of trenches. Stakes shall be driven 2-ft (minimum) into ground.

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4. Hang filter fabric on posts carrying to bottom of trench with about 4-in of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and maintain secure both ways.

5. Backfill trench with excavated material and tamp.

6. Install pre-fabricated silt fence according to manufacturer's instructions.

B. Construct filter boxes as directed by the ENGINEER, from 1/4-in woven wire mesh or hardware cloth and wood. Fill with crushed stone and place over all drop inlets and manholes to storm drain system as each inlet is completed. This should be done prior to setting casting, if there is a delay between installation of inlet structures or drain manholes and setting of castings. An alternate method is to ring each inlet with a sediment fence.

C. Stone Filter Berm Installation

1. Place berm structural stone across channel just below lower sandbag wall at work area. Face upstream side of structural berm with crushed stone.

D. Staging areas and access ways shall be surfaced with a minimum depth of 4-in of crushed stone.

3.02 MAINTENANCE AND INSPECTIONS

A. Inspections

1. Make a visual inspection of all erosion and sedimentation control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas, promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

B. Device Maintenance

1. Sediment Fences

a. Remove accumulated sediment once it builds up to 1/2 of the height of the fabric.

b. Replace damaged fabric, or patch with a 2-ft minimum overlap.

c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.

2. Filter Boxes

a. Replace crushed stone when it becomes saturated with silt.

3. Stone Filter Berm

a. Muck out trapped silt from dewatering operations when it has built up to within 6-in of the top of the berm.

b. Replace crushed stone filter when saturated with silt.

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4. Add crushed stone to access ways and staging area as necessary to maintain a firm surface free of ruts and mudholes.

3.03 TEMPORARY MULCHING

A. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 30 days of the completion of rough grading.

B. Straw mulch shall be applied at rate of 100 lbs/1000 sq ft and tackified with latex acrylic copolymer at a rate and diluted in a ratio per manufacturer’s instructions.

3.04 EROSION CONTROL BLANKETS

A. Erosion control blankets shall be installed in all seeded drainage swales and ditches as shown on the Drawings and as directed by the ENGINEER in accordance with manufacturer's instructions. The area to be covered shall be properly prepared, fertilized and seeded with permanent vegetation before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow and stapled. Blankets shall be placed a minimum of three rows (of 4-ft) wide (total approx. 12-ft width) within the drainage swale/ditch and stapled together in accordance with manufacturer's instructions. Side overlaps shall be 4-in minimum. The staples shall be made of wire, .091-in in diameter or greater, "U" shaped with legs 10-in in length and a 1-1/2-in crown. Commercial biodegradable stakes may also be used with prior approval by the ENGINEER. The staples shall be driven vertically into the ground, spaced approximately two linear feet apart, on each side, and one row in the center alternately spaced between each size. Upper and lower ends of the matting shall be buried to a depth of 4-in in a trench. Erosion stops shall be created every 25-ft by making a fold in the fabric and carrying the fold into a silt trench across the full width of the blanket. The bottom of the fold shall be 4-in below the ground surface. Staple on both sides of fold. Where the matting must be cut or more than one roll length is required in the swale, turn down upper end of downstream roll into a slit trench to a depth of 4-in. Overlap lower end of upstream roll 4-in past edge of downstream roll and staple.

1. To ensure full contact with soil surface, roll matting with a roller weighing 100 lbs/ft of width perpendicular to flow direction after seeding, placing matting and stapling. Thoroughly inspect channel after completion. Correct any areas where matting does not present a smooth surface in full contact with the soil below.

3.05 REMOVAL AND FINAL CLEANUP

A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated on the Drawings.

END OF SECTION

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SECTION 02271

RIPRAP

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and place riprap and appurtenances as specified herein.

1.02 RELATED WORK

A. Trench excavation and backfill is included in Section 02221.

B. Earthwork is included in Section 02200.

PART 2 PRODUCTS

2.01 MATERIALS

A. Riprap used for channel and slope protection shall be hard, durable, angular in shape, resistant to weathering and may be naturally occurring particles or fragments of natural stone. Control of gradation shall be by visible inspection. Rounded stones, boulders, sandstone, or similar soft stone or relatively thin slabs will not be acceptable. Stone shall be free from overburden, spoil, shale and organic material. Each stone shall weigh not less than 50 lbs nor no more than 125 lbs and at least 75 percent of the volume shall consist of stones weighing not less than 75 lbs each. The remainder of the stones shall be so graded that when placed with the larger stones the entire mass will be compact.

B. A bank-run gravel (Type O) base shall be placed and graded to a depth of 12-in to obtain a continuous uninterrupted bed of the required thickness within the required limits. See Section 02200 for bank-run gravel material.

C. Riprap shall be placed and graded off in a manner to ensure that the larger rock fragments are uniformly distributed and that the smaller rock fragments serve to fill the spaces between the larger rock fragments in a manner that will result in a compact mass of stone of the specified thickness. Hand placing will be required only to the extent necessary to secure the results specified above.

D. Riprap shall have a minimum placed thickness of 12-in with individual pieces at the surface having a maximum deviation of plus or minus 2-in.

E. Placing of riprap in layers or by dumping into chutes or by similar methods to cause segregation will not be permitted.

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PART 3 EXECUTION

3.01 INSTALLATION

A. The construction methods, compaction equipment, and appurtenances for bank-run gravel shall be in accordance with Section 02200.

B. Place riprap and bank-run gravel base to the limits and grades shown on the Drawings.

END OF SECTION

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SECTION 02311

EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The work specified in this Section includes requirements for excavation and support of temporary excavations, and trenches. The CONTRACTOR shall design, furnish, install, and maintain a system of supports, including all bracing and associated items, to retain excavations in a safe manner and to control ground movements. Upon completion of the required construction the system of supports shall be completely removed and the excavation and staging area sites restored as discussed herein.

B. The work shall include site grading; fencing and signing; construction staging areas; design and construction of excavation support systems; design and construction of thrust blocks; disposal of excavated material, surface water, and ground water; backfilling; and site restoration. Work shall include all labor, materials, and equipment required to complete excavation support.

C. Retain the services of a professional engineer registered in the State of California to prepare excavation support and protection system designs and submittals described herein.

D. Work shall include the design, equipment, materials, installation, protection, and monitoring of geotechnical instrumentation required to monitor the performance of the excavation support system as required herein.

E. All excavations and support systems shall conform to applicable OSHA excavation, trenching, and shoring standards which are contained in the U.S. Code of Federal Regulations 29 (C.F.R.) 1926.650-1926.653, other federal, state or local requirements. In the event of a conflict, comply with the more restrictive applicable requirements.

1.02 RELATED WORK

A. Submittals are included in Section 01300.

B. Site Preparation is included in Section 02100.

C. Dewatering is included in Section 02140.

D. Earthwork is included in Section 02200.

E. Trenching, Backfilling and Compaction is included in Section 02221.

F. Settlement Monitoring is included in Section 02445.

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1.03 SUBMITTALS

A. Submit to the ENGINEER in accordance with Section 01300, Shop Drawings and design calculations for the CONTRACTOR-designed excavation support system stamped by a Professional Engineer in the State of California. Submittals shall indicate the following, as a minimum:

B. Shop Drawings shall include:

1. Provide overall plan layout of the system, indicating clearances, dimensions, material properties, member sizes, locations, spacing and penetrations depth of all members, locations of various types of lateral supports. Indicate existing and proposed utilities, structures or other obstruction, location and type of instrumentation and monitoring points within the area of influence of the excavation.

2. Provide wall elevations and locations of all bracing.

3. Show the overall sequence of installation and removal of bracing, indicating levels to which the work will be carried out before bracing is installed or removed.

4. Method of preloading bracing (if required) and the preload for each member, and the method of locking-off the preload. Include detailed drawings of the connections, jacking supports and method of shimming.

5. Details, layout, arrangement, equipment requirements, and method of construction of the proposed excavation support system.

6. Procedures for resolving difficulties arising from misalignment of members exposed during excavation, and criteria for implementing those procedures.

7. Pile driving report meeting the requirements of Section 01060 – Regulatory Agency and Utility Requirements, Coastal Development Permit Condition 80.

C. Design calculations shall include:

1. Loads on the excavation support system for all stages of excavation, bracing removal, and concrete placement, including material and equipment loads on adjacent ground during construction.

2. Design of wall and all bracing members including all details for all stages of construction.

3. Theoretical deflections of excavation support system and deformation of structures, pipelines, and other improvements located within the area of influence of the excavation.

4. Submit to the ENGINEER for review and acceptance, a plan of action to be implemented in the event any threshold value for deformation, as specified in Section 02445, is reached. The plan of actions shall be positive measures by the CONTRACTOR to limit further movement of the wall including but not limited to trenching for struts and wales, placement of granular earth berms against the wall, installation of additional struts, or combinations thereof. The details of the mitigating measures shall include a schedule of implementation, location and/or availability of materials, structural details for all connections to the wall and

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support elements, and a detailed description of the method of implementation. The CONTRACTOR shall be prepared to work 24 hours per day to implement such measures. The remedial work/mitigating measures shall be at no additional cost to the OWNER.

D. Submit quality control measures as required to ensure that the performance of the excavation support system is consistent with the approved shop drawings and the requirements herein.

E. Submit welder qualifications and weld procedures in accordance with AWS D1.1.

F. Submit CONTRACTOR's and Design Engineer's qualifications as described herein.

G. At least one copy of the design shall be maintained at the job site during excavation that includes a plan indicating the sizes, types, and configurations of the materials to be used in the protective system, and the identity of the registered engineer who approved the design.

H. Do not proceed with any support of excavation or protection activities until the submittal has been accepted by the ENGINEER.

I. Design Engineer's documentation shall include:

1. On-site inspections of excavation support system as the systems are constructed.

2. Review of quality control measures and performance data.

3. Certification that the excavation support system is constructed per the applicable design following completion of each support system and following any modifications by CONTRACTOR during construction.

1.04 QUALITY ASSURANCE

A. Regulations: Perform all work in accordance with current applicable regulations and codes of all Federal, State and local agencies.

B. The CONTRACTOR shall have at least 5 years of experience with work compatible to the Work shown and specified, employing labor and supervisory personnel who are similarly experienced in this type of Work.

C. The CONTRACTOR's Design Engineer shall be a Registered Professional Engineer in the State of California with at least 5 years professional experience in the design and construction of support of excavation systems and shall have completed not less than 5 successful excavation support projects of equal type, size, and complexity to that required for the work.

1.05 DESIGN REQUIREMENTS

A. The design of temporary excavation support systems is the responsibility of the CONTRACTOR. The design calculations and drawings shall be prepared, stamped and signed by a Professional Engineer registered in the State of California, who is experienced in designing similar excavation support systems.

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B. Design temporary excavation support systems in accordance with requirements of this Section. These criteria are the minimum acceptable standards. In the event of a conflict with federal, state, or local regulatory requirements, comply with the more restrictive applicable requirements.

C. All underground utility lines shall be identified, located, and protected from damage or displacement. Utility companies and other responsible authorities shall be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installation. When required, the CONTRACTOR shall obtain an excavation permit from the local authority having jurisdiction prior to the initiation of any excavation work.

D. Design excavation support systems in accordance with all OSHA requirements and other local and agency requirements.

E. Design the support system to minimize horizontal and vertical movements and to protect adjacent structures and utilities from damage.

F. Excavations below the level of the base of any adjacent foundation or retaining wall shall not be permitted unless the design of the excavation and bracing includes an analysis of the stability of the structure supported by the foundation and as necessary, incorporates required bracing/underpinning of the foundation.

G. For support systems in which bracing is installed between opposite sides of the excavation, design the excavation support of both sides to be nearly the same as feasible.

H. Where necessary to resist point loads, pipe piles used as soldier piles shall be filled with concrete with a compressive strength not less than 3,000 psi. The strength of the concrete shall not be considered in design of the pipe pile for bending stress.

I. Design, install, operate, and maintain ground water control system to control ground water inflows, prevent piping or loss of ground, and maintain stability of the excavation. Refer to the requirements of Section 02140.

J. Design review and field monitoring activities by the OWNER or by the ENGINEER shall not relieve the CONTRACTOR of his/her responsibilities for the work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Soldier piles and structural steel members shall conform to ASTM A572 or ASTM A242 unless approved otherwise. No members with permanent deformations are to be provided. Members shall not be spliced unless approved by the ENGINEER.

B. Steel sheet piling shall conform to ASTM A328 or ASTM A572 or ASTM A690, unless approved otherwise.

C. Liner plates shall be fabricated from structural quality hot-rolled carbon steel sheets or plates conforming to ASTM A1101 with the following minimum properties before cold forming:

1. Tensile Strength: 42,000 psi

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2. Yield strength: 28,000 psi

Plates shall be of either the two- or four-flange type, punched for bolting on all sides. Bolt spacing shall be in accordance with the manufacturer's standard spacing and shall be multiples of the plate length so that the plates having the same curvature shall be interchangeable. Bolt numbers and pattern shall be determined by the liner supplier.

D. Concrete shall conform to ASTM C33 and ASTM C150 unless otherwise approved.

E. All timber shall be structural grade with a minimum allowable flexural strength of 1100 psi. Timber lagging shall be at least 3 inches thick and free of large or loose knots.

PART 3 EXECUTION

3.01 GENERAL

A. Commence installation of support system and excavations only after shop drawings have been reviewed and accepted by the ENGINEER.

B. All instrumentation required per Section 02445 shall be installed and initialized prior to the start of work.

C. Methods of construction for excavations shall be such as to ensure the safety of the Work, CONTRACTOR's employees, ENGINEER, and OWNER's employees and inspectors, the public and adjacent property and improvements, whether public or private.

D. Before beginning construction at any location of this project, adequately protect existing structures, utilities, trees, shrubs, and other existing facilities. The repair of or compensation for damage to existing facilities shall be at no additional cost to the OWNER.

E. As a minimum, place fencing, gates, lights, and signs as necessary around the excavations and staging areas to provide for public safety.

F. Install excavation support systems in accordance with the approved shop drawings and applicable permits.

G. All voids between excavation support system and earth shall be filled with materials acceptable to the ENGINEER.

H. If unstable material is encountered during excavation, all necessary measures shall be taken immediately to contain it in place and prevent ground displacement.

I. If settlement or deflections of supports indicate that support system requires modification to prevent excessive movements, redesign and resubmit revised shop drawings and calculations to the ENGINEER at no additional cost to the OWNER.

J. Sufficient quantity of material shall be maintained on site for protection of work and for use in case of accident or emergency.

K. All welding shall conform to the applicable provisions of ANSI/AWS D1.1.

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3.02 PORTABLE TRENCH BOXES

A. Portable trench boxes or sliding trench shields may be used for the protection of workers only.

B. Trench boxes shall not be used as tunnel launch and exit shafts.

C. Additional excavation, backfilling, and surface restoration required as the result of trench box use shall be at no additional cost to the OWNER.

D. Trench boxes or shields shall be designed, constructed, and maintained to meet acceptable engineering and industry standards.

E. Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

F. A copy of the trench box manufacturer's specifications, recommendations, and limitations shall be in written form and maintained at the job site during all excavation work.

3.03 SOLDIER PILES

A. Install soldier piles with the minimum embedment depths as shown on approved shop drawings.

B. Soldier piles shall be installed using an impact hammer or within pre-drilled holes.

C. Driven piles shall be installed with driving shoes where hard driving is anticipated.

D. For soldier piles installed in predrilled holes, provide casing or other methods of support as necessary to prevent caving of holes and loss of ground.

E. Predrilled holes for soldier piles shall be backfilled with concrete from the pile tip elevation to the elevation of the bottom of the excavation. The remainder of the predrilled hole shall be backfilled with lean concrete or sand. Concrete strength shall be in accordance with the approved shop drawings.

F. The predrilled hole diameter shall be sufficient to allow for proper alignment and concrete backfilling of the pile.

G. Driven soldier piles shall be advanced without the aid of a water jet unless otherwise authorized.

H. Provide timber lagging of sufficient thickness to withstand earth pressures and in accordance with the approved shop drawings.

I. Install lagging such that ground loss does not occur between adjacent or below the lowest board. As excavation proceeds, the maximum height of unlagged face of excavation shall not exceed 4 feet. The unlagged face shall not exceed 2-ft if water seeps or flows from the face of the excavation or if the face of the excavation becomes unstable.

J. As installation progresses, backfill the voids between the excavation face and the lagging. Pack with materials such as hay, burlap, or geotextile filter fabric where necessary to allow drainage of ground water without loss of ground.

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3.04 STEEL SHEET PILING

A. Install steel sheet piling with the minimum embedment depths as shown on the approved shop drawings.

B. Drive sheeting in plumb position with each sheet pile interlocked with adjoining piles for its entire length so as to form a continuous diaphragm throughout the length of each run of wall, bearing tightly against original ground. Exercise care in driving so that interlocking members can be extracted without damaging adjacent structures or utilities. The methods of driving, cutting, and splicing shall conform to the approved shop drawings.

C. Use templates or other temporary alignment facilities to maintain piling line.

D. Prior to installation, the sheet piles shall be thoroughly cleaned and inspected for defects and for proper interlock dimensions. The CONTRACTOR shall provide a tool for checking the interlock dimensions.

E. Each sheet pile shall have sufficient clearance in the interlocks to slide, under its own weight, into the interlock of the sheet pile previously placed.

F. Excavation shall not be carried in advance of steel sheet piling installation.

G. Obstructions encountered before the specified embedment for piles shall be removed. Where obstructions cannot be removed, the sheet pile system shall be re-evaluated by the CONTRACTOR's Design Engineer for the resulted reduced embedment and additional toe stability measure implemented, as required or for realignment of the sheet pile wall. A submittal of the proposed measures shall be provided.

H. Damaged piling or piling with faulty alignment shall be withdrawn and new piling driven properly in its place. The cost of such additional work shall be considered as part of the pile driving and shall be borne by the CONTRACTOR.

3.05 LINER PLATES

A. Liner plates shall be installed as soon as excavation has progressed sufficiently for the next ring of plates to be installed. A complete circumferential ring of liner plates shall be installed prior to continuing the excavation. Installing more than one incomplete ring of liner plates at any time is not acceptable. Plates shall be staggered in the vertical direction to facilitate shaft strength and leakage resistance.

B. Liner plates shall be grouted in accordance with the approved shop drawings.

3.06 INTERNAL BRACING

A. Provide internal bracing to carry maximum design load without distortion or buckling.

B. Include web stiffeners, plates, or angles as needed to prevent rotation, crippling, or buckling of connections and points of bearing between structural steel members. Allow for eccentricities caused by field fabrication and assembly.

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C. Install and maintain all bracing support members in tight contact with each other and with the surface being supported. Wood shims shall not be used.

D. Coordinate excavation work with installation of bracing. Excavation shall extend no more than 2 feet below any brace level prior to installation of the bracing.

E. Use procedures that produce uniform loading of bracing member without eccentricities or overstressing and distortion of members of system.

3.07 REMOVAL OF EXCAVATION SUPPORT

A. Do not remove internal bracing and transfer loads to the permanent structure without prior acceptance of the ENGINEER.

B. Removal shall begin at and progress from the bottom of the excavation. Members shall be released slowly as to note any indication of possible failure of the remaining members or possible cave-in of the sides of the excavation.

C. Backfilling shall progress together with the removal of support systems from excavations.

D. Unless otherwise indicated, remove all portions of excavation support.

E. Do not remove vertical support members that were installed within the zone of influence of new or existing structures. The zone of influence is defined as a zone extending down and away from the outer edge of the structure at 1 horizontal to 1 vertical. Support members installed within this zone shall be cut off at 5 ft below finished grade and abandoned in place.

F. No untreated wood shall remain as part of the abandoned portion of the work.

G. When removing the excavation support system, do not disturb or damage adjacent buildings, structures, waterproofing material, or utilities. Fill voids immediately with lean concrete or well-graded cohesionless sand, as indicated or as directed by the ENGINEER.

H. Remove material of the excavation support system from the site immediately.

END OF SECTION

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SECTION 02355

PUMP STATION CAISSON CONSTRUCTION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required for caisson construction of the submersible and pocket pump stations complete as shown on the Drawings and as specified herein. Pump station caissons shall be constructed using the sunken caisson method.

B. Furnish all surveys including layout, inspection and record-keeping incident to caisson construction and as specified herein.

1.02 RELATED WORK

A. Dewatering is included in Section 02140.

B. Reinforced Concrete Pipe is included in Section 02612

C. Plastic Lining for Concrete Pipe is included in Section 02765.

D. Concrete Reinforcement is included in Section 03200.

E. Cast-In-Place Concrete is included in Section 03300.

F. Painting and Coatings are included in Division 09.

1.03 SUBMITTALS

A. Submit to the ENGINEER all submittals in accordance with Section 01300,

B. Shop drawings showing details of installation for caissons.

C. Product data showing materials of construction and details of installation for:

1. Interior coatings and sealants

2. Mechanical seals for pipe penetrations

D. Details of the steel cutting head shield including materials, dimensions, and connection details.

E. Detailed caisson construction sequence and construction method of seal slab and bottom slab as indicated on Drawings.

F. Description of caisson lifting equipment (if used), equipment placement around the structures, dewatering and excavation method, seal slab and bottom slab placement, protection of adjacent

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existing structures and utilities, and monitoring the vertical and horizontal deformation of caisson.

G. Qualifications submittals with the bid as noted in Paragraph 1.05A.

1.04 REFERENCE STANDARDS

A. American Concrete Institute (ACI) 350 – Code Requirements for Environmental Engineering Concrete Structures.

B. American Concrete Institute (ACI) 350.1 – Tightness Testing of Environmental Engineering Concrete Structures.

1.05 QUALITY ASSURANCE

A. The caisson Contractor and Subcontractor shall have completed at least 2 caisson constructions with similar size, depth, and soil conditions, within the past 5 years.

1. The CONTRACTOR shall submit with the bid the names and addresses of the owner's representatives, the completion dates and project locations of these constructions.

B. The superintendent for the Caisson construction shall have a minimum of 4 years experience with caisson construction similar to the specified work.

1. Superintendent's name, work history and telephone number shall also be included.

C. Submit quality control measures proposed to be used for the caisson construction.

1.06 COORDINATION

A. Coordinate size and location of pipe openings in walls of pump stations with Civil drawings and provide proper seals at these openings.

1.07 PROJECT/SITE REQUIREMENTS

A. Bring inaccuracies in alignment or elevations to the attention of the ENGINEER in writing. Do not proceed with construction until inaccuracies are corrected.

PART 2 PRODUCTS

2.01 FLEXIBLE PIPE CONNECTION SLEEVES

A. Flexible sleeve - Integrally cast sleeve in caisson or install sleeve in a formed or cored opening. Fasten pipe in sleeve with stainless steel clamp(s). Coat stainless steel clamp(s) with bituminous material to protect from corrosion. Flexible sleeve shall be Lock Joint Flexible Manhole Sleeve; Kor-N-Seal connector; or equal.

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2.02 COATING

A. Coat exposed concrete exterior of caissons with bitumastic, coal-tar, or approved equal, prior to sinking caissons.

2.03 CAISSONS

A. Caisson walls shall be reinforced concrete pipe in accordance with Section 02612.

B. Provide plastic lining for caissons in accordance with Section 02765.

C. Provide headed reinforcing dowels and shear keys as shown on the Drawings.

PART 3 EXECUTION

3.01 GENERAL

A. The caisson construction shall be performed by the caisson Subcontractor utilizing a caisson system as indicated on the Drawings and specified herein. The caisson subcontractor's construction of the structures shall conform to the in-situ materials utilizing the Geotechnical Report as a basis for the excavation.

B. Keep caisson plumb during sinking.

C. Unsuitable, waste and surplus excavated material shall be removed and disposed of off-site.

3.02 CAISSON PROCEDURE

A. The caisson procedure shall generally consist of, but not be limited to, the following elements:

1. Pre-auger soil at Pump Station locations as shown on the Foundation Plan to depth of seal slabs prior to constructing caissons.

2. Install steel cutting head shield as shown on Drawings.

3. Plug wall penetrations watertight prior to sinking of caissons.

4. Protect the plastic liner during sinking of Pump Stations from any damage with a suggested ¾-inch plywood interior assembly.

5. Excavate the pre-augered soils from the center of the caissons in a carefully controlled manner to allow uniform vertical settlement of the caissons to the desired depth. Sink one caisson at a time to the depth of seal slab as shown on the Drawings. Special care should be taken during excavation so as to not damage plastic liner.

6. During sinking, maintain groundwater level inside the caissons equivalent to the outside groundwater level to prevent piping or loss of soils into the center of the excavation should the groundwater level be higher than the seal slab.

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7. Cleanout the keys and base at the excavation level and place the seal slab reinforcing steel, if required, in the excavation, without altering the groundwater level in the caisson.

8. Tremie pump the 4,000 psi seal slab mix concrete (Class D) containing anti-washout admixture into place.

9. Maintain the groundwater level condition within the structures until the seal slabs achieve 4,000 psi compressive strength.

10. Upon achieving the 4,000 psi compressive strength results for the seal slab, pump out trapped groundwater from the inside of structures as necessary.

11. Clean out keys and threaded inserts in the walls. Place bottom slab reinforcing steel and 5,000 psi concrete (Class E).

12. No work shall be performed inside the Pump Station until the concrete bottom slab has achieved 30% of its specified design strength or three (3) days after concrete placement, whichever is longer.

13. Remove protection (if used) for plastic liner without damaging liner and caissons.

14. Install pipes per civil drawings inside structures. Connect pipes to spool pieces precast in walls. Perform hydrostatic test (HST-100) of Pump Station per ACI 350.01, Chapter 2.

15. Construct top slab roof reinforcing steel and concrete with access hatches as shown on the Drawings.

END OF SECTION

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SECTION 02445

SETTLEMENT MONITORING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section includes: Furnishing, installing, and monitoring settlement instrumentation to monitor ground movements around and above trenchless pipe installation operations, and all excavations. The Work includes, but is not limited to: installing surface control points, installing subsurface monitoring points, furnishing monitoring equipment, and recording observations and measurements from the monitoring points on a periodic basis before, during, and after trenchless construction, and excavation work.

B. The CONTRACTOR is responsible for surveying the elevations of the surface control points, the subsurface monitoring points, and other instrumentation locations in accordance with the requirements herein. Elevations shall be determined before operations begin to establish a baseline, and during and after operations to monitor any movements related to the tunneling and shaft construction. All monitoring points will be surveyed after trenchless construction has been completed to evaluate long-term settlements, as specified herein.

C. Minimum instrumentation requirements are specified herein. Additionally, the CONTRACTOR shall install other instrumentation as necessary to control operations, monitor ground conditions and ground response to achieve specified project requirements and to prevent damage to existing structures and facilities.

1.02 RELATED WORK

A. Submittals are included in Section 01300.

B. Site Preparation is included in Section 02100.

C. Dewatering is included in Section 02140.

D. Earthwork is included in Section 02200.

E. Trenching, Backfilling and Compaction is included in Section 02221.

F. Excavation Support and Protection is included in Section 02311.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. The publications listed below form a part of this Specification to the extent referenced. Where conflicts between these Specifications and the referenced specification, code or standard occur, the more restrictive specification shall govern. The latest edition available on the date of issue of Contract Documents shall be used.

1. Geotechnical Report: "Addendum and Update to Geotechnical Report, Los Osos Wastewater Project, San Luis Obispo County, California", Fugro Consultants, October 24, 2011.

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2. Geotechnical Report: "Geotechnical Report, Los Osos Wastewater Project, San Luis Obispo County, California" and Attachments, Fugro West, March 2004.

1.04 DEFINITIONS

A. Surface Control Points: Control points established as a reference for measuring elevation of the ground surface using optical survey methods.

B. Subsurface Monitoring Point: A cased borehole settlement monitoring point located above the tunnel crown used for detecting settlement between the location of the settlement point and the tunnel excavation.

1.05 DESIGN CRITERIA

A. Any ground movements (settlement/heave) shall be limited to values that shall not cause damage to adjacent utilities and facilities. In no case shall settlements exceed the applicable values listed in Table 1 below.

Table 1 - Allowable Settlement / Heave Values

Site Feature	Allowable Settlement/ Heave (inches)
Railroads	0.50
Surface Streets	1.00
Underground Utilities	1.00
Unimproved Ground	3.00

1.06 QUALITY ASSURANCE

A. Surveyor Qualifications: All surveying shall be performed by a land surveyor licensed in the State of California with previous experience surveying for the detection of surface deformations.

B. Install all monitoring points and instrumentation as directed by the ENGINEER. Other surface control points shall be installed as directed by the ENGINEER.

C. Should actual field conditions prevent installation of instruments at the location specified herein, obtain written acceptance from the ENGINEER for new instrument location and elevation.

D. Surveying for monitoring settlement instrumentation shall be referenced to the same control points and benchmarks established for setting out the Work. Control points shall be tied to benchmarks and other monuments outside of the zone of influence of the excavation or trenchless construction.

E. Installation of instrumentation shall, at all times, be performed in the presence of the ENGINEER.

1.07 SUBMITTALS

A. Submittals shall be made in accordance with these Specifications. Provide sufficient detail to allow the ENGINEER to judge whether the proposed equipment, materials, and procedures will meet the Contract requirements. All drawings shall be legible with dimensions accurately shown

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and clearly marked in English. Drawings and photographs transmitted by a facsimile will not be accepted.

1. Qualifications: Submit surveying personnel qualifications in accordance with the requirements herein.

2. Submit the following, at least one (1) month before scheduled installation of monitoring points:

   a. Instrumentation Schedule: Submit the proposed schedule for installing the surface control points and subsurface monitoring points.

   b. Description of methods and materials for installing and protecting surface control points and subsurface monitoring points.

   c. Drawings with locations of proposed monitoring points shown in plan and profile.

3. Reports and Records:

   a. The CONTRACTOR shall submit all reports of monitoring data to the ENGINEER.

   b. Within 72 hours following installation of the instruments, submit drawings showing the actual as-built installed location, the instrument identification number, the instrument type, the installation date and time, and the tip elevation and instrument length. Include details of installed instruments, accessories and protective measures including all dimensions and materials used.

   c. Submit surveyed baseline measurements of all monitoring points at least fourteen (14) days prior to commencing excavation to establish baseline readings.

   d. Submit surveyed measurements of monitoring points during and after construction in accordance with Part 3 of this Specification.

PART 2 PRODUCTS

2.01 MATERIALS

A. All instrumentation shall remain the property of the CONTRACTOR following completion of the Work, and shall be removed or abandoned according to applicable codes and standards unless otherwise noted.

B. Surface Control Points: Surface control points shall be established by an inscribed marking or approved surveyor's nail driven flush with the surface in asphalt or concrete paved areas. In landscaped areas, surface control points shall be established by driving a 2-inch by 2-inch timber stake flush with the ground. The stake shall be driven to a depth required to provide a stable control point given the soil conditions. Each control point shall have a tag or marking indicating the station and offset from centerline.

C. Subsurface Monitoring Points: Subsurface monitoring points shall be established and installed as directed by the ENGINEER. Each point shall consist of a #6 rebar settlement rod installed within and isolated from a PVC cased borehole. The settlement rod shall be driven 6 to 12 inches past

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the bottom of the borehole casing and the tips shall be located at five feet above the pipe crown centerline or as directed by the ENGINEER. The settlement rod shall be secured to the PVC casing with a 12-inch length of loose cable or chain to prevent the rod from falling more than approximately 12 inches. The casing shall be flush with pavement or recessed, and capped and protected with a road box if installed within traffic lanes, shoulders, parking lots, or bike lanes and shall be in accordance with applicable permit requirements.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Instrumentation shall be installed at the locations as directed and approved by the ENGINEER. Instruments shall be installed in accordance with the approved installation schedule.

B. The CONTRACTOR shall locate conduits and underground utilities in all areas where borings are to be drilled and instruments installed. Instrument locations shall be modified, as approved by the ENGINEER, to avoid interference with the existing conduit and utilities. Repair damage to existing utilities resulting from instrument installations at no additional cost to the OWNER.

C. CONTRACTOR shall install and perform a baseline survey of all surface and subsurface settlement monitoring devices at least 14 days prior to excavation.

D. CONTRACTOR shall provide access and assistance to the ENGINEER for obtaining supplemental monitoring data, as requested by ENGINEER.

E. Provide data from readings of all monitoring points to the ENGINEER within 24 hours of reading.

3.02 MONITORING FREQUENCY

A. Surface Control Points: Initial survey measurements shall be obtained prior to any excavation and at two-day intervals after beginning excavation or trenchless operations.

B. Subsurface Monitoring Points: Once trenchless operations begin, subsurface monitoring points within 50 feet of the tunnel face shall be surveyed once for every 10 feet of tunnel progress. Additionally, all monitoring points shall be surveyed at least once per day during trenchless operations. Once these operations are complete, all settlement monitoring devices shall be surveyed once per day for the first seven days, once at 14 days, and once at 30 days after completion of the trenchless work.

3.03 SURFACE CONTROL POINTS

A. Establish a system of surface control points. Locations shall be determined jointly by the ENGINEER and CONTRACTOR in the field prior to construction.

B. Surveying of surface control points will consist of determining the elevation of each control point with respect to a benchmark selected by the ENGINEER to a precision of 0.01 foot.

3.04 SUBSURFACE MONITORING POINTS

A. Notify the ENGINEER at least 3 days in advance of installing subsurface monitoring points.

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B. The subsurface monitoring points shall be installed as close as practicable to the locations approved by the ENGINEER. The ENGINEER may modify subsurface monitoring point locations depending on field conditions, conflicting utilities and monitoring objectives.

C. Locate and confirm all utilities and protect utilities or relocate monitoring points as necessary to protect all utilities. Follow accepted industry procedures for one-call notification and visual confirmation of locations of all crossing or adjacent utilities.

D. Subsurface monitoring point installations shall be completed at least 14 days in advance of commencing shaft construction or microtunneling operations.

E. Conduct drilling operations using appropriate methods that are consistent with anticipated geologic conditions. Use mud rotary wash methods or provide casing as required to hold drill hole open.

F. Subsurface monitoring rods shall move freely with the soil at the tip and shall be isolated from the soil surrounding the borehole by the casing.

G. Protection: Install protective housing with cap. Protective housing shall be installed within a flush-mounted precast concrete box or vault so as not to obstruct vehicle or foot traffic, and shall be in accordance with CalTrans standards and permit requirements.

3.05 INSTRUMENT PROTECTION, MAINTENANCE, AND REPAIR

A. Protect the instruments and surface control points from damage. Damaged installations shall be replaced or repaired prior to continuing excavation, pipe jacking, or HDD, unless permitted otherwise in writing by the ENGINEER.

3.06 ABANDONMENT OF INSTRUMENTS

A. Surface Control Points: All surface control points on public property shall remain in place at the completion of the Work. Remove all surface control points on private property during the cleanup and restoration work, or as required by the ENGINEER.

B. Subsurface monitoring points: Properly abandon all monitoring point boreholes, by grouting drilled holes with neat cement grout. Subsurface monitoring points shall be abandoned at the conclusion of the monitoring phase (See Section 3.2 B) or as required by the ENGINEER.

END OF SECTION

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SECTION 02460

FULL DEPTH RECLAMATION

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide Hot Mix Asphalt (HMA) pavement and base, complete and in place, in accordance with Contract Documents. New HMA pavement and base shall be provided as shown on the Drawings. Replacement HMA pavement and base shall be provided by patching or full depth reclamation as specified herein. Full depth reclamation work shall include pulverization of existing pavement, base, and subgrade materials and compacting and treating the material prior to paving.

B. Where existing pavement is removed by construction activities, the pavement shall be restored with patching or full-width restoration as specified herein and shown in the Drawings.

C. The OWNER has conducted a pavement condition assessment and has identified the segments of existing street pavement designated for patching and the segments designated for full depth reclamation in lieu of patching. The full depth reclamation segments are also designated as “Dry” or “Wet” categories. The segments designated for full depth reclamation are shown on the Drawings.

D. Full depth reclamation shall consist of placing the following thickness of HMA on a base of pulverized and compacted subgrade (PCSG) in areas designated “Dry” and on a base of pulverized, treated, and compacted subgrade (PTSG) in areas designated “Wet”. The minimum thickness of paving and base sections for full depth reclamation of collector streets and minor streets is summarized as follows:

1. Collector Streets (Dry): 4-inches HMA, 14-inches PCSG

2. Collector Streets (Wet): 4-inches HMA, 14-inches PTSG

3. Minor Streets (Dry): 3-inches HMA, 12-inches PCSG

4. Minor Streets (Wet): 3 inches HMA, 12-inches PTSG

The “Dry” designation refers to streets where the estimated groundwater level is approximately greater than 10 feet below grade and the "Wet" designation refers to streets where the estimated groundwater level is approximately less than 10 feet below grade.

E. The full depth reclamation for designated street segments (station by station) shall be from original outside edge of pavement to original outside edge of pavement. The PCSG or PTSG base shall be graded so that the minimum thickness of HMA is achieved across the full width of the street and the top of the HMA matches the elevation of adjoining streets, driveways, drainage facilities, and other existing surface features. The elevation of manhole frames and covers, valve boxes, and other appurtenances shall be adjusted to final grade as required.

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1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. State of California Department of Transportation (Caltrans) 2010 Standard Plans and Specifications

1.03 CONTRACTOR SUBMITTALS

A. Submittals shall be in accordance with Section 01300 – Submittals. Include materials testing reports, job-mix formulas, and other pertinent information satisfactory to the ENGINEER.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

A. The subgrade shall be prepared in accordance with Section 02200 -Earthwork as applicable to roadways and embankments. The surface of the subgrade after compaction shall be hard, uniform, smooth and true to grade and cross-section. Subgrade for pavement or base material shall not vary more than 0.05-foot from the indicated grade and cross section.

3.02 PCSG

A. PCSG shall consist of pulverization of the existing pavement, base, and native sub-grade material and compacting the resulting material to a minimum of 95 percent relative compaction as determined by ASTM D1557.

B. Pulverization and mixing of the material shall be performed utilizing machines or a combination of machines that will produce results meeting all requirements for PCSG specified herein.

C. Pulverization of the material shall be conducted using equipment capable of mixing the materials uniformly to the depth specified. Mixing or remixing operations, regardless of the equipment used, shall continue until the material is uniformly mixed and reduced to a maximum size less than 2 inches and not less than 55 percent material passing the U.S. Standard No. 4 sieve. Oversized rock or aggregate that cannot be pulverized or reduced shall be removed from the sub-grade. Prior to compaction, the material shall be conditioned to uniform moisture content near the optimum.

D. The surface of the PCSG material shall be rolled and graded smooth and true to the elevations and contours to match the existing pavement and to provide a firm and unyielding condition. Soft or yielding material shall be removed and replaced with properly compacted material prior to paving. Excess material from finish grading shall be disposed of offsite.

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3.03 PTSG

A. PTSG shall consist of pulverization of the existing pavement, base, and native subgrade material in the same manner as for PCSG. The pulverized soil shall be treated with additives to control excess moisture for compaction and subgrade stabilization to improve the subgrade support for pavements in wet areas. The CONTRACTOR shall submit the application method, application rate, equipment to be used, and the spreading and compaction methods for PTSG for approval of the ENGINEER prior to beginning work.

B. PTSG shall contain 3 percent by mass dry weight of Type II Modified Portland cement. Additional cement may be provided at the discretion of the CONTRACTOR with the prior approval of the ENGINEER and at no change to Contract Price or Contract Times. Cement can be added prior to, during, or following pulverization. Compaction shall commence within 30 minutes after cement is mixed with the PTSG and proceed continuously until the completed. Final compaction of the mixture to the specified density shall be compacted within 2.5 hours after commencing mixing of the cement with the material.

C. During finishing operations, the surface of the PTSG shall be shaped to the required lines, grades, and cross section and shall be kept moist. PTSG shall be allowed to cure a minimum of 3 days prior to paving. Vehicular traffic will be allowed on the PTSG during the curing period. The CONTRACTOR shall provide saw cutting for control joints as needed to limit cracking due to shrinkage of the PTSG.

3.04 TEST SECTION

A. The CONTRACTOR shall submit Shop Drawings of the proposed machines and methods for the PCSG and PTSG to the ENGINEER for review and schedule installation of a test section within 45 days of Notice to Proceed. The test section shall be full depth reclamation as specified herein with the proposed machines and methods to install a one block street segment and shall be approximately 50 percent PCSG and 50 percent PTSG. Full depth reclamation shall not proceed for the WORK until a satisfactory test section has been installed and accepted by the ENGINEER that meets the requirements specified herein, Section 01313 – Construction and Schedule Constraints including, but not limited to, noise and dust control constraints, and Section 01571 – Traffic Control.

3.05 HOT MIX ASPHALT PAVING

A. Final paving of full depth reclamation segments shall be completed in accordance with Section 02577 –Hot Mix Asphalt Paving.

END OF SECTION

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SECTION 02576

PAVEMENT REPAIR AND RESURFACING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, material, equipment and incidentals required and replace all pavement shown in the Drawings, pavement removed over trenches, or otherwise disturbed by the CONTRACTOR's operations.

B. New pavement in streets shall consist of temporary pavement or all weather surface over trenches and final hot mix asphalt (HMA) pavement placed either over trenches or over the entire paved traveled way as shown in the Drawings.

C. Streets, driveways, parking areas or sidewalk pavements damaged or disturbed by the CONTRACTOR's operations shall be repaired, replaced or restored in accordance with the requirements specified herein and as directed for the respective type of pavement replacement and in a manner satisfactory to the ENGINEER.

D. Furnish all labor, material, equipment and incidentals required to cold plane where directed by the ENGINEER.

1.02 RELATED WORK

A. Trimming edges of existing pavement is included in Section 02221.

B. Flowable Fill is included in Section 02210.

C. Hot Mix Asphalt (HMA) is included in Section 02577.

1.03 REFERENCE STANDARDS

A. Except as otherwise specified herein, the 2010 State Standard Plans and Specifications, issued by the California Department of Transportation (CalTrans), shall apply to materials and workmanship required for the work of this Section.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 MAINTENANCE

A. All pavement placed shall be maintained for a period of 1 year. During this period all areas which have settled or are unsatisfactory for traffic shall be refilled and replaced.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pavement shall be as specified in 02577.

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PART 3 EXECUTION

3.01 GENERAL

A. Materials for pavement shall be mixed, delivered, placed and compacted in accordance with Section 02577.

3.02 INSTALLATION

A. Temporary pavement or all weather surface shall be placed wherever existing pavement has been removed or disturbed at the end of each day, before traffic is released to roadway.

1. A temporary all-weather roadway surface of aggregate base, per Section 02200, cement treated materials, per Section 02210, or other suitable material, as determined by the ENGINEER, may be used on minor streets prior to final pavement repair during the non-rainy season (April 15 to October 15).

2. Temporary pavement (cold mix asphalt) or cement treated materials, per Section 02210, shall be used for the temporary roadway surface on arterial and collector roads, and on all roads during the rainy season (October 15 to April 15).

B. Final pavement over trenches shall be constructed as specified in Section 02577 and as shown on the Drawings.

C. Final pavement over the entire paved traveled way shall be constructed as follows:

1. Repair all soft and broken areas in temporary and existing pavement. Remove all cold patch that has been placed. Clean all surfaces to be paved of all foreign matter and loose material. All surfaces shall be dry before priming.

2. Where required, level depressions in the temporary pavement or all weather surface with HMA pavement approved by the ENGINEER.

3. Repair any defects in curbing caused by the CONTRACTOR's operations.

4. Place and compact HMA pavement in accordance with Section 02577.

5. Clean all pavement penetrations and remove all loose aggregate from the site.

6. Raise all manhole, drop inlet and catch basin frames, gate valve and curb stop boxes, gas drips and valves and any other pavement penetrations to finished elevation of the new pavement. All raised appurtenances shall be grouted with concrete or otherwise as approved by the ENGINEER to firmly support them flush with the surface of the new pavement.

D. Cold planing shall be performed as follows:

1. In areas directed by the ENGINEER, remove up to 12-in of HMA using a cold planer. The planing machine shall be specifically designed and built for planing flexible pavements and have the ability to plane concrete patches when encountered in bituminous pavement.

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2. The planing machine shall be self-propelled and have the means for planing without tearing or gouging the underlaying surface and blading the cutting into a window. The machine shall be capable or being operated at speeds from 10 to 40 fpm and designed such that the operator can at all times observe the planing operation without leaving the control area. A cut to predetermined grade or any specified lesser depth up to the thickness specified in Paragraph 3.02E1 above may be required. The machine shall be adjustable as to crown and depth.

3. All manhole/catch basin covers and grates and other items at the roadway surfaces shall be lowered to a sufficient depth prior to cold planing. All damaged covers, grates and utility boxes shall be replaced with new covers, grates or utility boxes by the CONTRACTOR, at his/her expense.

4. The equipment furnished shall be maintained so as to produce a clean cut in the pavement at all times.

5. The planed surface shall conform generally to the grade and cross slope required and be free from being torn, gouged, shaved, broken or excessively grooved.

6. Surface texture shall be as specified by the ENGINEER and in any case be acceptable to traffic in the event resurfacing is delayed. The planing shall be squared off for the full width of the traveled way at the end of each work day.

7. No cutting shall remain on the project at the end of each work day. Dispose of all waste materials as specified in Section 01046 at no additional compensation.

8. The planed surface shall be free of imperfections of workmanship that will prevent the surface from being resurfaced with new pavement following this operation.

3.03 PAVEMENT MARKINGS

A. Reline all streets with pavement markings equal in type and location where existing prior to paving.

END OF SECTION

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SECTION 02577

HOT MIX ASPHALT (HMA) PAVING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Section Includes:

1. Hot mix asphalt (HMA) pavement for roadways, parking areas, ramps, grade adjustments and walkways on prepared aggregate base course or subgrade as shown in the Drawings or required as part of the Work.

2. Removal, preparation and replacement of existing pavement required for the construction of buried utilities, new structures, or potholing that is part of the Work.

3. Removal, preparation, and replacement or repair of existing pavement that is damaged by CONTRACTOR's operations during the construction of the Work.

4. Temporary HMA pavements until the permanent pavements can be constructed.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. Painted Traffic Lines and Markings are included in Section 02762.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, the following:

1. Product information for aggregate materials, HMA mix design, and prime and tack coats. Minimum information shall include source of aggregates and asphalt, gradation, unit weight of mix design, gradation, air void content, and other test results needed for compliance with the 2010 CalTrans Standard Specifications and field testing by ENGINEER.

1.04 REFERENCE STANDARDS

A. State of California Department of Transportation (CalTrans):

1. Standard Specifications, 2010.

PART 2 PRODUCTS

2.01 HOT MIX ASPHALT (TYPE A):

Hot mix asphalt (HMA) shall be Type A, using the standard process for overlays, and shall conform to the provisions in Section 39, "Hot Mix Asphalt," of the 2010 State Standard Specifications and these Specifications.

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A. The grade of asphalt binder to be mixed with aggregate for HMA Type A shall be Performance Grade PG 70-10 for dikes and dike overlays and PG 64-10 for all other HMA and shall conform to the provisions in Section 92, "Asphalts," of the 2010 State Standard Specifications.

B. The aggregate for HMA Type A shall be 3/8-inch grading for dikes and dike overlays and ½-inch grading for overlays and leveling courses.

C. All Job Mix Formulas in accordance with Section 39-1.03, "Hot Mix Asphalt Mix Design Requirements," of the 2010 State Standard Specifications shall be submitted within 10 calendar days, not including Saturdays, Sundays, and legal holidays, of the CONTRACTOR's receipt of the fully executed contract, in accordance with Section 4-1.03, "Submittals," of these Specifications.

D. The first paragraph of Section 39-1.07, "Production Start-up Evaluation," of the 2010 State Standard Specifications is modified to read: "The ENGINEER evaluates HMA production and placement at start-up or at any location agreed upon at least 3 business days in advance.

E. In addition to the requirements of Section 39-2.02B, "Quality Control Testing," of the 2010 State Standard Specifications the CONTRACTOR shall submit QC test reports to the ENGINEER on Caltrans Form CEM 3501 within 2 days of production. Testing and inspection frequency shall conform this section or as directed by the ENGINEER.

F. In addition to the requirements of Section 6-1.04, "Defective Materials," 39-2.03A, and 39-3.02A, "Testing," of the 2010 State Standard Specifications, a credit to the OWNER of $5 per ton, at the discretion of the ENGINEER, will be taken for each ton of HMA represented by acceptance tests that do not comply with these provisions.

G. Item 1 of the third paragraph of Sections 39-2.03A and 39-3.02A, "Testing," of the 2010 State Standard Specifications is hereby modified to read: "Stop production if directed by the ENGINEER."

PART 3 EXECUTION

3.01 EXISTING PAVEMENT REMOVAL

A. Existing pavements to be removed shall be cut or ground by a wheel cutter, clay spade, or other device capable of making a neat, and reasonably straight cut with minimal damage to adjacent pavement that is not to be removed.

B. If saw cut, the existing pavement shall be cut and trimmed after placement of required base course material and just prior to placement of HMA for pavement replacement, and the trimmed edges shall be painted with a coating of prime coat immediately prior to constructing the new abutting HMA pavements. No extra payment shall be provided for these items, and all costs incurred in performing this work shall be incidental to underground utility construction or pavement replacement.

C. All removed pavement material is the property and disposal responsibility of the CONTRACTOR.

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3.02 PAVEMENT INSTALLATION

A. The construction of HMA pavements shall conform to the requirements of these Specifications and upon completion the pavement shall be true to grade and cross.

B. The CONTRACTOR shall not pass equipment over any pipe, drain, utility line, duct or structure before it is protected by ample fill material, properly compacted. Any damage to such facilities shall be promptly repaired by the CONTRACTOR at its own expense.

C. The subgrade shall be brought to the required grades and cross sections by excavating, filling, blading and compacting as specified.

D. Base and subbase materials shall be bladed to a smooth surface and shall be compacted to 95 percent relative compaction as determined by ASTM D1557. Subgrade for pavement shall not vary more than 0.05 feet (1.5 cm) from the specified road grade.

E. When HMA is to be applied over existing pavement, existing surfaces adjoining gutters and other permanent features shall be ground to create smooth transitions and to maintain surface water flow lines.

F. Potholes and depressed areas in existing pavements to be overlaid with new HMA shall be completely removed, subgrade and aggregate base course prepared, and patched with new HMA before the installation of new pavement overlays.

G. At terminations of new surface course, the HMA shall be feathered into the existing surface over such a distance as may be required to produce a smooth riding transition. Existing pavements to be over-laid shall be ground or removed as required to avoid feather edges less than 1-in in depth.

H. Grind all edges with concrete swales and gutters to provide minimum 1-in depth at transition and to maintain original drainage flow lines between new and existing surfacing unless otherwise noted.

I. The top of pavement shall match utility surface features such as valve boxes, corrosion protection test station boxes, electrical and telephone pull boxes, utility vaults, etc. Wherever possible drainage should be directed away from such utility structures, except drainage structures such as curb inlets and drop inlets.

J. Vertical Joints: Before opening the lane to public traffic, pave shoulders and median borders adjacent to a lane being paved.

   1. Longitudinal vertical joints are not allowed on the traveled way open to traffic, regardless of thickness. Place HMA on adjacent traveled way lanes so that at the end of each work shift, the distance between the ends of HMA layers on adjacent lanes is between 5 feet and 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. Kraft paper or another approved bond breaker may be placed under the conform tapers to facilitate the taper removal when paving operations resume.

   2. Place shoulder conform tapers concurrently with adjacent lane's paving.

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3. At the end of each work shift a vertical joint between driveways and adjacent lanes shall not be more than 0.15 foot.

K. Smoothness: The first paragraph 39-1.12A, "General," of the 2010 State Standard Specifications is hereby modified to read: "Determine HMA smoothness with a straightedge."

1. Section 30-1.12C, "Profilograph," of the 2010 State Standard Specifications shall not apply.

2. The fourth paragraph of Section 39-1.12D, "Smoothness Correction," is hereby modified to read: "After grinding, measure the ground HMA pavement surface with a 12-foot straightedge until the pavement is within specified tolerances. If straightedged pavement cannot be ground to within specified tolerances, remove and replace the pavement.

L. Compaction Testing: Relative density of HMA placed in overlay layers (excludes leveling) of 0.15 foot or more, and in widths 5 feet or more will be determined by nuclear gage in backscatter mode in accordance with California Test 375.

1. Section 39-1.04F, "Cores," of the Standard Specification is hereby deleted.

2. The first paragraph of Section 39-1.07, "Production Start-up Evaluation," of the 2010 State Standard Specifications is hereby modified to read: "The ENGINEER evaluates HMA production and placement at start-up or at any location agreed upon at least 3 business days in advance."

3. The sixth paragraph of Section 39-1.07, "Production Start-up Evaluation," of the 2010 State Standard Specifications is hereby modified to read: "For Standard projects, perform a test strip in accordance with California Test 375 to calibrate nuclear gages. The ENGINEER will take density measurements with a nuclear from random locations selected per California Test 375. Take two 4-inch or 6-inch diameter cores of HMA from the locations of each test site. Take cores in the ENGINEER's presence, and backfill and compact holes with HMA. Before submitting a core to the ENGINEER, mark it with the core's location and place it in a protective container. Do not start production paving until the ENGINEER has correlated the nuclear gage with the core densities and has developed a gage conversion factor; this is assumed to require two business days after the completion of the test strip. A new test strip is required if the mix design is changed, if the lift thickness is changed, material source changes, or if the gage used is changed or recalibrated."

4. The fourth and fifth paragraphs of Section 39-2.03A, "Testing," are hereby modified to read: "The ENGINEER determines the percent of maximum theoretical density of the HMA in 500 ton lots, using a calibrated nuclear gauge, with a minimum of ten tests per lot. The ENGINEER will provide the CONTRACTOR the final results of the nuclear gauge tests based on the maximum theoretical density of that day's production within 24 hours. The CONTRACTOR may proceed with the work at the CONTRACTOR's own risk before the final results are available. If the maximum theoretical density results for any day's production are not available by the end of shift, the ENGINEER will provide the CONTRACTOR preliminary results based on the maximum theoretical density of a previous day's material.

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5. If the relative compaction of any lot, based on the calibrated nuclear gauge, is less than 89%, or greater than 99%, the CONTRACTOR shall take two cores from each 500 ton lot at random locations designated by the ENGINEER, in accordance with the procedures specified above. The ENGINEER determines the percent of maximum theoretical density for each core by determining the core's density and dividing by the maximum theoretical density. The average percent of maximum theoretical density of the two cores will be considered final for determining removal and replacement requirements."

M. Hot Mix Asphalt Paving: In addition to the requirements of Section 39-1.09, "Subgrade, Tack Coat, and Geosynthetic Pavement Interlayer," of the 2010 State Standard Specifications, the CONTRACTOR shall remove any permanent pavement markers, temporary pavement delineation and temporary construction tapers prior to the HMA overlay operation and dispose of materials as provided in Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way", of the 2010 State Standard Specifications.

1. The CONTRACTOR shall mark or otherwise provide line for the paving operation longitudinal joints shall correspond with the existing traffic stripes.

2. At locations where the new overlay width is not as wide as the existing roadway surfacing, the outer one foot shall be tapered and compacted so the outer edge of new pavement is a maximum one-half inch thick.

3. Additional HMA surfacing material shall be placed along the edge of road connections, private drives, and other highway facilities, hand raked, if necessary, and compacted to form smooth, tapered conforms an shown on "Asphalt Concrete Blanket Details" of these Specifications. Full compensation for furnishing all labor and tools and for doing all the work necessary to hand rake these conforms shall be considered as included in the contract prices paid per ton for the various items of HMA surfacing involved and no additional compensation will be allowed therefor.

N. Hot Mix Asphalt (Miscellaneous Areas): This work includes producing hot mix asphalt (HMA) and placing it on miscellaneous areas and shall conform to the provisions in Section 39, "Hot Mix Asphalt," of the 2010 State Standard Specifications and these Specifications.

1. Miscellaneous areas include, but are not limited to, Overside Drains (OSD), Driveways and Intersection Flares, swales, ditches, and non-standard berms.

O. Place Hot Mix Asphalt Dike Overlay: Dikes shall be overlaid, shaped, and compacted with an extrusion machine to the required cross sections at the locations and shaped designated on the Plans and shall conform to the provisions in Section 39, "Hot Mix Asphalt," of the 2010 State Standard Specifications and these Specifications.

3.03 ROADWAY SURFACE REMOVAL

A. All pavement cuts shall be neat and straight to provide an unfractured and level pavement joint for bonding existing surfacing with pavement replacement. Pavement cuts shall be parallel or at right angles to the road or area centerlines. All cut edges shall provide clean, solid, vertical faces free from all loose material.

B. All existing crushed aggregate and pavement removed, and any excess new material shall be hauled away from the project site and legally disposed of by the CONTRACTOR.

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3.04 RESURFACING

A. In all existing pavement areas where the surface is removed, broken or damaged by CONTRACTOR's equipment or in which the ground has caved in or settled because of the installation of the improvements, or areas designated to be repaved, resurfaced, or modified, the surface shall be restored to the original grade by the CONTRACTOR. Prior to resurfacing, the existing surfacing shall be removed as provided above. All broken and jagged edges of the pavement edge shall be straight. Areas to be cut shall be indicated until these edges have been sawed. If during the initial removal of the existing pavement a method of removal was used that disturbed the adjoining pavement, or if during general construction operations the adjacent pavement was disturbed, then this adjoining pavement must also be removed and replaced. Where irregular surfaces are to be surfaced, existing pavement shall be cut parallel to the alignment of the pipe or to the centerline of the roadway. Pavement shall be saw cut or ground to a minimum depth of 2-in at a point not less than 6-in outside the limits of excavation or the previous pavement cut (made by pneumatic tools), whichever limits are the greater. The additional surfacing so cut shall be removed and disposed of by the CONTRACTOR prior to resurfacing.

B. Restoration of pavement shall be to the same section as the existing roadway/paved area or a minimum thickness of 3-in, whichever is greater.

3.05 PAVEMENT MARKING REPAIR

A. All traffic markings and signs painted on areas which are covered with new or repair pavement shall be replaced in kind. See Section 02762.

3.06 SPECIAL REQUIREMENTS

A. The restoration of all surfaces, as described herein, disturbed by the installation or repair to underground facilities shall be completed as soon as is reasonable and practical, but in no case greater than the time allowed in Section 01571.

3.07 CLEAN-UP

A. After all installation, repair and restoration of paving has been completed, all excess asphalt, dirt, rock and other debris shall be removed from the roadways. Adjoining curbs, gutters, structures, and other surfaces over-sprayed or splattered shall be cleaned of all HMA products.

3.08 REPAIR OF PAVEMENT SURFACE

A. Following Final Completion, the CONTRACTOR shall repair settled pavement over trenches, excavation, or backfill placed as part of this Work during the period of the warranty of the Work.

B. All materials and labor required for the repair of paving shall be supplied by the CONTRACTOR and the work shall be done in a manner satisfactory to the ENGINEER.

END OF SECTION

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SECTION 02605

PRECAST CONCRETE STUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials and equipment required to install precast concrete manholes, vaults, frames and covers, frames and grates, access hatches, and appurtenances as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Dewatering is included in Section 02140.

B. Earthwork is included in Section 02200.

C. Trenching, backfilling, and compaction are included in Section 02221.

D. Concrete is included in Division 3.

E. Metal Fabrications are included in Section 05500.

1.03 SUBMITTALS

A. Submit the following to the ENGINEER in accordance with Section 01300:

1. Shop drawings, product data, materials and details of construction, reinforcing and joints for all precast structures.

2. Details of construction for manhole base sections, riser sections, eccentric and concentric conical top sections, flat slab tops, grade rings with notarized certificate indicating compliance with ASTM C478.

3. Manhole frame and cover details with notarized certificate indicating compliance with the specified ASTM standard and Class designation.

4. Vault access hatches.

5. Pipe connections to manholes and vaults.

6. Method of repair for minor damage to precast concrete sections.

B. Design Information

1. Precast concrete structures:

a. Sectional plans and elevations showing dimensions and reinforcing steel placement.

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b. Structural calculations including assumptions prepared and sealed by a registered Civil or Structural Engineer in the State of California.

C. Test Reports

1. Precast concrete structures:

a. Concrete test cylinder reports from an approved testing laboratory certifying conformance with this Section.

2. Results of leakage tests.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A48 - Standard Specification for Gray Iron Castings

2. ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

3. ASTM C33 - Standard Specification for Concrete Aggregates.

4. ASTM C150 - Standard Specification for Portland Cement

5. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes

6. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections

7. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

8. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections using Preformed Flexible Joint Sealant.

9. ASTM D4101 - Standard Specification for Propylene Plastic Injection and Extrusion Materials

B. American Concrete Institute (ACI)

1. ACI 318 - Building Code Requirements for Structural Concrete

2. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures

C. American Association of State Highway and Transportation Officials (AASHTO)

1. Standard Specifications for Highway Bridges

D. Occupational Safety and Health Administration (OSHA)

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E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All material shall be new and unused.

B. Materials' quality, manufacturing process and finished sections are subject to inspection and approval by ENGINEER or other OWNER representative. Inspection may be made at place of manufacture, at work site following delivery, or both.

C. Materials will be examined for compliance with ASTM standards, this Section and approved manufacturer's drawings. Additional inspection criteria shall include: appearance, dimensions, blisters, cracks and soundness.

D. Materials shall be rejected for failure to meet any requirements specified herein. Rejection may occur at place of manufacture, at work site, or following installation. Mark for identification rejected materials and remove from work site immediately. Rejected materials shall be replaced at no cost to OWNER.

E. Imperfections in structure sections may be repaired, subject to the approval of the ENGINEER, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at 7 days and 5,000 psi at 28 days, when tested in 3-in by 6-in cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the ENGINEER.

PART 2 PRODUCTS

2.01 GENERAL

A. Reference to a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. Like items of materials/equipment shall be the end products of one manufacturer in order to provide standardization for appearance, operation, maintenance, spare parts and manufacturer's service.

C. Provide lifting lugs or holes in each precast section for proper handling.

D. Cement shall conform to ASTM C150, Type II cement.

E. Water cement ratio for all precast structures shall be 0.40 maximum.

F. Precast concrete sections shall be properly cured prior to shipping. Precast concrete sections shall not be shipped before concrete has attained 5,000 psi compressive strength.

G. Mark date of manufacture, name and trademark of manufacturer on the inside of each precast section.

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H. For precast structures, design each structure to resist uplift from buoyant forces due to high groundwater levels. Friction between the walls and surrounding soil shall not be used to resist uplift. Flotation forces shall be resisted by the dead load of the structure and soil directly above the structure footing. Reference the Project geotechnical report and supplemental memoranda for groundwater elevations. It is considered reasonably conservative to assume groundwater is at finished grade.

I. If the design of the structure requires a concrete pad to prevention flotation, the cost of designing, furnishing and installing a reinforced concrete pad shall be included in the price for the structure. Details of the design of the concrete pad (if required) shall be submitted to the ENGINEER for review.

J. All exterior walls shall be designed for an at-rest equivalent fluid pressure of 90 pcf. The top of the pressure diagram shall be assumed to originate at finished ground level. Additional lateral surcharge pressure from approaching truck wheels shall be included in accordance with the project geotechnical report.

K. All exterior walls shall be designed for internal fluid pressure based on unit weight of 63 pcf with precast structure filled from invert to cover with no balancing external soil pressure.

L. The tops of all precast structures shall be designed to resist an AASHTO H-20 truck live load applied at finished grade.

2.02 PRECAST CONCRETE MANHOLES

A. Precast concrete base sections, riser sections, transition top sections, flat slab tops and grade rings shall conform to ASTM C478 and meet the following requirements:

1. Design precast concrete base and flat slab top for their own weight, weight of soil at 130 pcf, and a live load equal to AASHTO H-20 truck loading applied at finished grade.

2. Bottom slab thickness shall be no less than the riser wall thickness or as shown on the Drawings, whichever is thicker.

3. Construct concrete bases as shown on the Drawings.

4. Base, riser and transition top sections shall have tongue and groove joints.

5. Top section shall be eccentric cone where cover over pipe exceeds 4-ft. Top section shall be a flat slab where cover over top of pipe is 4-ft or less. Top section shall be a plastic lined flat slab where manhole riser sections are to be plastic lined.

6. Provide integrally cast knock-out panels in precast concrete manhole sections at locations, and with sizes shown on Drawings. Knock-out panels shall have no steel reinforcing.

7. Concrete manhole walls shall be furnished with a plastic lining in accordance with Section 02765.

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8. Exposed interior manhole concrete (not plastic-lined), including manhole shelves, shall be lined with an airless-spray applied elastomeric polyurethane (minimum 80 mils DFT) in accordance with manufacturer's recommendations. Polyurethane liner shall be applied by qualified applicators certified by the manufacturer. Polyurethane liner shall be Polibrid 705 by Polybrid Coatings, Brownsville, TX; or approved equal.

2.03 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30.

B. Manhole covers on new recycled water manholes shall have a 24-in. clear opening and a diamond pattern, blind pick holes, the words "SANITARY SEWER" cast in 3-in letters (see Drawings for details).

C. All manhole frames and covers shall be Neenah Foundry, East Jordan Iron Works, Inc., Campbell Foundry Company, Pinkerton, or equal. Model numbers refer to Pinkerton products:

1. Manhole Frame and cover in streets and cross country locations – A-640.

2.04 JOINTING PRECAST MANHOLE SECTIONS

A. Seal tongue and groove joints of precast manhole sections with either rubber O-ring gasket or preformed flexible joint sealant. O-ring gasket shall conform to ASTM C443. Preformed flexible joint sealant shall be Kent Seal No. 2 by Hamilton-Kent; Ram-Nek by K.T. Snyder Company or equal.

B. Provide splices in plastic liner in accordance with Specification Section 02765.

C. Completed joint shall withstand 15 psi internal water pressure without leakage or displacement of gasket or sealant.

2.05 PRECAST CONCRETE VAULTS

A. Concrete vaults shall be reinforced precast concrete conforming to the requirements of ACI 318 and ACI 350. Vaults shall be designed for HS20-44 loading and furnished with prefabricated Type 316 stainless steel access hatches in accordance with the Drawings and Section 05500. Dimensions of vaults shall be as shown on the Drawings. If no dimensions are shown on the Drawings, provide a vault with inside dimensions at least 8 inches greater than the outside dimensions of the enclosed piping or equipment and a depth as required to match finish grade. Unless otherwise shown, vaults shall be provided with precast concrete floors, frames, Type 316 stainless steel access hatches, sumps, and appurtenances as required for the intended use.

B. Spacing for reinforcement shall be adjusted in such a manner as to minimize cracking in the concrete per ACI 318 section 10.6.4.

C. The vault floor slab and walls shall be cast together to form a monolithic base section.

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D. The structural design shall take into account discontinuities in the structure produced by openings and joints in the structure.

E. All walls and slabs shall be analyzed by accepted engineering principles. Openings shall be completely framed as required to carry the full design loads to support walls. All slabs and walls shall be fully reinforced on both faces and the minimum reinforcing shall be No. 5 at 12-in E.F.E.W. Additional reinforcing shall be provided around all openings.

F. Where joints are designed in precast concrete vaults, such joints shall be interlocking to secure proper alignment between members and prevent migration of soil through the joint. Structural sections at joints shall be sized sufficiently to reinforce the section against excess contact bearing pressures through the joint. Completed joint shall withstand 15 psi internal water pressure without leakage or displacement of gasket or sealant.

G. The horizontal wall joints shall not be located within 18-in of the horizontal centerline of wall penetrations.

H. The structure shall be built by the manufacturer in no more than three major sections.

I. Access openings and pipe penetrations shall be formed openings and located as shown on the Drawings.

J. Vaults shall be by Jensen, Utility Vault Company, Hanson Pipe and Products, or equal.

2.06 PIPE CONNECTIONS TO PRECAST CONCRETE STRUCTURES

A. Barrel section to sewer pipe connections shall be sealed with resilient connectors complying with ASTM C923, and suitable to resist anticipated groundwater pressures.

B. Connect pipe to precast structures in the following way:

1. Flexible sleeve - Integrally cast sleeve in precast manhole section or install sleeve in a formed or cored opening. Fasten pipe in sleeve with stainless steel clamp(s). Coat stainless steel clamp(s) with bituminous material to protect from corrosion. Flexible sleeve shall be Lock Joint Flexible Manhole Sleeve; Kor-N-Seal connector; or equal.

2.07 DAMPPROOFING

A. Two coats of bituminous waterproofing material shall be applied to the exterior surfaces of the precast concrete structures by brush or spray and in accordance with the manufacturer's recommendations. Dampproofing shall be Hydrocide 648 by Sonneborn Building Products; Dehydratine 4 by A.C. Horn Inc; RIW Marine Liquid by Toch Brothers or equal.

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PART 3 EXECUTION

3.01 INSTALLATION

A. Manhole Installation.

1. Manholes shall be constructed to the dimensions shown on the Drawings and as specified herein. Protect all work against flooding and floatation.

2. Place manhole base on a bed of crushed rock as shown on the Drawings. Set manhole base grade so that a maximum grade adjustment of 12-in is required to bring the manhole frame and cover to final grade.

3. Set precast concrete barrel sections plumb with a 1/4-in maximum out of plumb tolerance allowed. Seal joints of precast barrel sections with either a rubber O-ring set in a recess or preformed flexible joint sealant in sufficient quantity to fill 75 percent of the joint cavity. Fill the outside and inside joint with non-shrink grout and finished flush with the adjoining surfaces. Grout the inside of any barrel section joint with non-shrink grout to the satisfaction of the ENGINEER.

4. Allow joints to set for 24 hours before backfilling unless the ENGINEER specifically approves a shorter period.

5. Plug holes in the concrete barrel sections required for handling with a non-shrinking grout or non-shrinking grout in combination with concrete plugs. Finish flush on the inside.

6. Construct manhole pipe connections, including pipe stubs, as specified herein. Close or seal pipe stubs for future connections with a gasketed watertight plug.

7. Set manhole covers and frames in a full mortar bed. Utilize bricks or precast concrete grade rings, a maximum of 15-in thick, to assure frame and cover are set to the finished grade. Set manhole frame and cover to final grade prior to placement of permanent paving.

8. Repair plastic liner and seal liner joints in accordance with Specification Section 02765.

9. Apply elastomeric polyurethane to exposed interior manhole concrete in accordance with manufacturer's recommendations.

B. Vault Installation.

1. Vaults shall be constructed to the dimensions shown on the Drawings and as specified herein. Protect all work against flooding and floatation.

2. Provide a minimum of 3-ft of aggregate base compacted to a minimum 90% relative compaction per ASTM D1557 under all vaults, unless greater thicknesses or other installation conditions are shown on the Drawings. Extent of aggregate base beyond the vault foundation shall be 12-in or as shown on the Drawings, whichever is greater.

3. All concrete joints shall be cleaned prior to setting sections. Vault sections shall be provided with mastic or rubber gaskets to seal joints between sections. Mastic gaskets shall

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be used only within the temperature range and atmospheric conditions recommended by the gasket manufacturer. Lifting holes in precast units shall be completely packed with non-shrink grout after the unit is installed.

4. All surfaces to receive grout shall be cleaned and wetted before placing grout.

5. Precast vaults shall be set plum and with sections in true alignment with a 1/4-in maximum tolerance to be allowed. The outside and inside joint shall be filled with non-shrink grout mortar and finished flush with adjoining surfaces. Allow joints to set for 24-hours before backfilling. Backfilling shall be done in a careful matter, bringing the fill up evenly on all sides. If any leaks appear in the structure, the inside joints shall be waterproofed to the satisfaction of the ENGINEER. Install the precast sections in a manner that will result in a watertight joint.

6. Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done prior to setting structure sections in place, to prevent any subsequent jarring which may loosen the mortar joints. Concrete reinforcement shall be located through nondestructive methods prior to cutting holes. Holes shall be relocated to miss concrete reinforcement.

7. Vaults shall be placed so that they are flush with paved surfaces and 1-in above surrounding grade in unpaved areas. In unpaved areas, slope the surrounding 4-ft away from each vault.

3.02 LEAKAGE TESTS

A. Leakage tests for Manholes

1. Test each manhole for leakage. ENGINEER shall observe each test. Perform exfiltration test as described below:

2. Assemble manhole in place; fill and point all lifting holes and exterior joints within 6-ft of the ground surface with an approved non-shrinking mortar. Test prior to placing the shelf and invert and before filling and pointing the horizontal joints below 6-ft of depth. Lower ground water table below bottom of the manhole for the duration of the test. Plug all pipes and other openings into the manhole and brace to prevent blow out.

3. Fill manhole with water to the top of the cone section. If the excavation has not been backfilled and no water is observed moving down the exterior surface of the manhole for 24 hours, the manhole is satisfactorily watertight. If the test, as described above is unsatisfactory as determined by the ENGINEER, or if the manhole excavation has been backfilled, continue the test. A period of time may be permitted to allow for absorption. Following this period, refill manhole to the top of the cone, if necessary and allow at least 8 hours to pass. At the end of the test period, refill the manhole to the top of the cone again, measuring the volume of water added. Extrapolate the refill amount to a 24-hour leakage rate. The leakage for each manhole shall not exceed one gallon per vertical foot for a 24-hour period. If the manhole fails this requirement, but the leakage does not exceed three gallons per vertical foot per day, repairs by approved methods may be made as directed by the ENGINEER. If leakage due to a defective section of joint exceeds three gallons per vertical foot per day, the manhole shall be rejected. Uncover the rejected manhole as

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necessary to disassemble, reconstruct or replace it as directed by the ENGINEER. Retest the manhole and, if satisfactory, fill and paint the interior joints.

4. No adjustment in the leakage allowance will be made for unknown causes such as leaking plugs, absorptions, etc. It will be assumed that all loss of water during the test is a result of leaks through the joints or through the concrete.

5. An infiltration test may be substituted for an exfiltration test at the discretion of the ENGINEER if the ground water table is above the highest joint in the manhole. If there is no leakage into the manhole, the manhole will be considered watertight. If the ENGINEER is not satisfied, exfiltration testing shall be performed as previously described.

6. A vacuum test may be substituted for a leakage test at the discretion of the ENGINEER as follows:

   a. Where the excavation has not been backfilled, the filling and pointing of exterior joints shall not be necessary prior to performing this test.

   b. The vacuum test shall be conducted as follows:

      1. A compression band shall be inflated to provide a seal between the vacuum base and the top of the manhole. The vacuum pump shall then be connected to the outlet port with the valve open and a vacuum of 10-in Hg (20-in of Hg absolute) drawn. The valve shall then be closed.

      2. The following test criteria shall apply to 4-ft and 5-ft diameter manholes:

         (a) A drop of 1-in Hg shall be allowed over a 2-minute period for manholes 0 to 10-ft deep.

         (b) A drop of 1-in Hg shall be allowed over a 2-1/2-minute period for manholes 10 to 15-ft deep.

         (c) A drop of 1-in Hg shall be allowed over a 3-minute period for manholes 15 to 30-ft deep.

         (d) If the pressure drop exceeds the acceptable limits the CONTRACTOR shall be allowed to make necessary repairs, as approved by the ENGINEER. The manhole shall then be re-tested.

         (e) If the manhole fails to meet the minimum requirements of the vacuum test when re-tested, it may be water tested as outlined in paragraph 3.02.

         (f) Upon completion of a successful vacuum test, the interior and exterior joints shall be filled and pointed.

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B. Leakage tests for Vaults

1. Test each vault for leakage. ENGINEER shall observe each test. Perform exfiltration test as described below:

2. Assemble vault in place; fill and point all lifting holes and exterior joints with an approved non-shrinking mortar. Lower ground water table below bottom of the vault for the duration of the test. Plug all pipes and other openings into the vault and brace to prevent blow out.

3. Fill vault with water to the top of the wall. If the excavation has not been backfilled and no water is observed moving down the exterior surface of the vault after 24 hours of filling, the vault is satisfactorily watertight. If the test, as described above is unsatisfactory as determined by the ENGINEER, or if the vault excavation has been backfilled, continue the test. A period of time may be permitted to allow for absorption. Following this period, refill vault to the top of the wall, if necessary and allow at least 8 hours to pass. At the end of the test period, refill the vault to the top of the wall again, measuring the volume of water added. Extrapolate the refill amount to a 24-hour leakage rate. The loss of volume for each vault shall not exceed 0.10 percent in 24 hours.

4. The following conditions shall be considered as NOT meeting the criteria for acceptance regardless of the actual loss of water volume from the structure.

   a. Ground water leakage into the structure.

   b. Water flowing from the vault walls or joints or from beneath the foundation.

   c. Moisture picked up by a dry hand from the exterior surface.

5. Repairs and Retesting of Vaults.

   a. Structures failing the watertightness test and not exhibiting visible leakage may be retested after an additional stabilization period of not less than 3 days. Tanks failing this second test shall be repaired prior to further testing.

   b. Repair structures which fail the watertightness test and structures showing visible leakage in compliance with the provisions specified herein or as approved by the ENGINEER.

   c. Repairs and retesting of vaults shall be performed at no additional cost to the OWNER.

   d. All discharged test water shall be dechlorinated per OWNER requirements and be disposed of by the CONTRACTOR in an approved manor. Water shall not be disposed of by discharging it onto ground surface of public or private land.

6. An infiltration test may be substituted for an exfiltration test at the discretion of the ENGINEER if the ground water table is observed to be at grade. If there is no leakage into the vault, the vault will be considered watertight. If the ENGINEER is not satisfied, testing shall be performed as previously described.

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3.03 CLEANING

A. Thoroughly clean precast structures of all silt, debris and foreign matter of any kind, prior to final inspections.

END OF SECTION

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SECTION 02612

REINFORCED CONCRETE PIPE FOR CAISSONS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals necessary and install and test reinforced concrete pipe for pump station caisson construction complete as specified herein. Reinforced concrete pipe shall be constructed with integral plastic lining.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. Caisson Construction is included in Section 02355.

C. Plastic Lining for Precast Concrete is included in Section 02765.

D. Concrete is included in Division 3.

1.03 SUBMITTALS

A. Within 30 days of the Effective Date of the Agreement submit the name of the pipe and fitting supplier and a list of materials to be furnished.

B. Submit, in accordance with Section 01300, shop drawings showing layout and details of reinforcement, joint, method of manufacture and installation of pipe, specials and fittings, and a schedule of pipe lengths by diameter for the entire job.

C. Submit with the shop drawings certification from the manufacturer that the fine and coarse aggregates used in manufacture of the concrete pipe comply with the requirements of Paragraph 2.01C.

D. Prior to each shipment of pipe, submit the manufacturer's certification that the pipe for this Contract conforms to the ASTM Standards specified herein.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C33 - Standard Specification for Concrete Aggregates.

2. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

3. ASTM C150 - Standard Specification for Portland Cement.

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4. ASTM C361 - Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.

5. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

6. ASTM C924 - Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.

7. ASTM E329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. The manufacturer shall perform the acceptance tests specified in ASTM C76, Paragraph 5.1.2.

B. Inspection of the pipe will be made by the ENGINEER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

PART 2 PRODUCTS

2.01 REINFORCED CONCRETE PIPE

A. Except as otherwise specified herein, pipe shall conform to ASTM C76, Class III, Wall C. The pipe interior shall be smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. The concrete mass shall be dense and uniform.

B. Cement shall be non-air-entraining portland cement conforming to ASTM C150, Type II. The use of any admixture shall be subject to the specific approval of the ENGINEER.

C. Fine aggregate shall consist of washed inert natural sand conforming to the requirements of ASTM C33, except for gradation, with a maximum loss of 8 percent when subjected to 5 cycles of the soundness test using magnesium sulfate. Coarse aggregate shall consist of well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33, except for gradation, with a maximum loss of 8 percent when subjected to 5 cycles of the soundness test using magnesium sulfate. Documentation that the aggregates to be used in the manufacture of reinforced concrete pipe meet these requirements shall be submitted to the ENGINEER as stated in Paragraph 1.03 above.

D. Minimum concrete compressive strength shall be 5,000 psi, and maximum water cement ratio shall be 0.40. The 28-day compressive strength of the concrete, as indicated by cores cut from the pipe shall be equal to or greater than the design strength of the concrete. The concrete mass shall be dense and uniform. Reinforcement shall be circular for all concrete pipe. Quadrant steel shall not be used. Reinforcement shall be installed in both the bell and the spigot. At least one circumferential reinforcement wire shall be in both the bell and spigot area and

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reinforcement in the bell and spigot shall be adequate to prevent damage to concrete during shipping, handling and after installation. When cores indicate that reinforcing steel has less than 85 percent bond the pipe shall be subjected to a 3-edge bearing test to 13 psi to verify strength and water tightness.

E. Pipe may be rejected for any of the following reasons:

1. Exposure of any steel reinforcement in any surface of the pipe.

2. Transverse reinforcing steel found to be in excess of 1/4-in out of specified position after the pipe is molded.

3. Any shattering or flaking of concrete at a crack.

4. Voids, with the exception of a few minor bugholes, on the interior and exterior surfaces of the pipe exceeding 1/4-in in depth unless properly and soundly pointed with mortar or other approved material.

5. Unauthorized application of any wash coat of cement or grout. Any pipe dressing procedures shall be subject to approval of the ENGINEER.

6. A hollow spot (identified by tapping the internal surface of the pipe) which is greater than 30-in in length or wider than 3 times the specified wall thickness. Repair of such defective areas not exceeding these limitations may be made as specified in Paragraph 2.01R.

7. Defects that indicate imperfect molding of concrete; or any surface defect indicating honeycomb or open texture (rock pockets) greater in size than area equal to a square with a side dimension of 2-1/2 times the wall thickness or deeper than two times the maximum graded aggregate size; or local deficiency of cement resulting in loosely bonded concrete, the length of which is greater than 30-in in length or wider than 3 times the specified wall thickness when the defective concrete is removed. Repair of such defects not exceeding these limits may be made as specified in Paragraph 2.01R.

8. Any of the following:

   a. A crack having a width of 0.005 to 0.01-in throughout a continuous length of 36-in or more.

   b. A crack having a width of 0.0 to 0.03-in or more throughout a continuous length of 1-ft or more.

   c. Any crack greater than 0.005-in extending through the wall of the pipe and having a length in excess of the wall thickness.

   d. Any crack showing two visible lines of separation for a continuous length of 2-ft or more, or an interrupted length of 3-ft or more anywhere in evidence, both inside and outside.

   e. Cracks anywhere greater than 0.03-in in width.

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F. The pipe shall be clearly marked as required by ASTM C76 in a manner acceptable to the ENGINEER. The markings may be at either end of the pipe for the convenience of the manufacturer, but for any one size shall always be at the same end of each pipe length. Pipe shall not be shipped until the compressive strength of the concrete has attained 5,000 psi.

G. Pipe shall have a minimum length of 8-ft, except for closure and other special pieces as approved by the ENGINEER. Short lengths of pipe made for closure etc., may be used.

H. Each length of pipe shall be checked against the length noted on the shop drawings. Pipe more than 1-1/2-in longer than that shown on the shop drawings shall not be used on this project. Variations in length of the same pipe shall not exceed ASTM C76 requirements.

I. During manufacturing, measuring devices shall be used to assure joint assembly is within the tolerance of ASTM C76 and this Section.

J. The ENGINEER shall have the right to take samples of the concrete after it has been mixed or as it is being placed in the forms or molds and to make such inspection and tests thereof as he/she may wish.

K. At the start of the work, a set of test cylinders shall be taken each day on which pipe is manufactured for the project or more often if required. This may ultimately be reduced to one set of three specimens for every 50 cu yds of concrete placed, if the uniformity of results warrants and if approved by the ENGINEER. At the start of the work, a relationship shall be established between ultimate strength of test cylinders stored in a standard manner as compared to cylinders steam cured with the pipe and as compared to cores taken from the corresponding finished pipe. At least five sets of tests shall be made.

L. The ENGINEER shall have the right to cut cores from such pieces of the finished pipe as he/she selects for inspection and such tests as he/she may wish to apply. Holes left by the removal of cores shall be filled in an approved manner by and at the expense of the manufacturer. Core drilling shall be carried out by the pipe manufacturer at his/her expense. The number of cores shall not exceed the requirements of ASTM C76.

M. Test cores may be taken for every 500 linear feet of pipe manufactured, but not less than once each day on which pipe is manufactured for the project. Cores may be reduced to one set of two per week (or possibly fewer, but not less than one set for every 1,500 linear feet), if a satisfactory relationship is established between cores and cylinders made and cured in the standard manner. This relationship shall not vary by more than 10 percent more or less from the average ratio. Cores may be drilled in any manner which will provide a smooth core face. All pipe cylinders and cores shall be 4-in in diameter. Cores shall be carefully saw-trimmed and capped in a vertical position with a sulfur cap of minimum thickness, at least one day before being tested.

N. Core testing shall conform to Standard ASTM Methods.

O. At the time of inspection, the pipe will be carefully examined for compliance with the appropriate ASTM standard, as specified herein and shop drawings. All pipes shall be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, soundness, etc. All pipes will be checked for soundness by being tapped and scratched at least once on every 50 sq in of pipe surface. The surface shall be dense and close-textured. Cores also shall

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serve as a basis for rejection of pipe, particularly if lamination or poor bond of reinforcement is apparent.

P. The manufacturer shall use measuring devices to assure joint assembly is within tolerances of ASTM C76 and as specified herein. If, during construction, the pipes cannot be satisfactorily joined, the manufacturer shall pre-join the pipe at the plant.

Q. Unsatisfactory or damaged pipe will be either permanently rejected or returned for minor repairs. Only that pipe actually conforming to the specifications and accepted will be listed for approval, shipment and payment. Approved pipe will be so stamped or stenciled on the inside before it is shipped. All pipe which has been damaged after delivery will be rejected and if such pipe already has been laid in the trench, it shall be acceptably repaired, if permitted, or removed and replaced, entirely at the CONTRACTOR's expense.

R. Pits, blisters, rough spots, breakage and other imperfections may be repaired, subject to the approval of the ENGINEER, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Non-shrink cement mortar used for repairs shall have a minimum compressive strength of 6,000 psi at the end of 7 days and 7,000 psi at the end of 28 days, when tested in 3-in cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the ENGINEER.

S. Provide plastic liner for concrete pipe in accordance with Specification Section 02765.

T. CONTRACTOR shall coordinate required penetrations in concrete pipe. See Specification Section 02355 for additional information on caisson construction requirements.

2.02 JOINTS FOR CONCRETE PIPE

A. Joints shall be concrete and rubber tongue and groove or bell and spigot type joint conforming to ASTM C361 with provisions for using a round rubber O-Ring gasket in a recess in the spigot end of the pipe. The bevel on the bell of the pipe shall be between 1-1/2 degrees and 2-1/2 degrees. The diameters of the joint surfaces which compress the gasket shall not vary from the true diameters by more than 1/16-in.

B. The round rubber O-Ring gaskets shall conform to ASTM C443 except as otherwise specified herein. Two gaskets shall be submitted to the ENGINEER for tests at least 30 days before joining any the pipe.

C. The gaskets shall be designed and manufactured so that the completed joint will withstand an internal water pressure in excess of 13 psi for a period of 10 minutes without showing any leakage by the gasket or displacement of it. The pipe manufacturer shall provide facilities for testing the effectiveness of the joints against leakage and one such test may be required for each 500-ft of pipe for each type of joint manufactured. Such tests shall be made by an internal or external pressure against the joint of at least 13 psi for a period of ten minutes in accordance with ASTM C443. The completed joint, when installed in place in the work, shall be capable of withstanding a groundwater pressure of 13 psi without exceeding the allowable leakage specified for the pipe testing.

D. The ends of the pipe shall be made true to form and dimension and the bell shall be made by casting against steel forms. The manufacturer shall inspect all pipe joint surfaces for out-of-roundness and pipe ends for squareness. The manufacturer shall furnish to the

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ENGINEER a notarized affidavit stating all pipe meets the requirements of ASTM C76, as specified herein and the joint design.

PART 3 EXECUTION

3.01 CONCRETE PIPE INSTALLATION

A. Installation of reinforced concrete pipe for caissons shall be performed in accordance with Section 02355.

END OF SECTION

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SECTION 02616

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required, install, disinfect and test ductile iron fittings for piping as shown on the Drawings and as specified herein.

B. Fittings shall be located substantially as shown on the Drawings. The ENGINEER reserves the right to make such modifications in locations as may be found desirable to avoid interference between pipes or for other reasons. Pipe fitting notation is for the CONTRACTOR's convenience and does not relieve him/her from installing and jointing different or additional items where required to achieve a complete piping system.

C. Where the word "pipe" is used it shall refer to pipe, fittings, or appurtenances unless otherwise noted.

1.02 RELATED WORK

A. Submittal Requirements are included in Section 01300.

B. Pipeline testing and cleaning is included in Section 01445.

C. Warranties and bonds are included in Section 01740.

D. Jacking is included in Section 02151.

E. Trenching, Backfilling and Compaction is included in Section 02221.

F. Earthwork is included in Section 02200.

G. Sedimentation and Erosion Control is included in Section 02270.

H. Pavement Repair and Resurfacing is included in Section 02576.

I. Valves and Appurtenances are included in Division 15.

1.03 SUBMITTALS

A. Submit shop drawings and product data, including piping layouts, design calculations, warranty information, test reports, in accordance with Section 01300 and the referenced standards.

B. Submit design calculations in accordance with Paragraph 2.02 below signed by a Professional ENGINEER, as noted in Section 01300.

C. Submit the name of the pipe and fitting suppliers and a list of materials to be furnished.

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D. Prior to shipment of pipe, certified copies of mill tests confirming the type of materials used in the pipe, and shop testing of pipe to show compliance with the requirements of the applicable standards, along with a sworn affidavit of compliance that the pipe complies with the referenced standards, shall be submitted.

E. Submit copies of all shop tests, including hydrostatic tests.

F. Submit information on all warranties per Section 01740.

G. Submit shop drawings with a tabulated laying schedule which references stations and invert elevations as shown on the Drawings as well as all fittings, bends, outlets, restrained joints, tees, special deflection bells, adapters, solid sleeves and specials, along with the manufacturer's drawings and specifications providing complete details of all items. The laying schedule shall show pipe class, class coding, station limits and transition stations for various pipe classes. The above shall be submitted to the ENGINEER for approval before manufacture and shipment. The location of all pipes shall conform to the locations indicated on the Drawings. Full length pipe may be supplied from inventory provided that all specification requirements are met. Shop drawings shall include but not be limited to:

1. Complete and dimensional working drawings of all pipe layouts, including pipe stationing, invert elevation at changes in grade or horizontal alignment, all elements of curves and bends both in horizontal alignment and vertical position.

2. The grade of material; size, wall thickness, of the pipe and fittings and appurtenances, type and location of fittings, specials, and valves; and the type and limits of the lining, lining reinforcing and coating systems of the pipe and fittings. Methods and procedures recommended by the coating manufacturer will be documented.

3. Joint details; methods and locations of supports,; and complete information concerning type, size and location of all welds. Shop welds (no field welding will be allowed) will be clearly differentiated and welds will be clearly detailed with preparation procedures for all pipe and parent material comprising each weld. Critical welding procedures will be identified along with methods for controlling welding stresses and distortions. Locations and proposed joint details will also be clearly identified.

4. Method of manufacture of pipe fittings; and any specials.

5. All other pertinent information for all items to be furnished; product data to show compliance of all couplings, supports, fittings, coatings and related items.

H. Submit anticipated production and delivery schedule.

I. Prior to shipment of pipe, submit a certified affidavit of compliance from the manufacturer stating that the pipe, fittings, gaskets, linings and exterior coatings for this project have been manufactured and tested in accordance with AWWA and ASTM standards and requirements specified herein.

J. Submit handling procedures for all phases from finished fabrication through delivery including storage, transportation, loading, and unloading. This will include storage at the project site and required protection following installation prior to startup.

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1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and other special Purpose Applications.

2. ASTM A194 - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.

3. ASTM A242 – Standard Specification for High-Strength Low-Allow Structural Steel

4. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

5. ASTM C150 - Standard Specification for Portland Cement.

B. American Water Works Association (AWWA)

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

2. AWWA C105 – American National Standard for Polyethylene Encasement for Ductile Iron Pipe Systems

3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3-in through 48-in (75mm Through 1219mm) for Water.

4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

5. AWWA C115 – Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges.

6. AWWA C116 – Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior surfaces of Ductile Iron and Grey Iron Fittings for Water Supply Service.

7. AWWA C150 – Thickness design of Ductile Iron Pipe

8. AWWA C151 – Ductile Iron Pipe, Centrifugally Cast

9. AWWA C153 - Ductile- Iron Compact Fittings, 3-in through 24-in and 54-in through 64-in, for Water.

10. AWWA C550 – Protective Interior Coatings for Valves and Hydrants

11. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

12. AWWA C606 – Grooved and Shouldered Joints

13. AWWA C651 - Disinfecting Water Mains.

14. AWWA M41 – Ductile Iron Pipe and Fittings Manual of Water Supply Practices

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C. American National Standards Institute (ANSI)
   1. ANSI B16.1 – Cast Iron Pipe Flanges and Flanged Fittings

D. National Sanitation Foundation (NSF)

   1. NSF 61 – Drinking Water System Components Health Effects.

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. It is a requirement of these Contract Documents to have all of the ductile iron pipe under thus section designed and supplied by a single manufacturer rather than have selection and supply of these items by a number of different manufacturers. Similarly. It is a requirement of these Contract Documents to have all of the ductile iron fittings under this section designed and supplied by a single manufacturer rather than have selection and supply of these items by a number of different manufacturers. All connections between the fittings shall be compatible, as detailed in Section 1.06.

B. All ductile-iron fittings to be installed under this project shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. Furnish in duplicate to the ENGINEER sworn certificates of such tests and their results at least 5 days prior to the shipment of the goods.

C. Inspection of the fittings will also be made by the ENGINEER or representative of the OWNER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements even though pipe may have been accepted as satisfactory at the place of manufacture. Fittings rejected after delivery (including defects from manufacturing or delivery/transport) shall be marked for identification and shall immediately be removed from the job at the CONTRACTOR’s expense.

D. All pipe and fittings to be installed under this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory selected by the ENGINEER at the OWNER's expense.

E. A manufacturer's representative shall be made available to the ENGINEER during the manufacturing furnishing, transporting, and unloading of the pipe during installation and testing of the pipe to assist in insuring that the pipe is properly fabricated, transported, unloaded, stored in the field, joined and tested. Manufacturer's responsibilities relate only to the proper care and treatment of the pipe during these procedures and not the techniques or procedures used during installation and testing.

   1. The designated factory representative shall be made available at any time the ENGINEER may request. The field or site representative shall be made available a minimum of 10 working days (time on site) during the project when requested by the ENGINEER.

   2. The cost for the services of the factory representative, including expenses, shall be considered incidental to the project and will not be paid separately.

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F. The manufacturer shall meet the following criteria and furnish the necessary project information , which demonstrates the required experience:

1. Experience shall include the successful fabrication of at least 50 fittings in compliance with AWWA C110 or C153 of the largest specified diameter or larger with similar lining/coatings within the past 5 years.

G. All fittings shall be marked in accordance with all applicable AWWA standards. Legibly and permanently mark all fittings, specials and appurtenances to be consistent with the laying schedule and marking drawings (if required) with the following information:

1. Manufacturer, date.

2. Size, type, class, or wall thickness.

3. AWWA Standard(s) produced to.

4. Special fittings, bends, and appurtenances requiring specific orientation will be appropriately marked with the words "TOP" in the correct position and in a consistent location.

1.06 DESCRIPTION OF SYSTEMS

A. Fittings shall be supplied by one of the named pipe manufacturers or ENGINEER approved equal. Fittings shall be as supplied by the American Cast Iron Pipe Co., U.S. Pipe and Foundry, Griffin Pipe Products, all pipe divisions of the McWane Company or an approved equal who is a member of the Ductile Iron Pipe Research Association (DIPRA). All ductile iron fittings shall be supplied by a single manufacturer. The fittings supplier shall certify in writing that their fittings are compatible with the supplied brand of pipe.

B. Pipe is to be installed in those locations shown on the Drawings, and only where specifically indicated.

C. CONTRACTOR is responsible for compatibility between joints of all items they supply.

D. In the case of conflict between information on the Drawings and this section especially concerning pressures, coatings, linings minimum thickness etc. the information given in this section shall govern.

1.07 DELIVERY, STORAGE AND HANDLING

A. Care shall be taken in loading, transporting, and unloading to prevent injury to the fittings. See AWWA C600 and the referenced AWWA Standards for Shipping, handling and storage procedures. All fittings shall be examined as noted in Division 1. Any damage to linings or coatings discovered during the examination shall be repaired to the satisfaction of the ENGINEER at the cost of the CONTRACTOR, before proceeding with the work.

B. Under no circumstances shall the fittings be dropped or skidded against each other. Care shall be taken to preventing marring the pipe coating. Padded wooden pipe cradles, or chocks suitable for the protection of coatings shall be used between finished pipes and beneath them when pipes are placed upon rough surfaces.

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C. Materials, if stored, shall be kept safe from damage. The interior of all fittings and other appurtenances shall be kept free from dirt, excessive corrosion or foreign matter at all times.

D. No metal tools or heavy objects shall be permitted to come in contact unnecessarily with the finished coating. Workers will be permitted to walk upon the coated pipe only when necessary, in which case they shall wear footwear with rubber or composition soles and heels that are sufficiently free of dirt and mud that coating remains undamaged.

1.08 WARRANTIES

A. Provide warranties as required in Section 01740.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ductile iron pipe shall conform to AWWA C151. Pipe shall be supplied in standard lengths as much as possible.

B. Thickness design shall be per AWWA C150. The pipe supplier shall perform thickness analysis as referenced in Paragraph 2.02. All ductile iron pipe supplied shall meet the minimum wall thickness and pressure class indicated on the drawings.

2.02 DUCTILE IRON PIPE DESIGN

A. Ductile iron pipe shall have a minimum tensile strength of 60,000 psi with minimum yield strength of 42,000 psi (per AWWA M-41). Design shall be done for external and internal pressures separately using the larger of the two for the net design thickness. Additional allowances shall be made for service allowance and casting tolerance per AWWA C150. The pipe classes determined for various sizes and conditions shall provide the total calculated thickness at a minimum or conform to minimum pipe class specified in Paragraph 2.01A2 above, or as shown on the Drawings, whichever is greater.

B. Design for the net thickness for external loading shall be taken as the greater of the following conditions:

1. 2-1/2-ft of cover with AASHTO H-20 wheel loads, with an impact factor of 1.5.

2. Depth from existing ground level of future proposed grade (whichever is greater) to top of pipe as shown on the Drawings, with truck load.

3. Soil Density: 125 lbs/cu ft

4. Laying Conditions; AWWA C150, Type 2.

C. Design for the net thickness shall be based upon the following internal pressure conditions:

1. Design pressure: 150 psi

2. Surge allowance: 100 psi

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3. Safety factor: 2

4. Total internal pressure design: 2 ([150] + [100]) = [500] psi

5. E': 300 psi

D. Copies of design calculations showing that the pipe meets all of the requirements specified herein shall be furnished to the ENGINEER for approval during shop drawing review in accordance with Section 01300. A yield strength of 42,000 psi shall be used during design calculations.

2.03 END TREATMENTS/JOINTS

A. Ductile iron pipe/fitting joints shall be push-on rubber gasket type or rubber-gasket mechanical joint. All joints for pipe and fittings shall be restrained. All gasket materials shall comply with Table 5-1 of AWWA M-41. Rubber-gasket joints shall conform to AWWA C111. Gasket shall be of styrene butadiene rubber (SBR).

B. Restraint for push on joint pipe shall be positive locking "Locked-type" joints manufactured by the pipe and fitting manufacturer that utilize restraint independent of the joint gasket. All restrained joints shall be suitable for the specified 200 psig test pressure. Joints shall be fabricated of heavy section ductile iron casting. Bolts and nuts shall be low carbon steel conforming to ASTM A193, Grade B7. Restraint for mechanical joint pipe shall use retainer glands for restraining joint. Restrained push on joints shall be by one of the following or an approved equal:

- "TR Flex" by US Pipe and Foundary Company
- "Superlok" by Clow Water Systems Company

1. The minimum number of restrained joints required for resisting forces at fittings and changes in direction of the pipe shall be determined from the length of restrained pipe on each side of the fittings and changes in direction necessary to develop adequate resisting friction with the soil. The required lengths of restrained joints shall be as shown on the Drawings.

2. Restrained pipe joints that achieve restraint by incorporating cut out sections in the wall of the pipe shall have a minimum wall thickness at the point of the cut out that corresponds with the minimum specified wall thickness for the rest of the pipe.

C. Threaded ductile iron flanges for ductile iron pipe shall be fabricated per AWWA C115 and sealed during installation with a special high pressure, full face gasket per AWWA C111. At the pipe manufacturer's option, the use of 250 lb pattern flanges, which are faced and drilled in accordance with ANSI B16.1 may be substituted in order to match valves or other equipment and/or to meet the required working pressure requirements. All flanges shall be rated for the same pressure as the adjacent pipe in all cases. Compatibility of the flanges with the 250 lb class and higher special class AWWA valves will the responsibility of the CONTRACTOR.

1. Flanges shall be pre drilled and then faced after being screwed onto the pipe, with flanges true to 90 degrees of the pipe axis and shall be flush with the end of the pipe.

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2. Gaskets shall be full face rubber, 1/8" thick SBR material. Such as American Torseal Gasket, or approved equal. Special material ring gaskets such as those by Garlock or equal may be required for pressures exceeding 250 for ANSI rated and custom flanges.

3. Flanged joints shall be supplied with bolts and nuts on one end, bolt studs with a nut at each end, or studs with nuts on one end where the flange is tapped. The number and size of bolts shall comply with the same standard as the flange. Bolts and nuts shall, except as otherwise specified or noted in the Specifications or on the Drawings, comply with ASTM A193, grade B7.

4. Blind flanges shall mate with regular flanges.

D. Couplings and Adapters

1. Sleeve type couplings shall be Dresser Style 38, 138 or equal.

   a. Buried sleeve-type couplings shall have a protective wrapping of "Denso" material by DENSO Inc. of Texas or equal. Where "Denso" material is used, the joint shall be packed up with "Densyl mastic" to give an even contour for wrapping with "Densopol" tape. A 1.5 mm thick coating of "Denso" paste shall be applied following by 100 mm or more wide "Densopol" tape wound spirally round the joint with at least 50 percent overlap.

2. Split Sleeve type flexible couplings shall be Victaulic Depend-O-Lok Style E x E (unrestrained) or F x F (self-restrained) or equal.

3. Grooved flexible joints for ductile iron pipe sizes 36-in and smaller must be in accordance with AWWA C606 and shall be Victaulic Style 31 or equal.

4. Shouldered flexible joints for ductile iron pipe larger than 36-in shall be Victaulic Style 44 or equal.

2.04 FITTINGS

A. Pipe fittings shall be ductile iron with pressure rating of 350 psi for 24-in and smaller piping. Fittings shall meet the requirements of AWWA C110 or AWWA C153 as applicable. Fittings shall have the same pressure rating, as a minimum, of the connecting pipe.

B. Weld-on Outlets

1. As an alternative to ductile iron cast fittings, weld-on outlets may be used. Welded-on outlets shall be limited to branch outlets having a nominal diameter not greater than 30 percent of the nominal diameter of the main pipe, or 14-inches diameter, whichever is smaller. Welded-on outlets may be provided as radial tee outlet, tangential outlet, or lateral outlet fabricated at a specific angle to the main pipe (in 1 degree increments between 45 and 90 degrees from the axis of the main pipe). Welded-on outlets shall be welded onto the pipe under the supervision of a qualified welder at the same facility where the pipe is manufactured.. The ductile iron pipe manufacturer shall have a minimum of 5 years experience in the fabrication and testing of outlets of similar size and configuration. In no case shall field welding on of outlets be allowed.

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2. The joints on welded-on outlets shall be compatible with the connecting pipe and meet where applicable, the requirements of ANSI/AWWA C111/A21.11 and/or ANSI/AWWA C115/A21.15.

3. Welding procedures for welded-on outlets shall be as determined by the pipe manufacturer.

   a. Parent pipe and branch outlet candidate pipe shall be centrifugally cast ductile iron pipe designed in accordance with ANSI/AWWA C150/A21.50 and manufactured in accordance with ANSI/AWWA C151/A21.51. Minimum class shall be: for sizes 4-inch through 54-inch, special thickness class 53.

   b. All welded-on outlets shall be rated for the working pressure indicated on the Drawings and the connecting pipe. Prior to the application of any coating or lining in the outlet area, all weldments for branch outlets to be supplied for this project shall be subjected to an air pressure test of at least 15 psi. Air leakage is not acceptable. A hydrostatic test of 500 psi for 2 hours should also be allowed as an alternative. No leakage is allowed on the hydrostatic test. The hydrostatic test shall be done prior to cutting out the parent pipe. The rating, safety factor and testing must be certified and contained in the manufacturer's submittal package.

2.05 INTERIOR LINING

A. Ductile iron fittings shall have the same type of lining as specified herein.

B. Ductile iron fittings shall have a cement mortar lining in accordance with AWWA C104. The cement shall be per ASTM C150.

C. At the option of the supplier, fittings may be lined in accordance with AWWA C550. Lining shall be NSF 61 certified.

2.06 EXTERIOR COATING

A. Buried fittings shall be installed with a bituminous coating in accordance with AWWA C151 and C110 respectively.

B. Buried pipe and fittings shall be installed with polyethylene encasement. Polyethylene encasement shall have a minimum thickness of 8 mils and meet or exceed the minimum standards established by AWWA C105, current edition. Acceptable manufacturers include Northtown or approved equal.

   1. Polyethylene encasement shall meet minimum size requirements per TABLE 3 of section 2.15 of DIPRA's Installation Guide For Ductile Iron Pipe.

   2. Test results from an independent testing agency certifying that the polyethylene encasement meets all criteria established by AWWA C105, current edition, shall be submitted to the ENGINEER prior to approval of the polyethylene encasement for use. In general, samples shall be submitted and include test results in accordance with the AWWA standard associated with tensile strength, elongation, dielectric strength, impact resistance, and propagation tear resistance.

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3. A 2-inch wide plastic adhesive tape, such as Calpico Vinyl, Polyken 900, or approved equal, shall be used for sealing seams, cuts, or tears in polyethylene encasement. Duct tape shall not be allowed.

PART 3 EXECUTION

3.01 GENERAL

A. Care shall be taken in loading, transporting and unloading to prevent injury to the fittings, lining or coatings. Fittings shall not be dropped or skidded against each other. All fittings shall be examined before laying and no piece shall be installed which is found to be defective. Any damage to the fittings, lining or coatings shall be repaired per manufacturer's recommendations. Handling and laying of fittings shall be in accordance with manufacturer's instruction and as specified herein.

If any defective fittings are discovered after it has been laid, it shall be removed and replaced with a sound fitting in a satisfactory manner. All fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work and when installed or laid, shall conform to the lines and grades required.

B. Materials, if stored, shall be kept safe from damage. The interior of all fittings and other appurtenances shall be kept free from dirt, excessive corrosion or foreign matter at all times.

C. Gaskets for mechanical and push-on joints to be stored shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.

3.02 INSTALLING DUCTILE IRON FITTINGS

A. Ductile iron fittings shall be installed in accordance with requirements of AWWA C600, except as otherwise specified herein. A firm, even bearing throughout the length of the pipe shall be provided by digging bell holes at each joint and by tamping backfill materials at the side of the pipe to the springline per details shown on the Drawings. Blocking will not be permitted. If any defective fitting is discovered after it has been laid, it shall be removed and replaced with a sound fitting in a satisfactory manner by the CONTRACTOR, at his/her own expense.

All fittings shall be kept clean until they are used in the work and shall be sound and thoroughly cleaned before laying. When laid, the fittings shall perform to the lines and grades required. Sufficient backfill shall be placed to prevent flotation.

All ductile iron fittings laid underground shall have a minimum of 4 of feet of cover unless otherwise shown on the Drawings or as specified herein.

Fittings, in addition to those shown on the Drawings shall be provided, where required, in crossing utilities which may be encountered upon opening the trench. Solid sleeve closures shall be installed at locations approved by the ENGINEER. The first pipe section connecting to fittings shall be a full length section of pipe.

3.03 PIPE JACKING

A. Pipe jacking is specified in Section 02151.

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3.04 CLEANING

A. At the conclusion of the work, thoroughly clean all of the fittings by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period. All debris shall be removed from the pipeline. The lowest segment outlet shall be flushed last to assure debris removal.

B. After the fitting has been cleaned and if the groundwater level is above the pipe or water in the pipe trench is above the pipe following a heavy rain, the ENGINEER will examine the pipe for leaks. If defective fittings or joints are discovered at this time, they shall be repaired or replaced by the CONTRACTOR.

3.05 DISINFECTION

A. Ductile iron fittings used for recycled water service shall be disinfected after cleaning. Provide all necessary equipment and labor for the disinfection.

B. Disinfection shall be in accordance with AWWA C651 standard.

C. Discharge of chlorinated water shall comply with all Federal, State and local standards. Provide sodium bisulfite for dechlorination prior to discharge.

3.06 TESTING

A. After installation, the pipe shall be tested for compliance in accordance with Section 01445 and as specified herein. Furnish all necessary equipment and labor for the hydrostatic pressure test on the pipelines.

B. Submit detailed test procedures and method for ENGINEER's review. In general, testing shall be conducted in accordance with AWWA C605. The method and procedures for performing the hydrostatic pressure test shall be approved by the ENGINEER. Submit the plan for testing to the ENGINEER at least 10 days before starting a test.

C. Pressure pipelines shall be subjected to a hydrostatic pressure in accordance with paragraph 1.06-D. This test pressure shall be maintained for a minimum of 2 hours. The hydrostatic testing allowances shall not exceed those indicated in AWWA C605. Provide suitable restrained bulkheads as required to complete the hydrostatic testing specified.

D. CONTRACTOR shall make any taps and furnish all necessary caps, plugs etc, as may be required in conjunction with performing the testing.

E. Gravity pipelines shall be subjected to hydrostatic pressure test as specified in AWWA C605.

F. All valves and valve boxes shall be properly located and installed and operable prior to testing. Bulkheads shall be provided with a sufficient number of outlets for filling and draining the line and for venting air.

G. Hydrostatic pressure tests shall conform to Section 7.3 of AWWA C605. Furnish gauges, meters, pressure pumps and other equipment needed to fill the line slowly and perform the required hydrostatic pressure tests.

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H. The line shall be slowly filled with water and the specified test pressure shall be maintained in the pipe for the entire test period by means of a pump furnished by the CONTRACTOR. Provide accurate means for measuring the quantity of makeup water required to maintain this pressure.

I. Duration of pressure test shall not be less than 2 hours. All leaks evident at the surface shall be repaired and leakage eliminated regardless of the total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced.

END OF SECTION

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SECTION 02618

CORRUGATED METAL PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install the corrugated metal pipe as specified herein.

1.02 RELATED WORK

A. Trenching, Backfill, and Compaction are included in Section 02221.

B. Concrete is included in Division 3.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, the name of the pipe supplier and a list of materials to be furnished. The submittal shall include the following:

1. Shop drawings showing layout, joint, method of manufacture and installation of pipe and a schedule of pipe lengths.

2. Prior to shipment of pipe, submit certified test reports that the pipe for this project was manufactured and tested in accordance with the ASTM and AWWA standards specified herein.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A444 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Storm Sewer and Drainage Pipe.

B. American Water Works Association (AWWA)

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. Inspection of the pipe shall be made by the ENGINEER at the point of fabrication or after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specified requirements, even though pipes may have been accepted as satisfactory at the place of fabrication. Pipe rejected after delivery shall be marked for identification and removed from the site.

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PART 2 PRODUCTS

2.01 CORRUGATED METAL PIPE

A. The corrugated metal pipe shall be fabricated from zinc coated steel sheets conforming to ASTM A444. The pipe corrugations shall be 2-2/3-in by 1/2-in. The pipe shall be given a minimum 2 mil coating, inside and out, of a bitumastic asphalt material. Prior to installation any damage to this coating shall be repaired.

B. Pipe shall be riveted, bolted or resistance spot welded lap construction or fabricated with helical corrugations and a continuous lock or welded seam. The pipe and joints shall be leakproof and capable of withstanding an H-20 live load.

C. Minimum pipe gauges shall be as follows:

Pipe Diameter (in)	Minimum Gauge
12 to 24	16
30 to 36	14
42 to 48	12

2.02 FITTINGS FOR CORRUGATED METAL PIPE

A. Joints

1. Furnish and install one or two piece corrugated bands which mesh with the corrugations of the pipe ends. Bands shall be tightened by bolts through steel angles built into bands Jointing bands shall be specifically fabricated for the pipe to be used.

B. Fittings

1. Fittings required for drop manholes shall consist of saddle branches bolted or welded in place. Elbows shall be 3-piece elbows. All interior surfaces of drop manhole fittings shall be fully coated with asphalt at the point of fabrication. Furnish flared end sections of galvanized steel at the points where drains discharge to a ditch or to grade.

2.03 PERFORATED CORRUGATED METAL PIPE

A. Perforated pipe shall meet all of the qualifications of solid corrugated metal pipe.

B. Perforations shall be in the troughs of the corrugations when viewed from the pipe exterior to facilitate wrapping pipe with filter fabric. Perforations shall be in the bottom half of the pipe at least 22-1/2 degrees below horizontal axis. Pipe shall have no less than 16 perforations, 1/4-in in diameter per linear foot. The lowest quadrant of the pipe shall be blank i.e. without perforations.

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PART 3 EXECUTION

3.01 GENERAL

A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe or fittings and the joint surfaces. Pipe or fittings shall not be dropped. All pipe or fittings shall be examined before laying and no piece shall be installed which is found to be defective.

B. As soon as the excavation is completed to the normal grade of the bottom of the trench, place screened gravel in the trench and the pipe shall be firmly bedded in this gravel to restore accurately to the existing lines and grades. Blocking under the pipe will not be permitted.

C. For helically corrugated pipe ends shall bolt together. Keep dirt and gravel out of the joint so that corrugations will fit snugly. As the jointing band is tightened tap it with a mallet to take up slack and ensure a tight joint.

D. Holding the pipe section securely in place with jacks or come-along, place screened gravel backfill bringing it up evenly on both sides of the pipe. Compact the backfill as it is placed. Continue backfilling and compacting until screened gravel is a minimum of 6-in above crown of pipe.

E. Carefully regulate the equipment and construction operations such that the loading of the pipe does not exceed the loads for which the pipe is designed and manufactured. Any pipe damaged during construction operations shall promptly and satisfactorily be repaired or replaced at the CONTRACTOR's expense.

3.02 IMPERVIOUS DAM

A. An impervious dam or bulkhead cutoff of clay or other impervious material shall be constructed in the pipe trench as directed to interrupt the unnatural flow of groundwater after construction is completed. The dam shall be effectively keyed into the trench bottom and sidewalls.

END OF SECTION

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SECTION 02621

POLYVINYL CHLORIDE (PVC) GRAVITY PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install and test polyvinyl chloride (PVC) sewer pipe and fittings as specified herein.

B. Pipe or piping refers to all pipe, fittings, material and appurtenances required to construct PVC sewer pipe complete, in place.

1.02 RELATED WORK

A. Pipeline Testing and Cleaning is included in Section 01445.

B. Trenching, backfilling and compacting is included in Section 02221.

C. Earthwork is included in Section 02200.

D. Pavement repair and resurfacing are included in Section 02576.

E. Precast Concrete Structures are included in Section 02605.

F. PVC Pressure Pipe is included in Section 02622.

G. Loaming and hydro-seeding is included in Section 02930.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, and within 30 days of the Effective Date of the Agreement, the name of the pipe and fitting manufacturers and a list of materials to be furnished by each manufacturer. Also, include information on local representative for each manufacturer, if product is sold through a distributor.

B. Shop Drawings including piping layouts and schedules shall include dimensioning, fittings, types and locations of valves and appurtenances, joint details, methods and location of supports, anchorage, gasket material, grade of material and all other pertinent technical information for all items to be furnished.

C. Prior to each shipment of pipe, certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM Standards specified herein shall be submitted.

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1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

2. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

3. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

4. ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

5. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. National Sanitation Foundation (NSF)

1. Standard No. 14 - Plastic Piping Components and Related Materials.

C. Uni-Bell PVC Pipe Association (Uni-Bell)

1. Uni-Bell Handbook for PVC Pipe Design and Construction.

2. UNI-B-6 – Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe.

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All PVC sewer pipe and fittings of a similar type (e.g. solid wall or profile wall) shall be from a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in ASTM D3034 as applicable. In addition, all PVC pipe to be installed under this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory provided by the ENGINEER. The CONTRACTOR shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all pipe approved for this Contract, plus the cost of inspection of a reasonable amount of disapproved pipe, will be borne by the OWNER. Final payment will be reduced by excessive costs of plant inspection of pipe, CONTRACTOR shall have no claim thereto. Excessive inspection costs are defined as the costs of inspection of that amount of pipe which exceeds 125 percent of the aggregate length of each type installed.

B. Inspections of the pipe may also be made by the ENGINEER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

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1.06 SYSTEM DESCRIPTION

A. The equipment and materials specified herein are intended to be of standard types for use in transporting sewage.

B. Note information in this Section, especially concerning pressures, minimum thickness, etc.

C. CONTRACTOR is responsible for compatibility between pipe materials, fittings and appurtenances.

D. Unless otherwise noted, PVC pipe systems shall be designed for the following condition(s).

1. Class: SDR 35

2. Pressure:

a. Operating: 50

b. Testing: 75

E. Pressure pipes, as specified in Section 02622, shall be used in high groundwater areas for gravity sewer service, as shown in the Table below, and shall use PVC fittings.

Start Stationing	End Stationing	Street	Drawing No.	Pipe Diameter
7+79.94	10+50	3rd Street	A-PP-100	18
10+88.75	7+57.75	El Moro Avenue	A-PP-101	18
7+57.75	4+24.75	El Moro Avenue	A-PP-101	18
14+11.75	10+88.75	El Moro Avenue	A-PP-102	18
27+33.02	24+10.02	El Moro Avenue	A-PP-102	10
24+10.02	20+76.02	El Moro Avenue	A-PP-102	12
20+76.02	17+44.75	El Moro Avenue	A-PP-102	16
17+44.75	14+11.75	El Moro Avenue	A-PP-102	16
30+67.02	27+33.02	El Moro Avenue	A-PP-103	10
25+12	28+18.16	5th Street	A-PP-107	8
32+50	28+18.16	5th Street	A-PP-108	8
29+50	33+40	6th Street	A-PP-110	8
33+40	34+95.23	6th Street	A-PP-110	8
39+00	34+95.23	6th Street	A-PP-111	8
43+00	39+00	6th Street	A-PP-111	8
39+72	41+75.61	7th Street	A-PP-113	8
37+76	39+72	7th Street	A-PP-114	8
45+75	41+75.61	7th Street	A-PP-115	8
45+75	48+56.04	8th Street	A-PP-118	8
41+74.99	45+75	8th Street	A-PP-119	8
52+50	48+56.04	8th Street	A-PP-120	8
52+00	54+99.46	9th Street	A-PP-124	8
48+20.02	52+00	9th Street	A-PP-125	8

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Start Stationing	End Stationing	Street	Drawing No.	Pipe Diameter
59+00	54+99.46	9th Street	A-PP-126	8
51+93	56+07.62	10th Street	A-PP-131	8
47+92.93	51+93	10th Street	A-PP-132	8
44+65	48+54.51	11th Street	A-PP-133	8
47+16.36	50+37.86	Paso robles Avenue	A-PP-158	8
50+37.86	53+76.76	Paso robles Avenue	A-PP-158	8
43+79.05	47+16.36	Paso robles Avenue	A-PP-159	8
6+60	10+30	18th Street	A-PP-161	8
18+42	14+50	18th Street	A-PP-163	8
42+00	45+71	17th Street	A-PP-165	8
45+71	49+65.98	17th Street	A-PP-165	8
53+50	49+65.98	17th Street	A-PP-167	8
14+94	18+30	16th Street	A-PP-168	8
18+30	21+29.49	16th Street	A-PP-168	8
24+00	21+29.49	16th Street	A-PP-169	8
26+00	24+00	16th Street	A-PP-169	8
10+50.01	7+74.59	2nd Street	A-PP-175	8
7+74.59	3+17.40	2nd Street	A-PP-175	12
9+22.86	10+50.01	2nd Street	A-PP-175	8
0+98.43	5+34.78	Santa Maria Avenue	A-PP-184	10
5+34.78	7+21.31	Santa Maria Avenue	A-PP-184	10
7+21.31	10+56.31	Santa Maria Avenue	A-PP-184	10
5+25	7+74.69	1st Street	A-PP-187	8
14+58.70	11+49.67	1st Street	A-PP-187	8
11+49.67	7+74.69	1st Street	A-PP-187	8
5+95	3+50	Baywood	A-PP-189	8
3+50	0+98.31	Baywood	A-PP-189	8
17+14.10	13+81.33	Santa Maria Avenue	A-PP-191	8
13+81.33	10+56.33	Santa Maria Avenue	A-PP-191	8
22+04	25+00	4th Street	A-PP-192	8
25+00	28+14.46	4th Street	A-PP-192	8
17+13	21+34.11	3rd Street	A-PP-194	8
15+60	17+13	3rd Street	A-PP-194	8
23+50	21+34.11	3rd Street	A-PP-195	8
0+95.31	03+06.2	Lupine Street	B-PP-101	18
22+17.04	24+31.24	Doris Avenue	B-PP-102	16
24+31.24	26+62.57	Doris Avenue	B-PP-102	18
10+62.44	12+94.02	Binscarth Road	B-PP-103	16
8+33.20	10+62.44	Binscarth Road	B-PP-104	16
5+74.42	8+33.20	Binscarth Road	B-PP-104	16
1+06.06	5+74.42	Binscarth Road	B-PP-104	16
19+75.06	22+14.71	Pecho Road	B-PP-105	16
17+23	19+75.06	Pecho Road	B-PP-105	16
14+74.47	17+23	Pecho Road	B-PP-105	12
3+12.19	2+77.19	Lupine Street	B-PP-107	10

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Start Stationing	End Stationing	Street	Drawing No.	Pipe Diameter
5+40.59	3+12.19	Lupine Street	B-PP-107	10
3+19.04	1+05.94	Bay Street	B-PP-108	10
6+62.19	3+19.04	Bay Street	B-PP-108	10
3+60	0+94	Ramona Avenue	B-PP-109	8
6+15.58	3+60	Ramona Avenue	B-PP-109	8
7+50	6+15.58	Ramona Avenue	B-PP-109	8
12+00	13+13.71	Donna Avenue	B-PP-110	8
11+20	15+10.65	Fearn Avenue	B-PP-111	8
15+67.55	15+10.65	Fearn Avenue	B-PP-111	10
16+03.64	13+38.30	Mitchell Drive	B-PP-112	8
17+60	16+03.64	Mitchell Drive	B-PP-112	8
11+90	13+38.30	Mitchell Avenue	B-PP-112	8
6+66.83	9+41.72	Don Avenue	B-PP-113	8
20+62.32	23+08.37	Pine Avenue	B-PP-115	8
25+34.98	23+09.12	Broderson Avenue	B-PP-117	8
28+25.73	26+58.75	Doris Avenue	B-PP-118	8
29+49.59	28+25.73	Doris Avenue	B-PP-118	8
30+35.24	29+49.59	Doris Avenue	B-PP-118	8
15+45.88	12+94.02	Binscarth Road	B-PP-120	8
17+73.62	15+45.88	Binscarth Road	B-PP-120	8
20+25.78	17+73.62	Binscarth Road	B-PP-120	8
8+29.31	10+73.32	Donna Avenue	B-PP-125	8
5+81.73	8+29.31	Donna Avenue	B-PP-125	8
8+25.16	10+70.99	Fearn Avenue	B-PP-128	8
5+79.28	8+25.16	Fearn Avenue	B-PP-128	8
3+55	5+85.95	don Avenue	B-PP-132	8
19+09.72	22+17.04	Doris Avenue	B-PP-140	8
17+07.46	19+09.72	Doris Avenue	B-PP-140	8
3+30	0+74.53	Garden Street	B-PP-141	8
13+08.95	10+68.94	Nancy Avenue	B-PP-142	8
0+92.97	5+00.61	Sunny Hill Road	B-PP-144	8
6+69.99	8+45.94	Henrietta Avenue	B-PP-145	8
1+03.90	4+94.15	Maple Avenue	B-PP-146	8
6+58.37	10+68.94	Nancy Avenue	B-PP-148	8
4+27.34	6+58.37	Nancy Avenue	B-PP-148	8
3+15	1+05.97	Grove Street	B-PP-151	8
5+30	3+15	Grove Street	B-PP-151	8
3+33.90	1+05.93	Henrietta Avenue	B-PP-152	8
5+07.24	3+33.90	Henrietta Avenue	B-PP-152	8
4+30.48	7+20.66	Solano Street	B-PP-155	8
7+83.78	7+20.66	Solano Street	B-PP-155	8
0+92.68	3+56.83	Nevada Court	B-PP-158	8
9+55.54	10+43.37	Butte Drive	B-PP-159	8
6+01.06	9+55.54	Butte Drive	B-PP-159	8
2+45.45	6+01.06	Butte Drive	B-PP-159	8

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Start Stationing	End Stationing	Street	Drawing No.	Pipe Diameter
76+89.07	74+75.63	Los Osos Valley Road	C-PP-103	16
80+08	76+89.07	Los Osos Valley Road	C-PP-104	16
80+97.37	80+08	Los Osos Valley Road	C-PP-104	16
83+31.78	80+97.37	Los Osos Valley Road	C-PP-104	12
84+20	83+31.78	Los Osos Valley Road	C-PP-104	12
85+98	84+20	Los Osos Valley Road	C-PP-104	12
86+94	85+98	Los Osos Valley Road	C-PP-104	10
90+04.35	86+94	Los Osos Valley Road	C-PP-104	10
91+25	90+04.35	Los Osos Valley Road	C-PP-105	10
93+42	91+25	Los Osos Valley Road	C-PP-105	8
95+53	93+42	Los Osos Valley Road	C-PP-105	8
96+97	95+53	Los Osos Valley Road	C-PP-105	8
97+11	96+97	Los Osos Valley Road	C-PP-105	8
98+56	97+11	Los Osos Valley Road	C-PP-105	8
101+18	98+56	Los Osos Valley Road	C-PP-105	8
103+95.18	101+18	Los Osos Valley Road	C-PP-106	8
104+34.73	103+95.18	Los Osos Valley Road	C-PP-106	8
108+15.11	104+34.73	Los Osos Valley Road	C-PP-106	8
1+55	1+11.9	Bush Drive	C-PP-129	8
4+45	1+55	Bush Drive	C-PP-129	8
3+92	3+61.78	Ferrel Avenue	C-PP-130	8
6+31	3+92	Ferrel Avenue	C-PP-130	8
1+00	0+47.44	9th Street	C-PP-131	8
3+06	1+00	9th Street	C-PP-131	8
6+49	3+06	9th Street	C-PP-131	8
11+83.69	12+23.69	Bayview Heights Drive	C-PP-132	8
10+52	11+83.69	Bayview Heights Drive	C-PP-132	8
6+97.2	10+52	Bayview Heights Drive	C-PP-132	8
11+71	10+10.61	Bay Oaks Drive	C-PP-133	8
12+56.95	11+71	Bay Oaks Drive	C-PP-133	8
1+65	0+90.83	10th Street	C-PP-139	8
4+06	1+65	10th Street	C-PP-139	8
6+40	6+89.92	Sunset Drive	C-PP-140	8
3+90	6+40	Sunset Drive	C-PP-140	8
1+89	3+90	Sunset Drive	C-PP-140	8
4+29.88	7+79.38	3rd Street	D-PP-101	18
1+68.51	4+29.88	3rd Street	D-PP-101	18
4+28.81	1+93.33	Pismo Avenue	D-PP-102	18
1+93.33	1+68.51	Pismo Avenue	D-PP-102	18
4+68.72	4+28.81	4th Street	D-PP-103	14
7+52.67	10+52.67	11th Street	D-PP-110	12
4+52.67	7+52.67	11th Street	D-PP-110	12
1+10.35	4+52.67	11th Street	D-PP-111	12
10+59.55	1+10.35	Los Olivos Avenue	D-PP-112	10
12+55.99	10+59.55	Los Olivos Avenue	D-PP-112	10

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Start Stationing	End Stationing	Street	Drawing No.	Pipe Diameter
7+64.46	4+28.81	Pismo Avenue	D-PP-114	14
15+26.2	18+33.47	10th Street	D-PP-134	8
11+89.22	15+26.2	10th Street	D-PP-135	8
9+25.94	11+89.22	10th Street	D-PP-135	8
5+68.81	8+43	Fairchild Way	D-PP-139	8
8+43	9+84.46	Fairchild Way	D-PP-139	8
10+18.25	7+91.22	4th Street	D-PP-144	8
26+11.11	28+11.68	11th Street	D-PP-158	8
9+45.58	10+94.16	Santa Ynez Avenue	D-PP-172A	8
1+20.07	5+19.12	12th Street	D-PP-174	8
21+13.03	1+20.07	Santa Ynez Avenue	D-PP-175	8
24+03.04	21+13.03	Santa Ynez Avenue	D-PP-175	8
15+42.68	24+03.04	Fairchild Way	D-PP-176	8
13+81.7	15+42.68	Fairchild Way	D-PP-176	8
7+14.56	8+52.10	Mountain View Avenue	D-PP-180	8
8+52.10	11+86.27	Mountain View Avenue	D-PP-180	8
5+17.99	7+14.56	Mountain View Avenue	D-PP-181	8
2+21.84	5+17.99	Mountain View Avenue	D-PP-181	8
27+70.72	29+81.92	Santa Ynez Avenue	D-PP-182	8
25+70.86	17+70.02	Santa Ynez Avenue	D-PP-182	8
29+81.92	30+69.45	Santa Ynez Avenue	D-PP-182	8
30+69.45	31+32.77	Santa Ynez Avenue	D-PP-182	8
31+32.77	17+22.27	Santa Ynez Avenue	D-PP-182	8
24+41.06	27+56.97	Los Olivos Avenue	D-PP-183	8

1.07 DELIVERY, STORAGE AND HANDLING

A. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the ENGINEER.

B. PVC items deteriorate in sunlight and are slightly brittle, especially at lower temperatures, so care shall be taken in loading, transporting and unloading items to prevent injury to the items. All items shall be examined before installation and no piece shall be installed which is found to be defective. Handling and installation of pipe and fittings shall be in accordance with the manufacturer's instructions, referenced standards and as specified herein.

C. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

D. While stored, pipe shall be adequately supported from below at not more than 3-ft intervals to prevent deformation. The pipe shall be stored in stacks no higher than that given in the following table:

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Pipe Diameter (inches)	Max. No. of Rows Stacked
8 or less	5
12 to 21	4
24 to 30	3
33 to 48	2
54 and larger	1

E. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of the sunlight [or delivered to the site so that no pipe is exposed to sunlight for more than [60] days]. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup or direct or indirect sunlight will not be permitted.

F. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact replacement item in a satisfactory manner by the CONTRACTOR, at the CONTRACTOR's own expense. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until testing.

G. In handling the items, use special devices and methods as required to achieve the results specified herein. No uncushioned devices shall be used in handling the item.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. PVC solid wall gravity pipe and fittings shall be Type PSM, PVC SDR 35 with full diameter dimensions and shall conform to ASTM D3034, for sizes 4 through 15-in and shall conform to ASTM F679 for sizes 18 through 27-in. Straight pipe shall be furnished in lengths according to ASTM D3034 and wyes shall be furnished in lengths of not more than 3-ft. Saddle wyes will not be allowed.

B. PVC pipe and fittings shall have bell and spigot push-on joints. The bell shall consist of an integral wall section with a solid cross-section elastomeric gasket securely locked in place to prevent displacement during assembly. Installation of elastomeric gasketed joints and performance of the joint shall conform to ASTM F477, ASTM D3139 or ASTM D3212.

C. All fittings and accessories for sewers shall have bell and/or spigot configurations compatible with the pipe.

D. Sewer lines shall be green in color.

PART 3 EXECUTION

3.01 INSTALLATION OF PVC PIPE AND FITTINGS

A. No single piece of pipe shall be laid unless it is straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16-in per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

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B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the OWNER. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required. PVC pipe and fittings shall be installed in accordance with requirements of the manufacturer, ASTM D2321, or as otherwise provided herein.

C. As soon as the excavation is complete to normal grade of the bottom of the trench, bedding shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. The pipe shall be laid accurately to the lines and grades indicated on the Drawings. Blocking under the pipe will not be permitted. Bedding shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the bedding under the haunches of the pipe and into the bell holes to give firm continuous support for the pipe. Bedding shall then be placed to 12-in above the top of the pipe. The initial 3-ft of backfill above the bedding shall be placed in 1-ft layers and carefully compacted. Generally the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the initial 3-ft of backfill shall be approved by the pipe manufacturer's representative prior to use.

D. All piping shall be sound and clean before installation. When installation is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by manufacturer. Fittings, in addition to those shown on the Drawings, shall be provided, if required, in crossing utilities which may be encountered upon opening the trench.

E. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end.

F. The ENGINEER may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such and immediately removed from the job site.

G. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".

H. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

I. Precautions shall be taken to prevent flotation of the pipe in the trench.

J. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend

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below top of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

3.02 JOINTING PVC PIPE (Push-on type)

A. Joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe and the joint surfaces cleaned and lubricated. The plain end of the pipe to be entered shall then be inserted in alignment with the bell of the pipe to which it is to be joined and pushed home with a come-along or by other means. Check that the reference mark on the spigot end is flush with the end of the bell.

3.03 JOINTING POLYVINYL CHLORIDE (PVC) SEWER PIPE AND FITTINGS

A. PVC sewer pipe and fittings shall be jointed in accordance with the recommendations of the latest ASTM Standards and detailed instructions of the manufacturer. The pipe manufacturer shall furnish information and supervise the installation of at least the first five joints.

B. All manhole connections shall be as shown on the Drawings and as specified in Section 02605. All concrete and mortared connections shall be equipped with an integral O-ring, or other sealant, such that a positive watertight seal is established.

3.04 WYE BRANCHES, CHIMNEYS AND STUBS

A. All fittings shall be furnished by the same manufacturer that furnishes the pipe.

B. Wye branches shall be furnished and installed and capped as shown on the Drawings or in locations directed by the ENGINEER. Each wye branch shall be provided with a PVC end cap and shall be backed with a piece of wood (2-in by 4-in) that extends to a point 3-ft below the finished ground surface.

C. PVC chimneys shall be installed according to the detail on the Drawings at locations to be determined by the ENGINEER. Concrete shall be as specified in Division 3. No backfill shall be placed over concrete within 16 hours of placing.

D. Ample time shall be given to the ENGINEER to obtain the exact location of each wye branch and chimney before it is covered. Wye branches and chimneys, which are covered before the ENGINEER has had time to obtain their location, shall be exposed at no additional cost so that location measurements can be taken.

E. PVC manhole drops shall be installed as shown on the Drawings. Concrete for encasements shall be 3500 psi as specified. No backfill shall be placed over this concrete within 16 hours of placing.

F. Pipe stubs for manhole connections shall not exceed 3.25-ft in length unless directed otherwise by the ENGINEER. Install caps where required.

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3.05 SERVICE CONNECTIONS

A. Service connections shall be installed at a minimum slope of 2 percent at the locations and to the limits determined by the ENGINEER in the field. In each case, the end shall be capped and backed with a 2-in by 4-in wood post extending to 3-ft below the finished ground surface.

B. Service connections shall be 6-in diameter unless otherwise shown on the Drawings.

3.06 TESTING (GRAVITY PIPELINES)

A. Testing and cleaning of pipe, except where specified herein, shall be as specified in Section 01445. Submit a testing plan including detailed procedures and methods and equipment that will be used for pipeline testing at least 10 days before starting the testing for ENGINEER's review. The methods and procedures shall be approved by the ENGINEER. All tests shall be conducted in the presence of the ENGINEER. Furnish all necessary equipment and labor for carrying out the specified tests.

B. Exfiltration Testing.

1. Conduct exfiltration tests on all gravity PVC pipelines by plugging the pipe at each end of the designated test section and filling the pipe within the test section with water such that the water level is at least 2 feet above the top of the pipe at the upper end of the test section or 2 feet above the groundwater level, whichever is greater, but not more than 25 feet above the top of the pipe at the lower end of the test section.

2. After allowing sufficient time for absorption and trapped air to escape, initiate the test by measuring the water level inside the pipe test section relative to a stable reference point. Conduct the test by measuring the amount of water required to maintain a constant water level within the test section for a period of at least two hours. The amount of water added shall not be greater than 25 gallons per inch of internal pipe diameter per mile of pipe per day.

3. Should the amount of added water exceed the amount permitted, locate and repair leaks and retest until the above acceptance criteria are met. All repairs and retests shall be at no additional cost to the OWNER.

C. Infiltration Testing

1. Infiltration will be acceptable method for leakage testing when the ground water level is 2 feet above the top of the pipe throughout the length of the section being tested. Infiltration shall not exceed 25 gallons per inch of internal pipe diameter per mile of pipe per day.

2. If at any time prior to acceptance, the observed infiltration between any two manholes is observed to exceed 25 gallons, per inch of internal pipe diameter, per mile of pipe per day, locate and repair leaks at no additional cost to the OWNER. All visible leaks shall be repaired.

D. Low-Pressure Air Testing

1. Low-pressure air testing may be used in lieu if exfiltration tests (except for manholes) where approved by the ENGINEER.

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2. All low-pressure air testing with air shall be performed in accordance with ASTM F1417.

3. Allowable leakage using the low- pressure air method shall not exceed 0.0015 cubic feet per minute per square foot of pipe.

4. Should the low-pressure air test yield a result that exceeds the amount permitted, locate and repair leaks and retest until the above acceptance criteria are met. All repairs and retests shall be at no additional cost to the OWNER.

E. Allowable Deflection Test

1. Pipe deflection measured not less than 90 days after the backfill has been completed as specified shall not exceed 5 percent. Deflection shall be computed by multiplying the amount of deflection (nominal diameter less minimum diameter when measured) by 100 and dividing by the nominal diameter of the pipe.

2. Deflection shall be measured with a rigid mandrel (Go/No Go) device cylindrical in shape and constructed with a minimum of nine evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the ENGINEER for each diameter of pipe to be tested. The mandrel shall be hand pulled through all sewer lines.

3. Any section of sewer not passing the mandrel shall be uncovered at no additional cost to the OWNER and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested at no additional cost to the OWNER. Retested pipe shall not deflect more than 4 percent.

F. Television testing as specified in Section 01658 shall be performed for all gravity sewers 6-inch diameter or greater.

END OF SECTION

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SECTION 02622

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install and test polyvinyl chloride (PVC) recycled water and sewer pipe and fittings, complete as specified herein.

B. Pipe or piping refers to all pipe, fittings, material and appurtenances required to construct PVC recycled water pipe or sewer pipe complete, in place.

1.02 RELATED WORK

A. Pipeline Testing and Cleaning is included in Section 01445.

B. Trenching, backfilling and compacting is included in Section 02221.

C. Earthwork is included in Section 02200.

D. Pavement repair and resurfacing are included in Section 02576.

E. Precast concrete structures are included in Section 02605.

F. Ductile Iron Pipe and Fittings are included in Section 02616.

G. Valves and appurtenances are included in Division 15.

H. Revegetation is included in Section 02930.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, and within 30 days of the Effective Date of the Agreement, the name of the pipe and fitting manufacturers and a list of materials to be furnished by each manufacturer. Also, include information on local representative for each manufacturer, if product is sold through a distributor.

B. Shop Drawings including piping layouts and schedules shall include dimensioning, fittings, types and locations of valves and appurtenances, joint details, methods and location of supports, anchorage, gasket material, grade of material and all other pertinent technical information for all items to be furnished.

C. Prior to each shipment of pipe, certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and AWWA Standards specified herein shall be submitted.

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1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

2. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

3. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

4. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Water Works Association (AWWA)

1. AWWA C110 - Ductile-Iron and Gray-Iron Fittings, 3-in Through 48-in (75mm Through 1219mm) for Water.

2. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

3. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

4. AWWA C-605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.

5. AWWA C651 - Disinfecting Water Mains.

6. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-in through 12-in for Water Distribution.

7. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings 14-in through 48-in for Water Transmission and Distribution.

8. AWWA M-23 – Manual of Water Supply Practices PVC Pipe, Design and Installation.

C. National Sanitation Foundation (NSF)

1. Standard No. 14 - Plastic Piping Components and Related Materials.

2. Standard No. 61 - Drinking Water System Components - Health Effects.

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All PVC recycled water pipe shall be from a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in ASTM D3034 and NSF

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Standard No. 14 as applicable. In addition, all PVC pipe to be installed under this Contract may be inspected at the plant for compliance with this Section by an independent testing laboratory provided by the ENGINEER. The CONTRACTOR shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all pipe approved for this Contract, plus the cost of inspection of a reasonable amount of disapproved pipe, will be borne by the OWNER.

B. Inspections of the pipe may also be made by the ENGINEER or other representatives of the OWNER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.06 SYSTEM DESCRIPTION

A. The equipment and materials specified herein are intended to be of standard types for use in transporting sewage and recycled water.

B. Note information in pipe schedule on Drawings, if any and in this Section, especially concerning pressures, minimum thickness, etc. In case of a conflict, information given in the pipe schedule shall govern.

C. CONTRACTOR is responsible for compatibility between pipe materials, fittings and appurtenances.

D. Unless otherwise noted, PVC pipe systems shall be designed for the following condition(s).

1. Class: 150 (DR 25)

2. System: AWWA C900/905

3. Pressure:

a. Operating: 150

b. Testing: 225

1.07 DELIVERY, STORAGE AND HANDLING

A. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the ENGINEER.

B. PVC items deteriorate in sunlight and are slightly brittle, especially at lower temperatures, so care shall be taken in loading, transporting and unloading items to prevent injury to the items. All items shall be examined before installation and no piece shall be installed which is found to be defective. Handling and installation of pipe and fittings shall be in accordance with the manufacturer's instructions, referenced standards and as specified herein.

C. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

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D. Any gouges or scratches that extend 10 percent or more into the pipe wall shall be cause for rejection of that pipe. The undamaged portion may be cut off and used. Rejected materials shall be clearly marked as rejected, segregated and removed from the site.

E. While stored, pipe shall be adequately supported from below at not more than 3-ft intervals to prevent deformation. The pipe shall be stored in stacks no higher than that given in the following table:

Pipe Diameter (inches)	Max. No. of Rows Stacked
8 or less	5
12 to 21	4
24 to 30	3
33 to 48	2

F. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of the sunlight. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup or direct or indirect sunlight will not be permitted.

G. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact replacement item in a satisfactory manner by the CONTRACTOR, at the CONTRACTOR's own expense. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until testing

H. In handling the items, use special devices and methods as required to achieve the results specified herein. No uncushioned devices shall be used in handling the item.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. PVC pressure pipe sized 4 through 12-in shall conform to the requirements of AWWA C900. All piping shall be Class 150 with a Dimension Ratio of 25. The pipe shall be PVC 1120 made from PVC compounds Class 12454-A or 12454-B as defined in ASTM D1784. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code, pressure class, AWWA designation number and seal of test agency that verified pipe material for potable-water service.

B. PVC pressure pipe sizes 14 through 48-in shall conform to the requirements of AWWA C905. The pipe shall be made from PVC compounds Class 12454-A or 12454-B as defined in ASTM D1784. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code, pressure class, AWWA reference and seal of test agency that verified pipe material for potable-water service.

C. All fittings for pressure mains shall be cast or ductile iron conforming to AWWA C110 for mechanical joints. All adaptors, fittings and transition gaskets necessary to connect cast or ductile iron fittings to PVC shall be furnished.

D. Sewer lines shall be green in color.

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E. Recycled water lines shall be purple in color.

2.02 FUSIBLE POLYVINYL CHLORIDE (FPVC)

A. Piping and Fittings: Pipe, AWWA C905. Fittings shall be the same as specified for PVC pipe. Fusible polyvinyl chloride pipe for non-potable water not conforming to AWWA C905 dimensionality shall conform to AWWA C900, ASTM D2241 or ASTM D1785 for standard dimensionality, as applicable. Testing shall be in accordance with the referenced AWWA standards. Unless otherwise specified, fusible polyvinyl chloride pipe lengths shall be assembled in the field with butt-fused joints. The fusion technician shall follow the pipe supplier's guidelines for this procedure. All fusion joints shall be completed as described in this specification. Fusible polyvinyl chloride pipe shall be green for sewer applications and purple in color for recycled water applications. Use of FPVC is not permitted for gravity sewer applications.

PART 3 EXECUTION

3.01 INSTALLATION OF PVC PIPE AND FITTINGS

A. No single piece of pipe shall be laid unless it is straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16-in per foot of length. If a piece of pipe fails to meet this requirement, check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the OWNER. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required. PVC pipe and fittings shall be installed in accordance with requirements of the manufacturer, ASTM D2321 and AWWA C605 or as otherwise provided herein.

C. As soon as the excavation is complete to normal grade of the bottom of the trench, bedding shall be placed, compacted and graded to provide firm, uniform and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. The pipe shall be laid accurately to the lines and grades indicated on the Drawings. Blocking under the pipe will not be permitted. Bedding shall be placed evenly on each side of the pipe to mid-diameter and hand tools shall be used to force the bedding under the haunches of the pipe and into the bell holes to give firm continuous support for the pipe. Bedding shall then be placed to 12-in above the top of the pipe. The initial 3-ft of backfill above the bedding shall be placed in 8-inch layers and carefully compacted. Generally the compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe. Equipment used in compacting the initial 3-ft of backfill shall be approved by the pipe manufacturer's representative prior to use.

D. All piping shall be sound and clean before installation. When installation is not in progress, including lunchtime, the open ends of the pipe shall be closed by watertight plug or other approved means. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by manufacturer. Fittings, in addition to those shown on the

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Drawings, shall be provided, if required, in crossing utilities that may be encountered upon opening the trench.

E. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a bell shall be beveled to conform to the manufactured spigot end and a reference mark made at the same distance from the pipe end as measured from a factory marked end from the same manufacturer.

F. The ENGINEER may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such and immediately removed from the job site.

G. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".

H. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

I. Precautions shall be taken to prevent flotation of the pipe in the trench.

J. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

K. Restrained joints shall be installed for all joints at fittings and in restrained joint areas as shown on the drawings. Where a pipe connects to a fitting, the first segment of pipe on both sides of the fitting shall be a full stick of pipe. Provide restrained joints at all pipeline angle points and deflections and as shown. Joint restraints shall be as follows:

1. Fully restrain all bell joints using Romac Industries Inc. “GripRing”, CertainTeed “Certa-Loc C-900/RJ”, or equal.

2. Fully restrain all mechanical joints using JCM “Model 610 Sur-Grip Fitting Restrainer”, EBBA Iron “Series 2000 PV” or approved equal.

3.02 JOINTING PVC PIPE (Push-on type)

A. Joints shall be made in strict accordance with the manufacturer's instructions. Pipe shall be laid with bell ends looking ahead. A rubber gasket shall be inserted in the groove of the bell end of the pipe and the joint surfaces cleaned and an approved lubricant applied in accordance with the manufacturer’s recommendations. The plain end of the pipe to be installed shall then be inserted into the bell of the pipe to which it is to be joined and when in alignment pushed home with a come-along or by other means. Check that the reference mark on the spigot end is flush with the end of the bell.

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3.03 JOINTING MECHANICAL JOINT FITTINGS

A. Mechanical joints at valves, fittings and where designated shall be in accordance with the AWWA C111 and the instructions of the manufacturer. Suitable PVC to cast iron adaptors shall be installed prior to installing fittings. PVC beveled spigot shall be cut flush prior to insertion in mechanical joint pipe. To assemble the joints in the field, thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening the bolts. Bolts shall be tight to the specified torques. Under no condition shall extension wrenches or pipe over handle of ordinary ratchet wrench be used to secure greater leverage.

3.04 INSTALLATION OF FUSIBLE POLYVINYLCHLORIDE (FPVC) PRESSURE PIPING

A. Installation guidelines from the pipe supplier shall be followed for all installations. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines. The fusible polyvinylchloride pipe will be installed in a manner so as not to exceed the recommended bending radius guidelines. Where fusible polyvinylchloride pipe is installed by pulling in tension, the recommended maximum safe pulling force, established by the pipe supplier, shall not be exceeded. The general best practices of the industry per AWWA M23 shall also be observed.

B. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians holding current qualification credentials for the pipe size being fused, as documented by the pipe supplier. Pipe supplier’s procedures shall be followed at all times during fusion operations. Each fusion joint shall be recorded and logged by an approved electronic monitoring device (data logger) connected to the fusion machine, which utilizes a current version of the pipe supplier’s recommended and compatible software. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. This includes requirements for safety, maintenance, and operation with modifications made for PVC.

C. Maximum offset in alignment between adjacent pipe joints shall be as recommended by the manufacturer and approved by the ENGINEER, but shall not exceed 5 degrees.

D. Fused joints are restrained joints. Fusible PVC may be used in areas where restrained fittings are indicated without additional restraint at fused joints.

E. Install fittings in accordance with AWWA C605.

3.05 FILLING AND TESTING

A. After installation, the pipe shall be tested for compliance as specified herein. Furnish all necessary equipment and labor for the hydrostatic pressure test on the pipelines.

B. Submit detailed test procedures and method for ENGINEER's review. In general, testing shall be conducted in accordance with AWWA C605. The method and procedures for performing the hydrostatic pressure test shall be approved by the ENGINEER. Submit the plan for testing to the ENGINEER at least 10 days before starting a test.

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C. Pressure pipelines shall be subjected to a hydrostatic pressure in accordance with paragraph 1.06-D. This test pressure shall be maintained for a minimum of 2 hours. The hydrostatic testing allowances shall not exceed those indicated in AWWA C605. Provide suitable restrained bulkheads as required to complete the hydrostatic testing specified.

D. CONTRACTOR shall make any taps and furnish all necessary caps, plugs etc, as may be required in conjunction with performing the testing.

E. Gravity sewer pipelines shall be tested in accordance with the provisions in Section 02621 – Polyvinyl Chloride (PVC) Gravity Pipe.

F. All valves and valve boxes shall be properly located and installed and operable prior to testing. Bulkheads shall be provided with a sufficient number of outlets for filling and draining the line and for venting air.

G. Hydrostatic pressure tests shall conform to Section 7.3 of AWWA C605. Furnish gauges, meters, pressure pumps and other equipment needed to fill the line slowly and perform the required hydrostatic pressure tests.

H. The line shall be slowly filled with water and the specified test pressure shall be maintained in the pipe for the entire test period by means of a pump furnished by the CONTRACTOR. Provide accurate means for measuring the quantity of makeup water required to maintain this pressure.

I. Duration of pressure test shall not be less than 2 hours. All leaks evident at the surface shall be repaired and leakage eliminated regardless of the total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced.

J. Television testing as specified in Section 01658 shall be performed for all gravity sewers 6-inch diameter or greater.

END OF SECTION

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SECTION 02623

HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS (PRESSURE PIPE)

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install high density polyethylene (HDPE) pipe and fittings complete as specified herein. HDPE pipe is an allowable alternative material for application to Sanitary Sewer Force Mains and Recycled Effluent Water Force Mains. Use of HDPE for gravity sanitary sewer is not permitted.

1.02 RELATED WORK

A. CONTRACTOR Submittals are included in Section 01300.

B. Testing and cleaning of pipe are included in Section 01445.

C. Dewatering and drainage are included in Section 02140.

D. Trenching, backfilling and compaction are included in Section 02221.

E. Horizontal directional drilling is included in Section 02158.

1.03 SUBMITTALS

A. All submittals shall be in accordance with Section 01300.

B. Submit completely detailed working drawings and schedules of all high density polyethylene (HDPE) pipe and fittings required.

C. Submit the name and address of pipe manufacturer.

D. Submit complete description of method of pipe installation.

E. Submit description of the method of testing the pipe and fittings including a complete drawing of mandrel with dimensions for each pipe size.

F. Submit the manufacturer's recommendations for handling, storing and installing the pipe and fittings.

G. Submit certification that the stress regression testing has been performed on the specific polyethylene resin being utilized in the manufacturing of the pipe for this contract in accordance with ASTM D2837.

H. Prior to each shipment, submit certified test reports that the pipe and fittings for this contract were manufactured and tested in accordance with the ASTM and AWWA Standards specified herein.

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I. Submit the name and qualifications of the technician proposed to perform the heat fusion of the pipe joints.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewer and Other Gravity-Flow Applications.

2. ASTM D2774 – Standard Practice for Underground Installation of Thermoplastic Pressure Piping.

3. ASTM D2657 - Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings.

4. ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

5. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

6. ASTM F714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

B. American Water Works Association (AWWA)

1. AWWA C600 - Installation of Ductile Iron Water Mains and Their Appurtenances.

2. AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4-in Through 63-in, for Water Distribution and Transmission.

C. American National Standards Institute (ANSI)

1. ANSI B16.1 - Cast Iron Flanges and Flanged Fittings.

2. ANSI B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges.

3. ANSI/NSF 61- Drinking Water System Components-Health Effects

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 DELIVERY, STORAGE AND HANDLING

A. The delivery, storage and handling of the pipe and fittings shall be done in accordance with the manufacturer's recommendations.

B. Pipe shall be stored on clean, level ground to prevent any scratching or gouging of the pipe. The handling of the pipe shall be done in a manner to avoid dragging the pipe over any hard or sharp objects to avoid cutting of the pipe's exterior. Any cut or gouge deeper than 5 percent of the pipe's wall thickness shall be removed from the site.

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C. Handling of the pipe shall be done in a manner to avoid all undue stress in the pipe caused by bending of the pipe.

D The interior of the pipe shall be free of cuts, gouges and scratches.

E. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed immediately from the job.

F. Any gouges or scratches that extend 10 percent or more into the pipe wall shall be cause for rejection of that pipe. The undamaged portion may be cut off and used. Rejected materials shall be clearly marked as rejected, segregated and removed from the site.

1.06 QUALITY ASSURANCE

A. All HDPE pipe and fittings shall be manufactured in strict accordance with ASTM F714, AWWA C906 and shall be from a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the polyethylene pipe and fittings to be furnished. All HDPE pipe and fittings shall be supplied by a single distributor who is fully experienced, reputable, and qualified with the distribution of the pipe and fittings to be furnished. The pipe shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications. All pipe and fittings shall be NSF 61 approved.

B. All pipes under this contract shall be manufactured from a polyethylene resin that has been specifically stress regression tested to provide a product supplying a minimum Hydrostatic Design Basis (HDB) of 1600 psi, as determined in accordance with ASTM D2837.

C. All HDPE pipe to be installed under this Contract may be inspected at the factory for compliance with this Section by an independent testing laboratory provided by the ENGINEER. The manufacturer's cooperation shall be required in these inspections. The cost of these plant inspections of all pipe approved for this Contract will be borne by the OWNER.

D. Inspection of the pipe may also be made by the ENGINEER or other representatives of the OWNER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the specified requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

1.07 WARRANTY

A. The pipe manufacturer shall provide a warranty against manufacturing defects of material and workmanship for a period of ten years after the final acceptance of the project by the ENGINEER. The manufacturer shall replace, at no additional cost to the OWNER, any defective pipe material within the warranty period.

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PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. HDPE pipe is a flexible conduit and shall be designed to transfer imposed loads to the surrounding embedment medium. The pipe and fittings shall be free from all defects including indentations, delaminations, cracks, bubbles and pinholes, which due to their nature, degree, or extent, detrimentally affect the strength and serviceability of the pipe. Any pipe or fittings with such defects which, in the judgment of the ENGINEER, will affect the strength and serviceability shall be repaired or rejected.

2. HDPE pipe resins shall be high molecular weight, high density polyethylene with a cell classification number of 345464C (or E) or higher cell classification in accordance with ASTM D3350.

B. Pipe and Fittings

1. The pipes shown and dimensioned on the Drawings are for PVC pipe. Use of HDPE may require the use of a larger nominal diameter, refer to Table below and the Drawings. Pipe shall meet the requirements of Dimension Ratio (DR) 17

Pump Station	Area	DR 17 HDPE Nominal Size (average ID)	C 900 or 905 PVC Nominal Size (average ID)
Mid-Town	B	18 (15.755)	16 (16.51)
West Paso	A	16 (14.005)	14 (14.52)
Lupine	B	10 (9.41)	8 (8.33)
Baywood	A	6 (5.798)	6 (6.35)
East Ysabel	A	6 (5.798)	6 (6.35)
East Paso	A	6 (5.798)	6 (6.35)
Solano	B	6 (5.798)	6 (6.35)
Sunny Oaks	C	4 (3.938)	4 (4.42)
Mt. View	D	4 (3.938)	4 (4.42)

2. All polyethylene pipes shall meet the requirements of ASTM F714 and AWWA C906. Pipe and fittings shall be NSF 61 approved.

3. Pipe shall be furnished in standard laying lengths not exceeding 50-ft.

4. Joining system: The pipe shall be joined with butt, heat fusion joints. All joints shall be made in strict compliance with the manufacturer's recommendations and ASTM 2657. Where required, flange connections, mechanical joint connections and butt connections using bolted mechanical couplers shall be provided from a pipe stub with a polyethylene and steel stiffener. Flanged connections shall be provided from a pipe stub and a steel back-up flanged. Back-up flanges shall be primed and painted in a corrosion protected paint recommended and supplied by the manufacturer. All bolts, nuts and hardware shall be Type 316 stainless steel.

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5. HDPE fittings shall be fully pressure rated to match the pipe DR pressure rating. All fittings shall be molded or fabricated by the same manufacturer as the pipe. HDPE fittings shall be joined using butt, heat fusion and/or electrofusion. Adhesives and solvent cements shall not be permitted.

2.02 PIPE IDENTIFICATION

A. At 5-ft intervals along the pipe, the pipe shall be marked with the name of the manufacturer, size and class (pressure and DR), and manufacturing reference to ASTM F714 and AWWA C906.

B. A color coded strip(s) shall be marked along the entire length of the pipe.

PART 3 EXECUTION

3.01 INSTALLATION

A. All pipe and fittings shall be installed in accordance with the manufacturer's instructions.

B. The CONTRACTOR performing the joining shall by a distributor of the pipe material supplied. All fusion joints shall be done by a factory qualified technician as designated by the manufacturer with a minimum of five years experience with the fusion equipment to be used.

C. Joining of the pipe by heat fusion shall be done in accordance with ASTM D2657. Prior to the start of pipe installation, one test joint shall be made and tested. Test shall be done in accordance with CPChem Co. Bulletin No. 106. No joints shall be made until a successful test joint has been made.

D. When cutting pipe is required, the cutting shall be done by machine specifically designed for the cutting of HDPE pipe. The cut shall leave a smooth cut at right angles to the axis of the pipe.

E. Fittings shall be connected to HDPE pipe in accordance with manufacturer's recommendations.

F. Flanged and mechanical connections shall consist of the following:

1. A high density polyethylene flange adapter, made by the manufacturer from the same resin as the pipe, and fully pressure rated to match the pipe DR pressure rating, thermally butt-fused to the stub end of the pipe.

2. A ductile iron or steel back-up ring conforming to ANSI B16.1 fitted to the polyethylene flange adapter and shaped as necessary to suit the outside dimension of the pipe.

3. A full face neoprene gasket, conforming to ANSI B16.21.

4. Corrosion resistant bolts and nuts of Type 316 stainless steel as specified in ASTM A276 and ASTM A307. Bolts shall be tightened alternatively and evenly to the manufacturer's specified torques. After installation a bitumastic coating shall be applied to bolts and nuts.

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3.02 CLEANING, TESTING AND DISINFECTION

A. After installation, the pipe shall be tested for compliance in accordance with Section 01445 and as specified herein. Furnish all necessary equipment and labor for the hydrostatic pressure test on the pipelines.

B. Submit detailed test procedures and method for ENGINEER's review. In general, testing shall be conducted in accordance with AWWA C605. The method and procedures for performing the hydrostatic pressure test shall be approved by the ENGINEER. Submit the plan for testing to the ENGINEER at least 10 days before starting a test.

C. Pressure pipelines shall be subjected to a hydrostatic pressure of 1-1/2 times the working pressure. This test pressure shall be maintained for a minimum of 2 hours. The hydrostatic testing allowances shall not exceed those indicated in AWWA C605. Provide suitable restrained bulkheads as required to complete the hydrostatic testing specified.

D. CONTRACTOR shall make any taps and furnish all necessary caps, plugs etc, as may be required in conjunction with performing the testing.

E. All valves and valve boxes shall be properly located and installed and operable prior to testing. Bulkheads shall be provided with a sufficient number of outlets for filling and draining the line and for venting air.

F. Hydrostatic pressure tests shall conform to Section 7.3 of AWWA C605. Furnish gauges, meters, pressure pumps and other equipment needed to fill the line slowly and perform the required hydrostatic pressure tests.

G. The line shall be slowly filled with water and the specified test pressure shall be maintained in the pipe for the entire test period by means of a pump furnished by the CONTRACTOR. Provide accurate means for measuring the quantity of makeup water required to maintain this pressure.

H. Duration of pressure test shall not be less than 2 hours. All leaks evident at the surface shall be repaired and leakage eliminated regardless of the total leakage as shown by test. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with. Defective materials, pipes, valves and accessories shall be removed and replaced.

END OF SECTION

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SECTION 02624

SMALL DIAMETER PVC PRESSURE PIPE

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The CONTRACTOR shall provide polyvinyl chloride (PVC) pressure pipe, complete and in place, in accordance with the Contract Documents.

B. This Section includes PVC pressure pipe with solvent-welded, flanged, or screwed joints. PVC pipe with bell and spigot joints is included in Section 02622 – PVC Pressure Pipe.

1.02 RELATED WORK

A. CONTRACTOR Submittals are included in Section 01300

B. Pipeline testing and cleaning water lines is included in Section 01445.

C. Trenching, backfilling and compacting is included in Section 02221.

D. Earthwork is included in Section 02200.

E. Pavement repair and resurfacing are included in Section 02576.

F. Precast concrete structures are included in Section 02605.

G. Ductile iron fittings are included in Section 02616.

H. Valves and appurtenances are included in Division 15.

I. Loaming and seeding is included in Section 02930.

1.03 SUBMITTALS

A. All Submittals shall be in accordance with Section 01300 – CONTRACTOR Submittals

B. Submit within 30 days of the Effective Date of the Agreement, the name of the pipe and fitting manufacturers and a list of materials to be furnished by each manufacturer. Also, include information on local representative for each manufacturer, if product is sold through a distributor.

C. Submit Shop Drawings including piping layouts and schedules shall include dimensioning, fittings, types and locations of valves and appurtenances, joint details, methods and location of supports, anchorage, gasket material, grade of material and all other pertinent technical information for all items to be furnished.

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D. Prior to each shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and AWWA Standards specified herein shall be submitted.

E. Submit complete description of method of pipe installation.

F. Submit the manufacturer's recommendations for handling, storing and installing the pipe and fittings.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

2. ASTM D1785 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120

3. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

4. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

5 ASTM F 1498 – Standard Specification for Taper Pipe Threads 60 Degrees for Thermoplastic Pipe and Fittings

6. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Water Works Association (AWWA)

1. AWWA M-23 – Manual of Water Supply Practices PVC Pipe, Design and Installation.

C. National Sanitation Foundation (NSF)

1. Standard No. 14 - Plastic Piping Components and Related Materials.

D. American National Standards Institute

1. ANSI/ASME B 16.5 – Pipe Flanges and Flanged Fittings, Class 150

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All small diameter PVC pipe shall be from a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in ASTM D3034 and NSF Standard No. 14 as applicable. In addition, all PVC pipe to be installed under this Contract may

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be inspected at the plant for compliance with this Section by an independent testing laboratory provided by the ENGINEER. The CONTRACTOR shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all pipe approved for this Contract, plus the cost of inspection of a reasonable amount of disapproved pipe, will be borne by the OWNER.

B. Inspections of the pipe may also be made by the ENGINEER or other representatives of the OWNER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the requirements specified herein, even though sample pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.06 DELIVERY, STORAGE AND HANDLING

A. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the ENGINEER.

B. PVC items deteriorate in sunlight and are slightly brittle, especially at lower temperatures, so care shall be taken in loading, transporting and unloading items to prevent injury to the items. All items shall be examined before installation and no piece shall be installed which is found to be defective. Handling and installation of pipe and fittings shall be in accordance with the manufacturer's instructions, referenced standards and as specified herein.

C. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed immediately from the job.

D. Any gouges or scratches that extend 10 percent or more into the pipe wall shall be cause for rejection of that pipe. The undamaged portion may be cut off and used. Rejected materials shall be clearly marked as rejected, segregated and removed from the site.

E. While stored, pipe shall be adequately supported from below at not more than 3-ft intervals to prevent deformation. The pipe shall be stored in stacks no higher than 5 rows.

F. Pipe and fittings shall be stored in a manner which will keep them at ambient outdoor temperatures and out of the sunlight. Temporary shading as required to meet this requirement shall be provided. Simple covering of the pipe and fittings which allows temperature buildup or direct or indirect sunlight will not be permitted.

G. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact replacement item in a satisfactory manner by the CONTRACTOR, at the CONTRACTOR's own expense. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until testing

H. In handling the items, use special devices and methods as required to achieve the results specified herein. No uncushioned devices shall be used in handling the item.

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PART 2 PRODUCTS

2.01 PIPE MATERIAL

A. PVC pipe shall be made from all new rigid unplasticized polyvinyl chloride and shall be normal impact Type 1, Grade 1, class 12454, Schedule 80, listed as compliant with NSF Standard 61, unless otherwise indicated, in accordance with ASTM D 1785-Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

2.02 PIPE JOINTS

A. Pipe joints shall be solvent-welded type with solvent cement and primer as recommended by the pipe manufacturer for the chemical in the pipe and in accordance with ASTM D2564 – Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

B. Screwed joints that are necessary to match up to threaded valves or fittings shall be made up with appropriate thread sealant, either paste or tape.

C. Flanged joints shall be made with solvent-welded PVC flanges, drilled to ANSI/ASME B 16.5 – Pipe Flanges and Flanged Fittings, Class 150, unless otherwise indicated. Gaskets shall be ANSI 150 lb. full face, 1/8-inch thick Neoprene for water or wastewater service. Gasket material for chemicals shall be suitable for the chemical service.

2.03 FITTINGS

A. Solvent Welded and Threaded Fittings: Solvent-welded and threaded fittings shall be Schedule 80 PVC fittings in accordance with ASTM D 2467 – Standard Specifications for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

B. Flanged Fittings: Flanged fittings shall be Schedule 80 fabricated PVC fittings with 150 lb. flanges to ANSI/ASME B 16.5.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: PVC pipe shall be installed in a neat and workmanlike manner, properly aligned, and cut from measurements taken at the Site to avoid interferences with structural members, architectural features, openings, and equipment. Exposed pipe shall afford maximum headroom and access to equipment, and where necessary, piping shall be installed with sufficient slopes for venting or drainage of liquids and condensate to low points. It is recommended that the CONTRACTOR obtain the assistance of the pipe manufacturer's field representative to instruct the pipefitters in the correct installation and support of PVC piping.

B. Supports and anchors: Piping shall be firmly supported with fabricated or commercial hangers or supports in accordance with Section 15140 – Pipe Hangers and Supports. Where necessary to avoid stress on equipment or structural members, the pipe shall be anchored or harnessed. Expansion joints and guides shall compensate for pipe expansion due to temperature changes.

C. Valve and Unions: Unless otherwise indicated, connections to fixtures, groups of fixtures, and equipment shall be provided with a shutoff valve and union, unless the valve has flanged ends.

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Unions shall be provided at threaded valves, equipment, and other devices requiring occasional removal or disconnection. Valves and flanges attached to PVC pipe shall be provided with adequate supports.

3.02 PIPE PREPARATION

A. Prior to installation, each pipe length shall be carefully inspected, flushed clean of any debris or dust, and be straightened, if not true. Ends of threaded pipes shall be reamed and filed smooth. Pipe fittings shall be equally cleaned before assembly.

3.03 PIPE JOINTS

A. Threaded Joints: Pipe threads shall conform to ASTM F 1498 – Standard Specification for Taper Pipe Threads 60 Degrees for Thermoplastic Pipe and Fittings, and shall be full and cleanly cut with sharp dies or molded. Joints shall be made with Teflon tape or thread sealant.

B. Solvent-Welded Joints: Solvent-welded joints shall be made with fresh primer and solvent cement on clean, dry pipe ends. The primer and cement cans shall be kept closed at all times and the joints shall be made up at the recommended ambient temperatures, to the pipe or cement manufacturer's written recommendations. Pipe ends shall be inserted to the full depth of the socket.

C. Flange Joints: Flanged joints shall be made with gaskets and Type 316 stainless steel bolts and nuts. Care shall be taken not to over-torque the bolts, in accordance with the manufacturer's written recommendations.

3.04 INSPECTION AND FIELD TESTING

A. Inspection: Finished installations shall be carefully inspected for proper joints and sufficient supports, anchoring, interferences, and damage to pipe, fittings, and coating. Damage shall be repaired to the satisfaction of the ENGINEER.

B. Field Testing: The CONTRACTOR shall allow adequate time for the solvent cement joints to cure. Curing time shall be per the solvent cement manufacturer's recommendation. Prior to enclosure or burying, piping systems shall be pressure tested as defined by the ENGINEER and in accordance with Section 01445, for a period of not less than two hours, without exceeding the rated tolerances of the material. Caution – Do not use air or gas for testing PVC pipe. Where no pressures are indicated, the pipes shall be subject to 1-1/2 times the maximum working pressure. The CONTRACTOR shall furnish all test equipment, labor, materials, and devices.

C. Leakage shall be determined by loss of pressure. Fixtures, devices, or other accessories that would be damaged if subjected to the test pressure shall be disconnected and ends of the branch lines shall be plugged or capped as appropriate during the testing procedures.

D. Leaks shall be repaired to the satisfaction of the ENGINEER, and the system shall be retested until no leaks are found.

END OF SECTION

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SECTION 02762

PAINTED TRAFFIC LINES AND MARKINGS

PART 1 GENERAL

1.01 SUMMARY

A. Work in this section includes: Traffic stripes and pavement marking in the types and arrangements as specified herein and replacement of existing markings obliterated by Contract work.

B. Provide all labor, equipment and materials to perform all traffic line and marking replacement required for project construction, complete as specified and shown on the Plans.

1.02 RELATED WORK

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. State of California, Department of Transportation (Caltrans):

1. Standard Specifications.

1.04 SUBMITTALS

A. Submittals shall be in accordance with Section 01300.

B. Submit:

1. Materials list of items proposed to be provided under this Section.

2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

3. Photographs, scale drawings, or other data acceptable to the ENGINEER, showing types of graphics proposed to be used.

4. Proposed work sequence and traffic control plan for work on or adjoining public rights-of-way.

1.05 QUALITY ASSURANCE

A. Alignment, layout, tolerances, appearance, and protection shall comply with Caltrans Standard Specifications Sections 84-1.02, -1.03, and -1.04.

B. Comply with product manufacturer's recommendations. Clean all surfaces thoroughly and remove all deleterious materials present.

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C. Mask and protect all surfaces not to be painted and protect vegetation from overspray.

D. Provide traffic control devices and personnel to safely direct vehicle traffic and to protect painted surfaces.

PART 2 PRODUCTS

2.01 PAVEMENT MARKING PAINT

A. Provide paint specifically formulated for use as pavement marking in automobile traffic areas, and in the colors selected by the ENGINEER from standard colors of the approved manufacturer. Paint must conform to requirements of State and local air quality control boards.

B. Products:

1. "Traffic Paint" manufactured by J.E. Bauer Company, Tnemec, "Romark Traffic" manufactured by Glidden-Durkee, "Traffic and Zone Marking Paint" manufactured by PPG, or equal.

2. Other products conforming to California State Specification 8010-91D-30 and masking.

2.02 OTHER MATERIALS

A. Provide other materials, such as stencils and masking, not specifically described but required for a complete and proper installation, as selected by the CONTRACTOR subject to the approval of the ENGINEER.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

B. Surfaces which are to receive traffic stripes and pavement markings shall be cleaned of all dirt and loose material prior to painting or marking.

3.02 APPLICATION

A. Secure the ENGINEER's approval of graphics design and layout prior to start of application. Application methods shall conform to Caltrans Standard Specifications Section 84 unless otherwise stated herein.

B. Using proper masking, stencils, and application equipment recommended for the purpose by the manufacturer of the approved paint, apply the approved paint in strict accordance with its manufacturer's recommendations.

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C. Apply minimum two coats of paint.

D. Striping pattern shall be as follows:

1. Single traffic stripe – Unless otherwise shown on the Drawings, a 4-inch wide broken yellow line.

2. Edge stripe - Unless otherwise shown on the Drawings, a 3-inch wide solid white line.

3. Stop bar (limit line) - Unless otherwise shown on the Drawings, a solid 12 inch wide white line.

4. Other markings – As shown on the Drawings.

E. Rate of Application. Apply paint at the following minimum rates:

1. Traffic stripe - 5 gal/mile first coat; 7 gal/mile second coat.

2. Solid stripe - 14 gal/mile first coat; 18 gal/mile second coat.

3.03 PROTECTION

A. Provide traffic cones, barricades, and other devices needed to protect the paint until it is sufficiently dry to withstand traffic.

3.04 CLEANUP

A. When paint is thoroughly dry, visually inspect the entire application, and

1. Touchup as required to provide clean, straight lines and surfaces throughout.

B. Using a permanently opaque paint identical in color to the surface on which the paint was applied, block out and eliminate all traces of splashed, tracked, and/or spilled pavement marking paint from the background surfaces.

C. Remove all stencils, product containers, masking, and other materials from the Site.

END OF SECTION

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SECTION 02765

PLASTIC LINING FOR CONCRETE PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and apply premolded self-anchoring plastic sheet linings to the following interior surfaces of precast and cast-in-place reinforced concrete structures.

1. Precast concrete manholes.

2. Precast concrete wetwells.

3. Reinforced concrete pipe for caissons.

1.02 RELATED WORK

A. Precast Concrete Structures are included in Section 02605.

B. Reinforced Concrete Pipe for Caissons is included in Section 02612.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, standard requirements and data covering the materials to be furnished and detailed drawings covering the installation thereof, including but not limited to the attachment of the linings to the forms and the arrangement and sealing or welding of the butt joints.

B. Furnish certification by the manhole and pipe manufacturers that the lining is of the materials specified. No lined manhole or reinforced concrete pipe sections will be accepted for use in the Work on this project until certificates have been submitted and approved.

1.04 QUALITY ASSURANCE

A. The manufacturer of the sheet lining shall furnish an affidavit attesting to the successful and completely satisfactory use of the materials as a lining for the service intended, before shipment thereof.

B. The accepted plastic sheet manufacturer's standard printed specifications covering the installation of the lining in concrete structures shall be considered as being incorporated herein and all work for and in connection with said plastic lining installation shall be strictly in accordance therewith. Such manufacturer's specifications shall include and cover application of sheets to concrete forms, including preparation of forms, joint welding and removal of forms; miscellaneous requirements covering transportation, handling, storing and inspection; and necessary precautions with respect to ventilation and protection of workmen.

C. All work for, and in connection with, the installation of plastic sheet lining, and the preparation of surfaces and the sealing and welding of joints shall be performed by the manufacturer of the lining, or by a firm or individual(s) who has been trained and certified by said manufacturer.

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D. Training certification shall be submitted by Contractor, from manufacturer, in writing. Only trained and certified workers shall perform work associated with plastic linings.

PART 2 PRODUCTS

2.01 MATERIALS

A. All liner plates furnished shall be: composed of chemically inert synthetic resin, pigments and plasticizers suitably compounded and processed; formed under pressure into permanently flexible sheets; white in color and shall conform to the following:

1. Premolded Plastic Sheet Linings shall be Amer-Plate "T-Lock", not less than 0.065-in thick, as manufactured by Ameron, Corrosion Control Division, Brea, CA or equal.

2. Welding Strip shall be Amer-Plate "T-Lock" welding strip or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Precast Concrete Sections

1. The vertical portion of the interior of all precast concrete manholes and reinforced concrete pipes shall be sealed and protected with plastic lining where indicated on the Drawings. All outlets and connections within the designated limits of the plastic pipe lining shall be completely sealed and protected with the plastic pipe lining. Joints shall be kept at a minimum. Except where outlets are required, the plastic lining for each length of pipe shall consist of a single sheet of material. Where joints occur between individual sheets or sections of plastic liner, they shall be continuously heat-welded, either by lapping adjacent sheets or with the use of auxiliary welding strips cut from the same kind and thickness of material as the liner plates (with the exception of the T-lock ribs). At outlets, the lining shall be turned back into the joint or otherwise suitably terminated so that the edges are adequately protected and anchored.

2. The lining for each pipe or manhole section shall be furnished to the pipe manufacturer as a single sheet.

3. The pipe liner shall extend to the end of the interior concrete surface at both bell and spigot end of the pipe. Unless otherwise authorized, a 4-in joint strip shall be molded integral with the plastic liner as furnished for installation in the pipe. This joint shall have no T-lock ribs on the back of the strip and is intended to lap over the lining of the adjacent pipe for field welding thereto. These joint extensions shall be made of the same material as used in the specified T-lock liner plates. The joint strip shall overlap the liner plate of the downstream pipe a minimum of 1-in. All adhesive, welding materials, separate strips of lining material for field joints (where authorized) shall be furnished by the lining material manufacturer.

C. All work in connection with the installation of the plastic lining in precast manhole sections and concrete pipe shall be performed in strict conformity with the lining manufacturer's

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recommendation. Liner sheets shall be fastened in place securely in the forms for the manhole sections and concrete pipe before reinforcing steel or concrete is placed.

D. Care shall be taken in handling and transporting plastic lined manhole sections and pipe to prevent damage to the liner. No interior hooks or other interior lifting device shall be used in handling the manhole sections and pipe; all handling requiring lifting or suspension shall be done by using exterior slings. No manhole sections or pipe with damaged lining will be accepted until and unless the damage has been repaired to the satisfaction of the Owner.

E. Repairs

1. All repairs to damaged portions of the linings shall be made and all holes in the linings sealed before final acceptance of the work, in conformity with the lining manufacturer's instructions and recommendations. The requirement for neat, high quality work is emphasized.

F. Testing

1. All surfaces covered with the lining shall be tested with an acceptable electrical holiday or flaw detector after installation and any imperfections discovered thereby shall be repaired as specified above.

3.02 FIELD JOINTS IN PLASTIC LINING

A. The joint between plastic lined pipes or manhole sections shall be prepared in the following manner before making the lining joints:

1. The inside joint shall be filled and carefully pointed with cement mortar for the full circumference of the pipe or manhole section. The mortar shall not, at any point, extend into the pipe or manhole section beyond a straight line connecting the surfaces of the adjacent pipe or manhole sections.

2. No manhole lining joint shall be made until after the trench has been backfilled. Pipe and manhole joints must be dry before lining joints are made. All mortar and other foreign material shall be removed from lining surfaces adjacent to the pipe or manhole joint.

B. Field joints in the lining at pipe or manhole joints may be either of the following described types:

1. The joint shall be made with a separate 4-in wide joint strip and two, 1-in wide welding strips. The 4-in strip shall be centered over the joint, secured to the lining with an adhesive compound and welded along each edge to adjacent liner sheets. The width of the space between the ends of pipe lining material shall not exceed 2-in. The 4-in joint strip shall overlap the lining in each pipe a minimum of 1-in.

2. The joint shall be made with a lining flap extending about 3-in beyond the spigot end of the precast concrete section. One welding strip is required. The joint flap shall overlap the lining in the adjacent precast concrete section a minimum of 1-in. An adhesive compound shall be used to hold the flap in place during welding. The flap shall be protected from damage during installation. Excessive tension and distortion in bending back the strip to expose the pipe or manhole joint during laying and joint mortaring shall be avoided.

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3. All joints between pipe and wall fittings in precast concrete sections and between wall fitting and lining of manhole walls, where lining is required, shall be made by one of the two ways described above.

4. All welding of joints shall be in strict conformity with the recommendations of the lining manufacturer.

3.03 TESTING AND REPAIRING

A. After the precast concrete is installed, all surfaces covered with plastic lining, including welds, shall be tested with an electric holiday detector. The voltage and specific methods of testing shall be as recommended by the manufacturer of the lining material. In addition, all welds shall be physically tested by non-destructive probing. All patches over holes, or repairs to the liner wherever damage has occurred, shall be installed in conformity with the instructions and recommendations of the liner manufacturer.

B. Each transverse welding strip which extends to a lower edge of the liner shall be tested. The welding strip shall extend 2-in below the liner to provide a tab. The force shall be applied normal to the face of the structure by means of a spring balance. Liner adjoining the welding strip shall be held against the concrete during application of the force. The 10 lb pull shall be maintained if a weld failure develops, until no further separation occurs. Defective welds shall be retested after repairs have been made. Tabs shall be trimmed away neatly after the welding strip has passed inspection. Inspection shall be made within 2 days after joint has been completed.

END OF SECTION

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SECTION 02910

TREE PROTECTION AND TRIMMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and the Provisions of Bid and Contract Documents, including General and Supplementary Conditions and Division 1 Specification Sections, shall apply to the work specified in this Section.

B. Habitat Management Plan (HMP) for the Los Osos Wastewater Project, Los Osos, San Luis Obispo County, Dated November 2011. This document sets forth implementation procedures for required habitat mitigation for the project and is included as Appendix E to these Specifications.

1.02 DESCRIPTION

A. All work shall conform to the provisions set forth within the approved HMP and these construction documents. Provisions made within these construction documents shall complement the HMP and provide additional direction for implementation. Any conflicts between these plans and the HMP shall be brought to the landscape architect's attention prior to construction.

B. Preserve, protect, and prune as necessary existing trees and shrubs, and other vegetation indicated to remain.

C. All trees and plant materials to remain on site shall be protected from all trades working on the job, and it shall be the CONTRACTOR's responsibility to insure that all subcontractors are aware of and held responsible for any damage to existing trees and plant material. In addition, the CONTRACTOR shall be held responsible to insure that following protective measures are carried out throughout the entire construction period.

D. Maintenance: throughout the life of the construction project, the CONTRACTOR shall be responsible for overseeing the watering, fertilizing, pruning, and other measures necessary to protect all existing trees.

E. Replacement of damaged trees due to construction activities.

1.03 SUBMITTALS

A. Submit manufacturer's cut-sheets for protective fencing.

1.04 QUALITY ASSURANCE

A. All pruning of trees shall be performed by or under the supervision of an ISA certified arborist.

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1.05 PROJECT CONDITIONS

A. Keep tree/shrub protective devices installed and in working order at all times throughout construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Tree protection fencing: Temporary fencing sufficient to keep people and vehicles out of protected zones.

PART 3 EXECUTION

3.01 GENERAL

A. Protect all trees from stockpiling, material storage including soil, vehicle parking and driving within the tree drip line. Restrict foot traffic to prevent excessive compacting of soil over root systems.

B. All CONTRACTORs, subcontractors, and their personnel must be informed and educated to the policies, penalties, and/or fines concerning the removal or destruction of existing trees, whether intentional or accidental. All personnel are to review all tree protection measures prior to working at the construction site.

C. All trees remaining onsite within 50 ft. of construction shall be fenced prior to start of construction or grading. The fence should be placed 1.5 times the radius of the dripline away from the trunk whenever possible. This fence shall not be removed during construction unless approved by the Arborist.

D. Protect root systems of existing trees, shrubs, and ground covers from damage due to chemically injurious materials in solution caused by runoff and spillage during mixing, placement of construction materials, and drainage from stored materials.

E. Consult with an ISA certified arborist prior to pruning any tree. All pruning of trees shall be kept to a minimum and must follow ISA standards.

F. CONTRACTOR shall consult with an arborist before removing any trees within the dripline of another protected tree to remain.

G. Protect root system from flooding, erosion, excessive wetting and drying resulting from de-watering and other operations.

H. Above ground surface runoff shall not be directed into the tree canopy area from adjacent areas. Ensure that sidewalks or other construction do not trap water near the tree.

I. Encroachment (grade changes – cuts, fills, or trenching) within the dripline shall be kept to a minimum.

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J. Encroachment shall be limited to one side of the tree and should not come any closer to the trunk than ½ the radius of the drip line or 10’ whichever is greater.

K. Trenching within the dripline shall be hand dug. Roots 2: in diameter and over should be left intact unless approved for removal by the Arborist. Consult with arborist for proper tools to use to remove/cut roots.

L. Grubbing within the dripline will be done by hand.

M. Protect all existing plant material to remain against unnecessary cutting, breaking, and skinning of roots and branches, skinning and bruising of bark.

N. No soil sterilants shall be applied under pavement near existing trees.

O. Do not allow fires under and adjacent to trees or other plants which are to remain.

P. Intentional or accidental destruction of trees and shrubs which are designated to remain may result in a fine. Fines can be equal to or greater than ISA assessed values of trees (or shrubs).

3.02 CLEANING

A. Remove all protective devices at the end of construction.

END OF SECTION

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SECTION 02930

REVEGETATION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and place loam, finish grade, apply fertilizer, hydraulically or manually apply seed and mulch and maintain all seeded areas as specified herein, including all areas disturbed.

1.02 RELATED WORK

A. Site Preparation is included in Section 02100.

B. Earthwork is included in Section 02200.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, complete shop drawings, materials and equipment furnished under this Section including seed mixtures and product label information.

B. Samples of all materials shall be submitted for inspection and acceptance upon ENGINEER's request.

C. Submit native seed collection plan to comply with Habitat Management Plan (in Appendix E of these Specifications).

PART 2 PRODUCTS

2.01 MATERIALS

A. See seed quantities/type in Habitat Management Plan (HMP).

2.02 NATIVE SEED COLLECTION/PLANT PROPAGATION

A. All native seed / plant material must be collected from local sources (20 miles of coast, from Piedras Blancas to North to Pt. Conception to South).

B. Only local seed may be used.

C. Seed collector shall be responsible for securing right of entry for seed collection purposes.

D. ENGINEER shall approve seed collection approach/plan.

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PART 3 EXECUTION

3.01 APPLICATION

A. Unless otherwise shown on the Drawings, loam shall be placed to a minimum depth of 4-in in areas indicated to be naturalized.

B. For all areas to be seeded:

1. Lime shall be applied at the rate of 25 lbs/1,000 sq ft.

2. Fiber mulch shall be applied at the rate of 20 lbs/1,000 sq ft.

C. The application of fertilizer and lime may be performed hydraulically in one operation with hydroseeding and mulching. If lime is applied in this manner, clean all structures and paved areas of unwanted deposits.

3.02 INSTALLATION

A. The subgrade of all areas to be loamed and seeded shall be raked and all rubbish, sticks, roots and stones larger than 2-in shall be removed. Subgrade surfaces shall be raked or otherwise loosened immediately prior to being covered with loam. Subgrade shall be inspected and approved by the ENGINEER before loam is placed.

B. Loam shall be placed over approved areas to a depth sufficiently greater than required so that after natural settlement and light rolling, the complete work will conform to the lines, grades and elevations indicated. No loam shall be spread in water or while frozen or muddy.

C. Seeding, mulching and conditioning shall only be performed during those periods within the seasons which are normal for such work as determined by the weather and locally accepted practice, as approved by the ENGINEER. Hydroseed only on a calm day.

D. Schedules for seeding and fertilizing must be submitted to the ENGINEER for approval prior to the work.

E. Seeding shall be done within 10 days following soil preparation. Seed shall be applied hydraulically at the rates and percentages indicated. The spraying equipment and mixture shall be so designed that when the mixture is sprayed over an area, the grass seed and mulch shall be equal in quantity to the specified rates. Prior to the start of work, the ENGINEER shall be furnished with a certified statement for approval as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the Hydroseeder.

F. In order to prevent unnecessary erosion of newly graded slopes and unnecessary siltation of drainage ways, carry out seeding and mulching as soon as satisfactory completion of a unit or portion of the project. A unit of the work will be defined as not more than 20,000 sq ft.

G. When protection of newly graded areas is necessary at a time that is outside of the normal seeding season, protect those areas by whatever means necessary (such as straw applied with a tar tack) or by other measures as approved by the ENGINEER.

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H. Native seed should be applied only at onset of rainy season.

3.03 SEEDING IN WOODED AND UNGRADED AREAS

A. For preparation and seeding in wooded areas under this Contract and where no grading is required, all of the specified materials and procedures shall be utilized except that no disking shall be performed within the drip line of trees to be preserved. The seed bed shall be prepared by the addition of a thin layer of top soil roughly 1-in deep.

3.04 MAINTENANCE AND PROVISIONAL ACCEPTANCE

A. Furnish full and complete written instructions for maintenance of the lawns to the ENGINEER at the time of provisional acceptance.

B. The inspection by the ENGINEER will determine whether maintenance shall continue in any area of manner.

3.05 GUARANTEE PERIOD AND FINAL ACCEPTANCE

A. All seeded areas shall be guaranteed for not less than 1 full year from the time of provisional acceptance.

B. At the end of the guarantee period, inspection will be made by the ENGINEER upon written request submitted at least 10 days before the anticipated date. Lawn areas not demonstrating satisfactory stands as outlined above, as determined by the ENGINEER, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

C. After all necessary corrective work has been completed, the ENGINEER shall certify in writing the final acceptance of the lawns.

END OF SECTION

Division 3 Concrete

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SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Concrete forms and accessories.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03250 – Concrete Joints and Joint Accessories.
2. Section 03200 – Concrete Reinforcement.
3. Section 03300 – Cast-in-Place Concrete.
4. Section 03600 – Grout.
5. Section 03922 – Modifications and Repair to Concrete.

1.02 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 347 – Guide to Formwork for Concrete.

B. American Plywood Association (APA):

1. Material grades and designations as specified.

1.03 DEFINITIONS

A. Architectural concrete is wall, slab, or beam concrete which will have surfaces exposed to view in the finished work.

1.04 SYSTEM DESCRIPTION

A. Design Requirements:

1. All forms and shoring shall be designed at no additional cost to the OWNER by a professional Civil or Structural Engineer registered in the State of California.

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2. Formwork shall be designed in accordance with the requirements of ACI 301, ACI 318, and ACI 347 and shall comply with all applicable regulations and codes.

3. The design shall consider any special requirements due to the use of plasticized and/or retarded set concrete.

B. Performance Requirements: All forms shall be designed and constructed to provide a flat, uniform concrete surface requiring minimal finishing or repairs. Form design shall accommodate all of concrete mix designs being used by the CONTRACTOR.

1. Furnish all labor, materials, equipment and incidentals required and design, install and remove formwork for cast-in-place concrete as shown on the Drawings and as specified herein.

2. Secure to forms as required or set for embedment as required, all miscellaneous metal items, sleeves, reglets, anchor bolts, inserts and other items furnished under other Sections and required to be cast into concrete.

1.05 SUBMITTALS

A. Submit to the ENGINEER all submittals in accordance with Section 01300.

B. Product Details: Submit to the ENGINEER, product data showing materials of construction for:

1. Form release agent

2. Form ties

4. Bond breakers

C. Shop Drawings

1. Location and sequence of the concrete placements.

2. Review of pour sequence, form system and panel layout shall be for appearance and strength of the completed structure only. Favorable review by the ENGINEER of forming plans or procedures shall not relieve the CONTRACTOR of responsibility for the strength, safety or correctness of methods used, the adequacy of equipment, or carrying out the work in full compliance with the requirements of the Drawings and as specified herein.

D. Calculations

1. Submit design calculations and details prepared and sealed by a Professional Civil or Structural Engineer registered in the State of California for all forms and shoring.

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E. Samples

1. The CONTRACTOR shall demonstrate to the ENGINEER on a designated area of the concrete substructure exterior surface that the form release agent will not adversely affect concrete surfaces to be painted, coated or otherwise finished and will not affect the forming materials. This demonstration shall include the application of these finishes in accordance with the requirements of the Contract Documents over areas of at least 16 square feet each.

PART 2 PRODUCTS

2.01 MATERIALS

A. Forms for cast-in-place concrete shall be made of wood, metal, or other approved material. Wood forms for architectural concrete and all surfaces in contact with water shall be new and unused and new plywood shall be on such forms for each use. Construct wood forms of sound lumber or plywood of suitable dimensions and free from knotholes and loose knots. Where used for exposed surfaces, dress and match boards. Sand plywood smooth and fit adjacent panels with tight joints. Metal forms may be used when approved by the ENGINEER.

B. Wall Forms

1. At the start of Work on this Project, all forms for all exposed exterior and interior concrete walls and all surfaces in contact with water shall be new and unused "Plyform" exterior grade plywood panels manufactured in compliance with the APA and bearing the trademark of that group, or equal. Provide B grade or better veneer on all faces to be placed against concrete during forming. The class of material and grades of interior plies shall be of sufficient strength and stiffness to provide a flat, uniform concrete surface requiring minimal finishing and grinding. Forms may be re-used up to two times provided they are thoroughly cleaned, holes are neatly plugged, and the surface is satisfactory in the opinion of the ENGINEER.

2. Forms for architectural concrete shall be constructed of materials and in a manner that will result in rigid forms with sufficient strength to withstand, without noticeable deflection, movement, or leakage, the high hydraulic pressures resulting from rapid filling of the forms and heavy high frequency vibration of the concrete. Deflection in formwork shall be limited to 1/360 of each component span. Form joints shall be laid out in a uniform pattern unless otherwise indicated on the Drawings.

3. All joints or gaps in forms shall be taped, gasketed, plugged, and/or caulked with an approved material so that the joint will remain watertight and will withstand placing pressures without bulging outward or creating surface patterns.

4. Forms for circular structures shall conform to the circular shape of the structure. Straight panels may be substituted for circular panels if the straight panels do not

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exceed 2-ft in width nor deflect more than 3-1/2 degrees per joint, nor conflict with specific notes on the Drawings.

C. Rustications shall be at the location and shall conform to the details shown on the Drawings. Moldings for chamfers and rustications shall be milled and planed smooth. Rustications and corner strips shall be of a nonabsorbent material, compatible with the form surface and fully sealed on all sides to prohibit the loss of paste or water between the two surfaces.

D. Form Release Agent

1. Coat all forming surfaces in contact with concrete which will not be painted, using an effective, non-staining, non-residual, water based, bond-breaking form coating unless otherwise noted.

E. Concrete surfaces which are to be painted shall be formed with hard plastic finished plywood or a similar material which does not require a form release agent unless the CONTRACTOR can substantiate to the satisfaction of the ENGINEER that the form release agent will not remain on the formed surface after it is stripped.

F. Form Ties

1. Form ties encased in concrete shall be designed so that, after removal of the projecting part, no metal shall remain within 1-1/2-in of the face of the concrete. The part of the tie to be removed shall be at least 1/2-in diameter or be provided with a wood or plastic cone at least 1/2-in diameter and 1-1/2-in long. Form ties in concrete exposed to view shall be the cone-washer type.

2. Flat bar ties for panel forms shall have plastic or rubber inserts having a minimum depth of 1-1/2-in and sufficient dimensions to permit proper patching of the tie hole.

3. Ties for liquid containment structures shall have an integral waterstop that is welded to the tie.

4. Common wire shall not be used for form ties.

PART 3 EXECUTION

3.01 EXAMINATION

A. Forms for walls shall have removable panels at the bottom for cleaning, inspection and joint surface preparation. Forms for wall heights in excess of 16 feet shall have closable intermediate inspection ports. Tremies and hoppers for placing concrete shall be used to allow concrete inspection, prevent segregation and prevent the accumulation of hardened concrete on the forms above the fresh concrete.

B. Confirm dimensions for all concrete equipment pads (for all types of equipment, electrical, instrumentation, mechanical, etc.) with actual equipment to be installed and installation

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details and anchorage calculations prior to forming. Change sizes of equipment pads to match actual equipment (larger or smaller) as required at no additional cost to the OWNER.

3.02 PREPARATION

A. Wood forms in contact with concrete which are not to be painted shall be coated with an effective release agent prior to form installation.

B. Steel forms shall be thoroughly cleaned and mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface for all forms, except those utilized for surfaces receiving a rough finish. All forms shall have the contact surfaces coated with a release agent unless they are to be painted.

3.03 INSTALLATION

A. General

1. Forms shall be used for all cast-in-place concrete including sides of footings except for pipe and conduit encasements where concrete may be placed directly against the side of the trench. Forms shall be constructed and placed so that the resulting concrete will be of the shape, lines, dimensions and appearance indicated on the Drawings.

2. Molding, bevels, or other types of chamfer strips shall be placed to produce blockouts, rustications, or chamfers as shown on the Drawings or as specified herein. Chamfer strips shall be provided at horizontal and vertical projecting corners to produce a 3/4-in chamfer. Rectangular or trapezoidal moldings shall be placed in locations requiring sealants where specified or shown on the Drawings. Sizes of moldings shall conform to the sealants manufacturer's recommendations.

3. Forms shall be sufficiently rigid to withstand construction loads and vibration and to prevent displacement or sagging between supports. Construct forms so that the concrete will not be damaged by their removal. The CONTRACTOR shall be entirely responsible for the adequacy of the forming system.

4. Form material that is allowed to be reused in unexposed conditions shall have all surfaces in contact with concrete thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn and all protrusions smoothed. Reuse of wooden forms for other than surfaces not exposed to view will not be permitted.

5. Metal items such as rebar, wire, or plates used to support pipe penetrations, and pipe embedments shall have minimum clearance of 2-inch from reinforcing steel bars.

B. Form Tolerances

1. Forms shall be surfaced, designed and constructed in accordance with the recommendations of ACI 347 and shall meet the following additional requirements for the specified finishes.

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2. Formed Surface Exposed to View: Edges of all form panels in contact with concrete shall be flush within 1/32-in and forms for plane surfaces shall be such that the concrete will be plane within 1/16-in in 4-ft. Forms shall be tight to prevent the passage of mortar, water and grout. The maximum deviation of the finish wall surface at any point shall not exceed 1/4-in from the intended surface as shown on the Drawings. Form panels shall be arranged symmetrically and in an orderly manner to minimize the number of seams.

3. Formed surfaces not exposed to view or buried shall meet requirements of Class "C" Surface in ACI 347.

4. Formed rough surfaces including mass concrete, pipe encasement, electrical duct encasement and other similar installations shall have no minimum requirements for surface smoothness and surface deflections. The overall dimensions of the concrete shall be plus or minus 1-in.

5. Formed Concrete Surfaces to Receive Paint: Surface deflections shall be limited to 1/32-in at any point and the variation in wall deflection shall not exceed 1/16-in per 4-ft. The maximum deviation of the finish wall surface at any point shall not exceed 1/4-in from the intended surface as shown on the Drawings.

C. Removal of Forms

1. The CONTRACTOR shall be responsible for all damage resulting from removal of forms. Forms and shoring for structural slabs or beams shall remain in place in accordance with ACI 301 and ACI 347, and the requirements herein.

2. Except as otherwise specifically authorized by the ENGINEER, forms shall not be removed before the concrete has attained the following percentage of its specified design strength, nor before reaching the following time after completion of concrete placement (whichever is the longer):

TABLE 03100-1
MINIMUM TIME TO FORM REMOVAL

Forms for	Percentage of Specified Strength	Time after Placement
Sides of footings, and encasements	--	12 hours with air temperature above 50°
Elevated beams and slabs	100	14 days
Sides of walls	30	48 hours

3. Shores for elevated slabs and beams shall not be removed until the concrete has attained its specified design strength.

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3.04 FIELD QUALITY CONTROL

A. Inspection

1. The ENGINEER shall be notified when the forms are complete and ready for inspection at least 12 hours prior to the proposed concrete placement.

2. CONTRACTOR shall ensure that all metal pipeline embeds are separated from form ties and rebar by a minimum of 2-inch to keep pipelines electrically isolated.

3. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with requirements of this Section, shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or replaced as directed by the ENGINEER at no additional cost to the OWNER. Such repair or replacement shall be subject to the requirements of this Section and Section 03922.

END OF SECTION

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SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Concrete Reinforcement.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 01300 – Submittals.
2. Section 03100 – Concrete Forms and Accessories.
3. Section 03250 – Concrete Joints and Joint Accessories.
4. Section 03300 – Cast-in-Place Concrete.
5. Section 03305 – Electrical and Instrumentation Duct Encasement Concrete.
6. Section 03600 – Grout.
7. Section 03922 – Modifications and Repair to Concrete.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

B. American Concrete Institute (ACI):

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 315 - Details and Detailing of Concrete Reinforcement.
3. ACI 318 - Building Code Requirements for Structural Concrete.

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4. ACI 530 – Building Code Requirement for Masonry Structures.

5. ACI SP-66 - ACI Detailing Manual.

C. Concrete Reinforcing Steel Institute (CRSI):

1. Manual of Standard Practice.

D. American Welding Society (AWS):

1. AWS D1.4 - Structural Welding Code Reinforcing Steel.

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Submit to the ENGINEER all submittals in accordance with Section 01300.

B. Product Data: Submit product data showing materials of construction for:

1. Reinforcing steel.

2. Mechanical reinforcing steel splicers. Product data including ICC Evaluation Service Reports.

3. Fiber reinforcements.

C. Shop Drawings: Submit to shop drawings showing details of installation for:

1. Reinforcing steel placing drawings. Placement drawings shall conform to the recommendations of ACI 315 and shall not be copies of the Contract Drawings. New scaled drawings shall be prepared showing plans, all vertical structure elevations, sections, and details as required to clearly delineate the reinforcing. All reinforcement in a concrete placement shall be included on a single placement drawing or cross-referenced to the pertinent main placement drawing. The main drawing shall include bar lists, schedule, bending details, placing plans and elevations, clear concrete cover, splice locations, splice length, and the additional reinforcement (around openings, at corners, etc.) shown on the standard detail sheets. Bars to be of special steel or special yield strength are to be clearly identified.

2. Bill of material (bar list). Clearly show the placement of each bar listed in the bill of materials on the placement drawings.

3. Bar bending details. The bars shall be referenced to the same identification marks shown on the placement drawings. Include standard bending diagrams in the submittal, as applicable. Bars to be of special steel or special yield strength shall be clearly identified.

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4. Schedule of all placements to contain synthetic reinforcing fibers. The amount of fibers per cubic yard to be used for each of the placements shall be noted on the schedule.

D. Samples

1. Two samples of each type of mechanical reinforcing steel splicers.

2. Two samples of fiber reinforcement.

E. Quality Assurance/Control: Submit test reports of each of the following items.

1. Certified copy of mill test on each steel proposed for use showing the physical properties of the steel and the chemical analysis.

2. Certified copy of test reports for each foreign manufactured steel proposed for use in the fabrication of reinforcement. The tests shall be specifically made for this project at the expense of the CONTRACTOR by a domestic independent testing laboratory certified to perform the tests. The testing shall be for conformity to the applicable ASTM standard.

3. Welder's certification. The certification shall be in accordance with AWS D1.4 when welding of reinforcement required.

1.04 QUALITY ASSURANCE

A. Provide services of a manufacturer's representative, with at least 2 years experience in the use of the reinforcing fibers for a construction meeting prior to the first use and for assistance during the first placement of the material.

B. CONTRACTOR shall ensure that all metal pipeline embeds are separated from form ties and rebar by a minimum of 2-inch, in order to keep pipelines electrically isolated.

1.05 DELIVERY, STORAGE AND HANDLING

A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.

B. Reinforcing steel shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof markings showing the same "mark" designations as those shown on the submitted placement drawings.

C. Reinforcing steel shall be stored off the ground, protected from moisture and kept free from dirt, oil, or other injurious contaminants.

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PART 2 PRODUCTS

2.01 MATERIALS

A. Materials shall be new and shall comply with the following material specifications.

B. Deformed Concrete Reinforcing Bars: ASTM A615, Grade 60 deformed bars..

C. Concrete Reinforcing Bars required on the Drawings to be Welded: ASTM A706.

1. ASTM A615 Grade 60 may be used for ASTM A706 provided the following requirements are satisfied:

a. The actual yield strength of the reinforcing steel based on mill tests shall not exceed the specified yield strength by more than 18,000 psi. Retests shall not exceed this value by more than an additional 3,000 psi.

b. The ratio of the actual ultimate tensile strength to the actual tensile yield strength of the reinforcement shall not be less than 1.25.

c. The carbon equivalency (CE) of bars shall be 0.55 or less.

D. Spiral Reinforcement

1. ASTM A615, Grade 60 for plain or deformed bars.

2. ASTM A82 for cold-drawn wire.

E. Welded Steel Wire Fabric: ASTM A185.

F. Reinforcing Steel Accessories

1. Plastic Protected Bar Supports: CRSI Bar Supports, Class 1 - Maximum Protection.

2. Stainless Steel Protected Wire Bar Supports: CRSI Bar Supports, Class 2 - Moderate Protection with legs made wholly from stainless steel wire.

3. Precast Concrete Bar Supports: CRSI Bar Supports, Precast Concrete Bar Supports. Precast concrete blocks that have equal or greater strength than the surrounding concrete.

G. Tie Wire

1. Tie wires for reinforcement shall be 16-gauge or heavier, black annealed wire.

H. Mechanical Reinforcing Steel Coupling System

1. Use only where indicated. Mechanical reinforcing steel coupling system shall be positive connecting taper threaded type employing a hexagonal coupler . Coupling

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system shall meet all ACI 318 requirements. Bar ends must be taper threaded with coupler manufacturer's bar threader to ensure proper taper and thread engagement. Provide with cap on female end to exclude dirt, debris and wet concrete. Couplers shall be torqued to manufacturer's recommended value.

2. Unless otherwise noted on the Drawings, mechanical reinforcing steel coupling system shall produce a splice strength in tension or compression of not less than 125 percent of the ASTM specified minimum yield strength of the reinforcing bar. Base yield strength on Grade 60 reinforcing unless otherwise indicated or specified.

3. Compression type mechanical splices shall provide concentric bearing from one bar to the other bar.

I. Headed Reinforcement

1. Headed reinforcement bars shall be mechanical devices complying with ACI 318 Section 12.6 for use as mechanical anchorage to develop steel reinforcement bars in tension as an alternate to standard hooks or development lengths. Development length shall be as required per manufacturer recommendations unless detailed otherwise in the Drawings. Headed reinforcement shall be HRC 555 Headed Reinforcing Bars by Headed Reinforcement Corporation, Fountain Valley, CA or equal.

J. Fiber Reinforcement (Synthetic Reinforcing Fiber)

1. Synthetic reinforcing fiber for concrete shall be 100 percent polypropylene collated, fibrillated fibers as manufactured by Fibermesh Company of Synthetic Industries Inc., Chattanooga, TN - Fibermesh or equal. Fiber length and quantity for the concrete mix shall be in strict compliance with the manufacturer's recommendations as approved by the ENGINEER.

2.02 FABRICATION

A. Comply with the CRSI Manual of Standard Practice.

B. Bend bars cold. Do not straighten or rebend bars.

C. Bend bars around a revolving collar having a diameter not less than that recommended by the CRSI or ACI 318.

D. Saw cut bar ends that are to be butt spliced, placed through limited diameter holes in metal, or threaded. Terminate saw cut ends in flat surfaces within 1-1/2 degrees of a right angle to the axis of the bar.

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PART 3 EXECUTION

3.01 INSTALLATION

A. Surface condition, bending, spacing and tolerances of placement of reinforcement shall comply with the CRSI Manual of Standard Practice. The CONTRACTOR shall be solely responsible for providing an adequate number of bars and maintaining the spacing and clearances shown on the Drawings.

B. Except as otherwise indicated on the Drawings, the minimum concrete cover of reinforcement shall be as follows:

1. Concrete cast against and permanently exposed to earth: 3-in

2. Concrete exposed to soil, water, sewage, sludge and/or weather: 2-in (including bottom cover of slabs over water or sewage)

3. Concrete not exposed to soil, water, sewage, sludge and/or weather:

a. Slabs (top and bottom cover), walls and joists – 1.5-in

b. Beams and columns (principal reinforcement) - 2-in

C. Reinforcement which will be exposed for a considerable length of time after being placed shall be coated with a heavy coat of neat cement slurry.

D. No reinforcing steel bars shall be welded either during fabrication or erection unless specifically shown on the Drawings or specified herein, or unless prior written approval has been obtained from the ENGINEER. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work. When welding of reinforcement is approved or called for, it shall comply with AWS D1.4.

E. Reinforcing steel interfering with the location of other reinforcing steel, conduits or embedded items may be moved within the specified tolerances or one bar diameter, whichever is greater. Greater displacement of bars to avoid interference shall only be made with the approval of the ENGINEER. Do not cut reinforcement to install inserts, conduits, mechanical openings or other items without the prior approval of the ENGINEER.

F. Securely support and tie reinforcing steel to prevent movement during concrete placement. Secure dowels in place before placing concrete. Wire tie ends shall be bent away from the outer surface of all concrete elements.

G. Reinforcing steel bars shall not be field bent except where shown on the Drawings or specifically authorized in writing by the ENGINEER. If authorized, bars shall be cold-bent around the standard diameter spool specified in the CRSI. Do not heat bars. Closely inspect the reinforcing steel for breaks. If the reinforcing steel is damaged, replace, Cadweld or otherwise repair as directed by the ENGINEER. Do not bend reinforcement after it is embedded in concrete.

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H. Reinforcing steel bars shall have minimum clearance of 2-in from all metal items such as rebar, wire, or plates used to support pipe penetrations and pipe embedments.

I. Reinforcing steel bars shall be cleaned before concrete placement. Reinforcing substantially (as determined by the ENGINEER) covered in rust shall be sandblasted clean prior to concrete placement.

3.02 REINFORCEMENT AROUND OPENINGS

A. Unless specific additional reinforcement around openings is shown on the Drawings, provide additional reinforcing steel on each side of the opening equivalent to one half of the cross-sectional area of the reinforcing steel interrupted by an opening. The bars shall have sufficient length to develop bond at each end beyond the opening or penetration.

3.03 SPLICING OF REINFORCEMENT

A. Lap splices shall be provided as shown on the Drawings. For lap splices not shown, request clarification from the ENGINEER.

B. Splicing of reinforcing steel in concrete elements noted to be "tension members" on the Drawings shall be avoided whenever possible. However, if required for constructability, splices in the reinforcement subject to direct tension shall be welded to develop, in tension, at least 125 percent of the specified yield strength of the bar. Splices in adjacent bars shall be offset the distance of a Class B splice.

C. Install wire fabric in as long a length as practicable. Wire fabric from rolls shall be rolled flat and firmly held in place. Splices in welded wire fabric shall be lapped in accordance with the requirements of ACI-318 but not less than 12-in. The spliced fabrics shall be tied together with wire ties spaced not more than 24-in on center and laced with wire of the same diameter as the welded wire fabric. Do not position laps midway between supporting beams, or directly over beams of continuous structures. Offset splices in adjacent widths to prevent continuous splices.

3.04 ACCESSORIES

A. The CONTRACTOR shall be solely responsible for determining, providing and installing accessories such as chairs, chair bars and the like in sufficient quantities and strength to adequately support the reinforcement and prevent its displacement during the erection of the reinforcement and the placement of concrete.

B. Use precast concrete blocks where the reinforcing steel is to be supported over soil.

C. Use plastic protected bar supports or steel supports with plastic tips where the reinforcing steel is to be supported on forms for a concrete surface that will be exposed to weather, high humidity, or liquid (including bottom of slabs over liquid containing areas). Use stainless steel supports or plastic tipped metal supports in all other locations unless otherwise noted on the Drawings or specified herein.

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D. Alternate methods of supporting top steel in slabs, such as steel channels supported on the bottom steel or vertical reinforcing steel fastened to the bottom and top mats, may be used if approved by the ENGINEER.

3.05 FIELD QUALITY CONTROL

A. Inspection: In no case shall any reinforcing steel be covered with concrete until the installation of the reinforcement, including the size, spacing and position of the reinforcement has been inspected by an ICC certified Special Inspector and the Inspector's release to proceed with the concreting has been obtained. The Inspector shall be given a minimum of 2 working days prior notice of the readiness of placed reinforcement for observation. The forms shall be kept open until the Inspector has finished his/her observations of the reinforcing steel.

B. CONTRACTOR shall ensure that all metal pipeline embeds are separated from form ties and rebar by a minimum of 2-inch to keep pipelines electrically isolated.

END OF SECTION

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SECTION 03250

CONCRETE JOINTS AND JOINT ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Furnish all labor, materials, equipment and incidentals required and install accessories for concrete joints as shown on the Drawings and as specified herein. See the related sections for additional work and requirements.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.
2. Section 03200 – Concrete Reinforcement.
3. Section 03300 – Cast-In-Place Concrete.
4. Section 03350 – Concrete Finishing.
5. Section 03600 – Grout.
6. Section 03922 – Modifications and Repair to Concrete.
7. Section 05500 –Metal Fabrications.
8. Section 07901 – Joint Sealants.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
2. ASTM C1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
3. ASTM D1751 - Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction. (Nonextruding and Resilient Bituminous Types).
4. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

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B. U.S. Army Corps of Engineers (CRD).

1. CRD C572 - Specification for Polyvinylchloride Waterstops.

C. International Concrete Repair Institute (ICRI):

1. ICRI Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply unless otherwise noted.

1.03 SUBMITTALS

A. Submit to the ENGINEER all submittals in accordance with Section 01300.

B. Product data. Submittals shall include the following:

1. Expansive Waterstops: Product data including catalogue cut, technical data, location of use, storage requirements, splicing methods, installation instructions and conformity to ASTM standards.

2. Premolded joint fillers: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.

3. Bond breaker: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.

4. Bonding agents: Product data including catalogue cut, technical data, storage requirements, product life, application requirements and conformity to ASTM standards.

C. Certifications

1. Certification that all materials used within the joint system are compatible with each other.

1.04 QUALITY ASSURANCE

A. Provide services of a manufacturer's field representative of the sealant who has performed at least five projects of similar size and complexity within the last 5 years. The field representative shall be present at the work site prior to any mixing of components to instruct on mixing, application and inspection procedures and to inspect the finish of the prepared surfaces prior to application of the sealant.

B. The manufacturer's field representative shall make at least one additional visit to the site as the work progresses and shall report on each visit to the CONTRACTOR and the

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ENGINEER, advising as to whether the application is being performed in accordance with this Section and the manufacturer's printed instructions.

C. Injectable waterstop hose system shall be installed by an applicator certified by the manufacturer. Applicator of injectable waterstop hose system shall have a minimum of 5 years experience installing injectable waterstop systems.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver products in original, unopened containers displaying the manufacturer's label showing manufacturer name, product identification and batch number.

B. Store products as recommended by the manufacturer.

PART 2 - PRODUCTS

2.01 GENERAL

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. All materials used together in a given joint (bond breakers, backer rods, joint fillers, sealants, etc.) shall be compatible with one another. Coordinate selection of suppliers and products to ensure compatibility. Under no circumstances shall asphaltic or bituminous bond breakers or joint fillers be used in joints receiving sealant.

C. All chemical sealant type waterstops shall be products specifically manufactured for the purpose for which they will be used and the products shall have been successfully used on similar structures for more than five years.

2.02 MATERIALS

A. Expansive Waterstops

1. Hydrophilic Waterstops - Non-expansion joint. The waterstops shall be preformed hydrophilic rubber seals. Installation adhesives used with the expansive waterstops shall be as recommended by the waterstop manufacturer. The waterstop shall be Earth Shield Type 20 by JP Specialties, Inc., Lake Elsinore, CA, or equal.

2. Injected Tube Waterstops – Non-expansion joint. The permeable injection tubes shall be composed of a reinforcing spiral covered with an inner and outer protective membrane. The injection material shall be a polyurethane grout with an accelerator system. The accelerator shall be capable of controlling the reaction time up to one hour. After reaction, the polyurethane grout shall form a flexible closed cell polyurethane form. The system shall be INJECTO with Flex LV resin by DeNeef America, Inc., ULTRA SEAL System with AKWASEAL grout by Colloid Environmental Technologies Co., Arlington Heights, IL, or equal.

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B. Retrofit Waterstops

1. PVC Retrofit Waterstops for non-expansion joints: "T" type waterstop conforming to CRD C572 and made by extruding elastomeric plastic compound with virgin polyvinylchloride as the basic resins. The compound shall contain no reprocessed materials. Minimum tensile strength of waterstop 1750 psi. Waterstop shall be style 609 system, complete with Type 304 stainless steel batten bars and 1/4-in diameter stainless steel expansion bolts, by Greenstreak Plastic Products, St. Louis, MO or equal.

C. Premolded Joint Filler

1. Premolded joint filler - structures. Self-expanding cork, premolded joint filler shall conform to ASTM D1752, Type III. The thickness shall be 3/4-in unless shown otherwise on the Drawings.

2. Premolded joint filler - sidewalk and roadway concrete pavements or where fiber joint filler is specifically noted on the Drawings. The joint filler shall be asphalt-impregnated fiber board conforming to ASTM D1751. Thickness shall be 3/4-in unless otherwise shown on the Drawings. Fiber joint filler shall be sealed with a joint sealant where recommended by the joint filler manufacturer.

D. Bond Breaker

1. Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape which will satisfactorily adhere to the premolded joint filler or concrete surface as required. The tape shall be the same width as the joint unless otherwise noted.

2. Except where tape is specifically called for on the drawings, bond breaker for concrete shall be either bond breaker tape or a non-staining type bond prevention coating such as Silcoseal Select, by Nox-Crete Products Group or equal.

E. Bonding Agent

1. Epoxy bonding agent shall be a two-component, solvent-free, moisture insensitive, epoxy resin material conforming to ASTM C881 (2002), Type V. The bonding agent shall be Sikadur 32 Hi-Mod by Sika Corporation of Lyndhurst, NJ; Concresive Liquid (LPL) by BASF of Shakopee, MN, or equal.

2. Latex bonding agent shall be a non-reemulsifiable acrylic-polymer latex conforming to ASTM C1059, Type II.

F. Joint Sealant

1. Joint sealants shall be two-part urethane sealant as specified in Section 07901. Minimum sealant thickness at concrete joints shall be 3/8-in.

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PART 3 - EXECUTION

3.01 INSTALLATION

A. Expansive Waterstops

1. Install waterstops at joints where specifically noted on the Drawings. Waterstops shall be continuous around all corners and intersections so that a continuous seal is provided.

2. Each piece of the waterstop shall be of maximum practicable length to provide a minimum number of connections or splices. Connections and splices shall conform to the manufacturer's recommendations and as specified herein.

3. Prepare the joint surfaces, install primers or adhesives, and install expansive waterstops in accordance with the manufacturer's instructions.

B. Injected Tube Waterstops

1. Injected Tube Waterstops shall be installed in accordance with the manufacturer's recommendations. Injection ports shall not be spaced greater than 25 feet. The joint surfaces shall be wire brushed and scraped as necessary to expose an uncontaminated surface. The joint shall then be cleaned with pressurized air to remove all residue and debris. Immediately prior to resin injection, the injection tubes shall be flushed with water to clean and moisten the full length of the tube. Resin injection shall be in accordance with the manufacturer's recommendations. The injection tube shall be sealed and injection commenced on the next adjacent tube prior to the setting of the resin.

C. Retrofit Waterstops

1. Provide straight butt joints for field splices. Make splices on a bench. Use a power saw and guide to cut straight ends to be spliced. Heat fuse weld splices using a Teflon coated thermostatically controlled waterstop splicing iron following the manufacturer's recommendations. The finished splices shall provide a cross-section that is dense and free of porosity. ENGINEER may conduct destructive tests of splices by cutting along one half of the splice length and by cutting perpendicular to the splice at several locations on the remaining half of the splice length. The right of the ENGINEER to make such tests shall not be construed as creating any obligation to make such tests, and not exercising this right to do so shall not relieve the CONTRACTOR from meeting the requirements of these Specifications. Completed splices shall exhibit a continuous and uniform bead of excess melted material. The welded material shall not look noticeably different from the parent material. Splices shall not show misalignment of center bulbs or ribs greater than 1/16-in, lack of fusion, porosity, pinholes, cracks, charred or burnt material, bubbles, or separation of cooled splice when bent by hand. If a splice displays any of these defects, reject the splice, recut back at least 1-in from rejected splice on each side, and reweld.

2. Secure waterstops in joints before concrete is placed in accordance with the manufacturer's recommendations. Use epoxy gel if required in the

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manufacturer's recommendations. Center the waterstop in the joint or as shown in the Drawings. Secure the waterstop centered on and perpendicular to the joint and to maintain this position during concrete placement.

D. Construction Joints

1. Make construction joints only at locations shown on the Drawings or as approved by the ENGINEER. Any additional or relocation of construction joints proposed by the CONTRACTOR, must be submitted to the ENGINEER for written approval.

2. Provide sealant grooves for joint sealant where indicated on the Drawings.

3. At all construction joints and at concrete joints designated on the Drawings to be "roughened", uniformly roughen the surface of the concrete to Concrete Surface Profile (CSP) 9 per ICRI Guideline 03732 with ¼-in minimum amplitude. This roughened surface may be accomplished by raking the plastic concrete or by bushhammering or chiseling hardened concrete surfaces or raking plastic concrete. Thoroughly clean joint surfaces of loose or weakened materials by waterblasting or sandblasting. Saturate the joints and adjacent concrete surfaces to at least 12-in past the joint with water 12 hours before and again immediately prior to concrete placement.

4. In lieu of the above method for bonding plastic concrete to hardened concrete, the following optional method may be used. Concrete must be allowed to set a minimum of 28 days. Use an epoxy bonding agent applied to roughened and cleaned surfaces of set concrete in strict accordance with manufacturer's recommendations.

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Cast-in-place concrete. See the related sections for additional work and requirements.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.

2. Section 03200 – Concrete Reinforcement.

3. Section 03250 – Concrete Joints and Accessories.

4. Section 03350 – Concrete Finishing.

5. Section 03600 – Grouts.

6. Section 03922 – Modifications and Repair to Concrete.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

2. ASTM C33 - Standard Specification for Concrete Aggregates.

3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

5. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

6. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

7. ASTM C150 - Standard Specification for Portland Cement.

8. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

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9. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

10. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.

12. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

13. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.

14. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

B. American Concrete Institute (ACI):

1. ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete.

2. ACI 305R - Hot Weather Concreting.

3. ACI 306.1 - Standard Specification for Cold Weather Concreting.

4. ACI 318 - Building Code Requirements for Structural Concrete.

5. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures.

C. National Ready Mixed Concrete Association (NRMCA)

1. Quality Control Manual, Section 3 - Certification of Ready Mixed Concrete Production Facilities.

D. Truck Mixer Manufacturers Bureau (TMMB)

1. TMMB 100 - Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards.

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Submit to the ENGINEER all submittals in accordance with Section 01300.

B. Product Data: Submit product data including the following:

1. Sources of cement, pozzolan, and aggregates.

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2. Material Safety Data Sheets (MSDS) for all concrete components and admixtures.

3. Air-entraining admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.

4. Water-reducing admixture. Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations and conformity to ASTM standards.

5. High-range water-reducing admixture (superplasticizer). Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations of use.

6. Concrete mixes: For each formulation of concrete proposed for use, submit constituent quantities per cubic yard, water-cementitious ratio, air content, concrete slump, type and manufacturer of cement. See also the required test reports and certifications listed below. Provide either (a) or (b) below for each mix design proposed.

    a. Compression test results for proposed mixes. Include standard deviation data for each proposed concrete mix based on statistical records.

    b. The curve of water-cementitious materials ratio versus concrete cylinder strength based on laboratory tests. Provide average cylinder strength test results at 7, 14, and 28 days for each mix.

7. Sheet curing material. Product data including catalogue cut, technical data and conformity to ASTM C171 standard.

8. Liquid curing compound. Product data including catalogue cut, technical data, storage requirements, product life, application rate and conformity to ASTM C309 standard. Identify proposed locations of use.

B. Samples

1. Fine and coarse aggregates if requested by the ENGINEER.

C. Quality Assurance/Control

1. Test Reports

    a. Fine aggregates for conformity with ASTM C33 - sieve analysis, physical properties, and deleterious substance.

    b. Coarse aggregates for conformity with ASTM C33 - sieve analysis, physical properties, and deleterious substances.

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c. Cements for conformity with ASTM C150 - chemical analysis and physical properties for each type.

d. Pozzolans for conformity with ASTM C618 - chemical analysis and physical properties.

e. Proposed concrete mixes - compressive strength, slump, and air content.

2. Certifications

a. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.

b. Certify that the CONTRACTOR is not associated with the independent testing laboratory proposed for use by the CONTRACTOR nor does the CONTRACTOR or officers of the CONTRACTOR's organization have a beneficial interest in the laboratory.

3. Work Plans

a. Hot weather concreting.

1.04 QUALITY ASSURANCE

A. Reinforced concrete shall comply with ACI 318, ACI 350 and other stated requirements, codes and standards. The most stringent requirement of the codes, standards and this Section shall apply when conflicts exist.

B. Independent testing laboratory shall meet the requirements of ASTM E329 and ASTM C1077 and be acceptable to the ENGINEER. Laboratories affiliated with the CONTRACTOR or in which the CONTRACTOR or officers of the CONTRACTOR's organization have a beneficial interest are not acceptable.

C. Only one source of cement and aggregates shall be used on any one structure. Concrete shall be uniform in color and appearance.

D. Concrete meeting: A meeting will be held between the ENGINEER and the CONTRACTOR to review the detailed requirements of the CONTRACTOR's proposed concrete design mixes and to determine the procedures for producing proper concrete construction. The meeting shall be held no later than 30 days prior to the first concrete placement. All parties involved in concrete work shall attend the conference including the following:

1. CONTRACTOR’s superintendent and/or project manager;

2. CONTRACTOR's concrete supplier testing laboratory representative (optional as determined by the ENGINEER);

3. Concrete subcontractor;

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4. Reinforcing steel subcontractor and detailer;

5. Concrete supplier;

6. Admixture manufacturer's representative(s).

Meeting discussion topics will include, but not be limited to: methods of hot and cold weather concrete placement, concrete placement during rainy weather, underwater concrete placement of seal slab, cleanliness of rebar before placement of concrete, concrete mix design(s) and source of concrete materials, concrete shrinkage for key structures, waterstop placement, use of admixtures, concrete curing methods, concrete finishes (Section 03350), grouts (Section 03600), and rebar submittals.

E. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the ENGINEER may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at no additional cost to the OWNER.

F. If, during the progress of the work, the materials from the sources originally accepted change in characteristics, the CONTRACTOR shall, at no additional cost to the OWNER, make new acceptance tests of aggregates and establish new design mixes.

G. Field testing and inspection services and related laboratory tests required will be provided by the ENGINEER. The cost of such work, except as specifically stated otherwise, will be paid by the OWNER. The CONTRACTOR shall be responsible for the cleanup and disposal of testing waste at the project site. The following items will be tested by the ENGINEER to verify conformity with this Specification Section.

1. Concrete placements - compressive strength (cylinders), compressive strength (cores), temperature, slump, and air content.

2. Other materials or products that may come under question.

H. All materials incorporated in the work shall conform to accepted samples and test reports.

1.05 DELIVERY, STORAGE AND HANDLING

A. Cement: Store in weathertight buildings, bins or silos to provide protection from dampness and contamination and to minimize warehouse set.

B. Aggregate: Arrange and use stockpiles in bunkers or other physical structures to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Build stockpiles in successive horizontal layers not exceeding 3-ft in thickness. Complete each layer before the next is started. Do not use frozen or partially frozen aggregate.

C. Sand: Arrange and use stockpiles in bunkers or other physical structures to avoid contamination. Allow sand to drain to a uniform moisture content before using. Do not use frozen or partially frozen aggregates.

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D. Admixtures: Store in closed containers to avoid contamination, evaporation or damage. Provide suitable agitating equipment to assure uniform dispersion of ingredients in admixture solutions which tend to separate. Protect liquid admixtures from freezing and other temperature changes which could adversely affect their characteristics.

E. Pozzolan: Store in weathertight buildings, bins or silos to provide protection from dampness and contamination.

F. Sheet Curing Materials: Store in weathertight buildings or off the ground and under cover.

G. Liquid Curing Compounds: Store in closed containers.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration required.

2. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance and manufacturer's service.

3. Materials shall comply with this Section and any applicable State or local requirements.

B. Cement: Domestic portland cement complying with ASTM C150. Air entraining cements shall not be used. Cement brand shall be subject to approval by the ENGINEER and one brand shall be used on any one structure. The following cement type(s) shall be used:

1. Class B Concrete - Type II with the equivalent alkalies, as defined in Table 2 of ASTM C150, limited to a maximum of a 0.60% (low-alkali cement).

2. Class D and Class E Concrete - Type II, low-alkali cement with fly ash resulting in C_3A being below 8 percent of total cementitious content.

C. Fine Aggregate: Washed inert natural sand conforming to the requirements of ASTM C33.

D. Coarse Aggregate: Well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33. Grading requirements shall be as listed in ASTM C33 Table 2 for the specified coarse aggregate size number. Limits of Deleterious Substances and Physical Property Requirements shall be as listed in ASTM C33 Table 3 for severe weathering regions. Size numbers for the concrete mixes shall be as shown in Table 03300-1 herein.

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E. Water: Potable water free from injurious amounts of oils, acids, alkalis, salts, organic matter, or other deleterious substances.

F. Admixtures: Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures and shall be suitable for use in contact with potable water after 30 days of concrete curing.

1. Air-Entraining Admixture: The admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

2. Water-Reducing Agent: The admixture shall comply with ASTM C494, Type A. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

3. High-Range Water-Reducer (Superplasticizer): The admixture shall comply with ASTM C494, Type F and shall result in non-segregating plasticized concrete with little bleeding and with the physical properties of low water/cement ratio concrete. The treated concrete shall be capable of maintaining its plastic state in excess of 2 hours. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

4. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the ENGINEER. When allowed, the admixtures shall combine retarding or accelerating with water reducing or high range water reducing admixtures.

5. Anti-washout admixture shall prevent cement and fines from washing out during underwater concreting operations while impeding the blending of external water into the plastic concrete. Anti-washout admixture shall be Eucon AWA by Euclid Chemical Company, Cleveland, OH; Rheomac UW 450 by BASF Construction Chemicals, Cleveland, OH; or equal. Proportioning and mixing shall be in accordance with manufacturer’s recommendations.

G. Pozzolan (Fly Ash). Pozzolan shall be Class C or Class F fly ash complying with ASTM C618 except the Loss on Ignition (LOI) shall be limited to 3 percent maximum.

H. Sheet Curing Materials. Waterproof paper, polyethylene film or white burlap-polyethylene sheeting all complying with ASTM C171.

I. Liquid Curing Compound. Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309, Type 1-D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil.

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2.02 MIXES

A. Measuring Materials

1. Concrete shall be composed of portland cement, fine aggregate, coarse aggregate, water and admixtures as specified and shall be produced by a plant acceptable to the ENGINEER. All constituents, including admixtures, shall be batched at the plant except a high-range water-reducer may also be added in the field.

2. Measure materials for batching concrete by weighing in conformity with and within the tolerances given in ASTM C94 and ACI 304R except as otherwise specified. Scales shall have been certified by the local Sealer of Weights and Measures within 1 year of use.

3. Measure the amount of free water in fine aggregates within 0.3 percent with a moisture meter. Compensate for varying moisture contents of fine aggregates. Record the number of gallons of water as-batched on printed batching tickets.

4. Admixtures shall be dispensed either manually using calibrated containers or measuring tanks, or by means of an automatic dispenser approved by the manufacturer of the specific admixture.

   a. Charge air-entraining and chemical admixtures into the mixer as a solution using an automatic dispenser or similar metering device.

   b. Inject multiple admixtures separately during the batching sequence.

B. Mix Design

1. Development of mix designs and testing shall be by an independent testing laboratory acceptable to the ENGINEER and engaged by the CONTRACTOR at no additional cost to the OWNER.

2. Select proportions of ingredients to meet the design strength and materials limits specified in Table 03300-1 and to produce placeable, durable concrete conforming to these specifications. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

3. The design mix shall be based on one of the following:

   a. Standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318.

   b. Trial mixtures developed by the design mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if such data is not available, be developed by a

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testing laboratory engaged by the CONTRACTOR and at no additional cost to the OWNER.

The water content of the concrete mix, determined by laboratory testing, shall be based on a curve showing the relation between water cementitious ratio and 7 and 28 day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the specified design strengths as modified below, without extrapolation. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the specified design strengths. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratio and net minimum cementitious content as specified in Table 03300-1. Acceptance of mixes based on standard deviation shall be based on the modification factors for standard deviation tests contained in ACI318.

4. Entrained air, as measured by ASTM C231, shall be as shown in Table 03300-1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal.

5. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 03300-1. If a high-range water-reducer (superplasticizer) is used, the slump indicated shall be that measured before superplasticizer is added. Plasticized concrete shall have a slump ranging from 7 to 10-in.

6. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

TABLE 03300-1

CONCRETE MIX REQUIREMENTS

Class	Design Strength (1)	Cement (2)	Fine Aggregate (2)	Coarse Aggregate (3)	Minimum Cementitious Content (4)
B	3000	C150 Type II	C33	57	480
D (11)	4000	C150 Type II	C33	57	650
E	5000	C150 Type II	C33	57	650

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Class	W/C Ratio (5)	Fly Ash	AE Range (6)(7)	WR (8)	HRWR (9)	Slump Range Inches
B	0.54 max.	15-20% (10)	3.5 to 5	Yes	No	1-3
D (11)	0.44 max.	15-20% (10)	3.5 to 5	Yes	Yes	8-10
E	0.40 max	15-20% (10)	3.5 to 5	Yes	No	3-5

NOTES:
(1) Minimum compressive strength in psi at 28 days
(2) ASTM designation
(3) Size Number in ASTM C33
(4) Cementitious content in lbs/cu yd
(5) W/C is Water-Cementitious ratio by weight
(6) AE is percent air-entrainment
(7) AE for concrete slabs may be less than 3 percent
(8) WR is water-reducer admixture
(9) HRWR is high-range water-reducer admixture
(10) Percentage of the total cement plus pozzolan content, by weight
(11) Provide anti-washout admixture per Specifications. Proportion concrete mix design for underwater concreting

C. Mixing and Transporting

1. Provide ready-mixed concrete produced by equipment complying with ACI 318 and ASTM C94 and produced by a plant certified by the NRMCA. Do not hand-mix. All truck mixers shall carry a rating plate conforming to TMMB 100. Clean each transit mix truck drum and reverse drum rotation before the truck proceeds under the batching plant. Equip each transit-mix truck with a continuous, nonreversible, revolution counter showing the number of revolutions.

2. Ready-mix concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of their rated capacities as stated on the name plate.

3. Keep the water tank valve on each transit truck locked at all times. Any addition of water must be approved by the ENGINEER. Added water shall be incorporated by additional mixing of at least 35 revolutions. All added water shall be metered and the amount of water added shall be shown on each delivery ticket.

4. Comply with ACI 318, ACI 304R and ASTM C94 for all central plant and rolling stock equipment and methods.

5. Select equipment of size and design to ensure continuous flow of concrete at the delivery end. Metal or metal-lined non-aluminum discharge chutes shall be used and shall have slopes not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20-ft long and chutes not meeting slope

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requirements may be used if concrete is discharged into a hopper before distribution.

6. Do not retemper (mixing with or without additional cement, aggregate, or water) concrete or mortar which has partially hardened.

7. Handle concrete from mixer to placement providing concrete of specified quality in the placement area and not exceeding the maximum time interval specified in Paragraph 2.02 C.9. Dispatch trucks from the batching plant so they arrive at the work site just before the concrete is required, thus avoiding excessive mixing of concrete.

8. Furnish a delivery ticket for ready mixed concrete to the ENGINEER as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck. Indicate the number of revolutions of the truck mixer. Annotate each delivery ticket with the structure and component where the concrete was placed.

9. Temperature and Mixing Time Control

   a. In cold weather, maintain the as-mixed temperature of the concrete and concrete temperatures at the time of placement in the forms as indicated in Table 03300-3.

   b. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees F.

   c. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees F. Well-crushed ice may be substituted for all or part of the mixing water.

   d. The maximum time interval between the addition of mixing water and/or cement to the batch and the placing of concrete in the forms shall not exceed the values shown in Table 03300-2.

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TABLE 03300-2

MAXIMUM TIME TO DISCHARGE OF CONCRETE

Air or Concrete Temperature (whichever is higher)	Maximum Time
Above 90 Degree F (32 Degree C) (Note 1)	60 minutes
80 to 90 Degree F (27 to 32 Degree C)	60 minutes
70 to 79 Degree F (21 to 26 Degree C)	60 minutes
40 to 69 Degree F (5 to 20 Degree C)	90 minutes

Note 1: In air temperatures above 90 degrees F, the temperature of concrete being placed shall not exceed 90 degrees F.

If an approved high-range water-reducer (superplasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes.

D. Concrete Appearance

1. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finishability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:

   a. The gradation of aggregate.

   b. The proportion of fine and coarse aggregate.

   c. The percentage of entrained air, within the allowable limits.

2. Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete, when viewed in good lighting from 10-ft away, shall be pleasing in appearance, and at 20-ft shall show no visible defects.

2.03 SOURCE QUALITY CONTROL

A. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the specified design strength requirements in conformity with Section 2.02B.

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PART 3 EXECUTION

3.01 INSTALLATION

A. Placing

1. The class of concrete shall be per Table 03300-3 or as shown on the Drawings. Place all concrete in accordance with the recommendations contained in ACI304R. Concrete shall not be placed when rainfall (or forecast rainfall) is sufficient to cause damage to the work. Concrete placement in progress shall be stopped when rainfall occurs unless the concrete is completely protected from rainfall damage. Verify that all formwork completely encloses concrete to be placed and is securely braced prior to concrete placement. Remove ice, excess water, dirt and other foreign materials from forms. Confirm that reinforcement and other embedded items are securely in place. Have competent workers at the location of the placement. Workers shall be able to ensure that reinforcing steel and embedded items remain in designated locations while concrete is being placed. Sprinkle semi-porous subgrades or forms to eliminate suction of water from the mix. Seal extremely porous subgrades in an approved manner.

2. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing. Place concrete continuously at a rate which ensures the concrete is being integrated with fresh plastic concrete. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials or on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section. If the section cannot be placed continuously, place construction joints as specified or as approved.

3. Pumping of concrete will be permitted. Use a mix design and aggregate sizes suitable for pumping and submit for approval. Do not use pipelines made of aluminum or aluminum alloy. When concrete is pumped, slump will be determined at point of truck discharge and air content will be determined at point of placement.

4. Remove temporary spreaders from forms when the spreader is no longer needed. Temporary spreaders may remain embedded in concrete only if it is a non-water containing structure, when made of galvanized metal or concrete, and only if prior approval from the ENGINEER has been obtained.

5. Do not place concrete for supported elements until concrete previously placed in the supporting element (slabs and/or walls) has reached adequate strength.

6. Where surface mortar is to form the base of a finish, especially surfaces designated to be painted, work coarse aggregate back from forms with a suitable tool to bring the full surface of the mortar against the form. Prevent the formation of excessive surface voids.

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7. Slabs

   a. After suitable bulkheads, screeds and jointing materials have been positioned, the concrete shall be placed continuously between construction joints beginning at a bulkhead, edge form, or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation.

   b. Avoid delays in casting. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of that previously placed to avoid cold joints. Bring concrete to correct level and strike off with a straightedge. Use bullfloats or darbies to smooth the surface, leaving it free of humps or hollows.

   c. Where slabs are to be placed integrally with the walls below them, place the walls and compact as specified. Allow 1 hour to pass between placement of the wall and the overlying slab to permit consolidation of the wall concrete. Keep the top surface of the wall moist so as to prevent cold joints.

8. Formed Concrete

   a. Place concrete in forms using tremie tubes and taking care to prevent segregation. Maintain bottom of tremie tubes in contact with the concrete already placed. Do not permit concrete to drop freely more than 4-ft. Place concrete for walls in 12 to 24-in lifts, keeping the surface horizontal. If plasticized concrete is used, the maximum lift thickness may be increased to 4-ft and the maximum free fall of concrete shall not exceed 4-ft.

B. Compacting

1. Consolidate concrete by vibration, puddling, spading, rodding or forking so that concrete is thoroughly worked around reinforcement, embedded items and openings and into corners of forms. Puddling, spading, etc, shall be continuously performed along with vibration of the placement to eliminate air or stone pockets which may cause honeycombing, pitting or planes of weakness.

2. Compact all concrete with mechanical vibrators. No concrete shall be ordered until sufficient approved vibrators (including standby units in working order) are on the job.

3. Use mechanical vibrators having a minimum frequency of 8000 vibrations per minute. Insert and withdraw vibrators vertically at points from 18 to 30-in apart. At each insertion, vibrate sufficiently to consolidate concrete, generally from 5 to 15 seconds. Do not segregate concrete through overvibration. Keep a spare vibrator on the site during concrete placing operations.

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4. Concrete Slabs: Concrete for slabs less than 8-in thick shall be consolidated with vibrating screeds; slabs 8-in and thicker shall be compacted with internal vibrators and (optionally) with vibrating screeds. Vibrators shall always be placed into concrete vertically and shall not be laid horizontally or laid over.

5. Walls and Columns: Use internal vibrators (rather than form vibrators) unless otherwise approved by the ENGINEER. In general, for each vibrator needed to melt down the batch at the point of discharge, one or more additional vibrators must be used to densify, homogenize and perfect the surface. Insert vibrators vertically at regular intervals, through the fresh concrete and slightly into the previous lift, if any.

6. Amount of Vibration: Use vibrators to consolidate properly placed concrete. Do not use vibrators to move or transport concrete in the forms. Continue vibration until:

   a. Frequency of vibrator returns to normal.

   b. Surface appears liquefied, flattened and glistening.

   c. Trapped air ceases to rise.

   d. Coarse aggregate has blended into surface, but has not disappeared.

C. Curing

1. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

2. Curing Methods

   a. Curing Methods for Concrete Surfaces: Cure concrete to retain moisture and maintain a temperature of at least 50 degrees F at the concrete surface for a minimum of 7 days after placement. Use the following curing methods as specified:

      1) Water Curing: Keep entire concrete surface wet by ponding, continuous sprinkling or covered with saturated burlap. Begin wet cure as soon as concrete attains an initial set and maintain wet cure 24 hours a day.

      2) Sheet Material Curing: Cover entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting or entrapping air under the sheet. Place and secure sheet as soon as initial concrete set occurs.

      3) Liquid Membrane Curing: Apply over the entire concrete surface except for surfaces to receive additional concrete. Curing compound shall NOT be placed on any concrete surface where additional concrete is to be placed, where concrete sealers or

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surface coatings are to be used, or where the concrete finish requires an integral floor product. Curing compound shall be applied as soon as the free water on the surface has disappeared and no water sheen is visible, but not after the concrete is dry or when the curing compound can be absorbed into the concrete. Application shall be in compliance with the manufacturer's recommendations.

b. Specified Applications of Curing Methods.

1) Slabs for Water Containment Structures: Water curing only.

2) Slabs on Grade and Footings (not used to contain water): Water curing, sheet material curing or liquid membrane curing.

3) Structural Slabs (other than water containment): Water curing or liquid membrane curing.

4) Horizontal Surfaces which will Receive Additional Concrete, Coatings, Grout or Other Material that Requires Bond to the substrate: Water curing.

5) Formed Surfaces: None if nonabsorbent forms are left in place 7 days. Water cure if absorbent forms are used. Sheet cured or liquid membrane cured if forms are removed prior to 7 days. Exposed horizontal surfaces of formed walls shall be water cured for 7 days or until next placement of concrete is made.

6) Concrete Joints: Water cured or sheet material cured.

3. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

D. Cold Weather Concreting:

1. "Cold weather" is defined as a period when for more than 3 successive days, the average daily outdoor temperature drops below 40 degrees F. Calculate average daily temperature as the average of the highest and the lowest temperature during the period from midnight to midnight.

2. Cold weather concreting shall conform to ACI 306.1 and the additional requirements specified herein. Temperatures at the concrete placement shall be recorded at 12 hour intervals (minimum).

3. The CONTRACTOR shall discuss a cold weather work plan with the ENGINEER. The discussion shall encompass the methods and procedures proposed for use during cold weather including the production, transportation, placement, protection, curing and temperature monitoring of the concrete. The procedures to be implemented upon abrupt changes in weather conditions or

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equipment failures shall also be discussed. Cold weather concreting shall not begin until the work plan is acceptable to the ENGINEER.

4. The minimum temperature of concrete immediately after placement and during the protection period shall be as indicated in Table 3. The temperature of the concrete in place and during the protection period shall not exceed these values by more than 20 degrees F. Prevent overheating and non-uniform heating of the concrete.

TABLE 03300-3

Concrete Temperatures

	Minimum Dimension of Section	
	< 12-in	12 to 36-in
Min. conc temp:	55 Degree F	50 Degree F

5. Protect concrete during periods of cold weather to provide continuous warm, moist curing (with supplementary heat when required) for a total of at least 350 degree-days of curing.

   a. Degree-days are defined as the total number of 24 hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g.: 5 days at an average 70 degrees F = 350 degree-days).

   b. To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50 degrees F as 0 degrees F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.

6. Do not use salt, manure or other chemicals for protection.

7. At the end of the protection period, allow the concrete to cool gradually to the ambient temperature. If water curing has been used, do not expose concrete to temperatures below those shown in Table 3 until at least 24 hours after water curing has been terminated and air dry concrete for at least 3 days prior to first exposure to freezing temperatures.

8. During periods not defined as cold weather, but when freezing temperatures are expected or occur, protect concrete surfaces from freezing for the first 24 hours after placing.

E. Hot Weather Concreting

1. "Hot weather" is defined as any combination of high air temperatures, low relative humidity and wind velocity which produces a rate of evaporation estimated in accordance with ACI 305R, approaching or exceeding 0.2 lbs/sqft/hr.

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2. Concrete placed during hot weather, shall be batched, delivered, placed, cured and protected in compliance with the recommendations of ACI 305R and the additional requirements specified herein.

   a. Temperature of concrete being placed shall not exceed 90 degrees F and every effort shall be made to maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set or cold joints.

   b. Promptly deliver concrete to the site and promptly place the concrete upon its arrival at the site, not exceeding the maximum time interval specified in Paragraph 3.02I.4. Provide vibration immediately after placement.

   c. The ENGINEER may direct the CONTRACTOR to immediately cover plastic concrete with sheet curing material.

3. The CONTRACTOR shall discuss with the ENGINEER a work plan describing the methods and procedures proposed to use for concrete placement and curing during hot weather periods. Hot weather concreting shall not begin until the work plan is acceptable to the ENGINEER.

F. Removal of Forms

1. Form and shoring removal shall conform to the requirements specified in Section 03100.

3.02 FIELD QUALITY CONTROL

A. The placing and curing of concrete shall be subject to the inspection of the Special Inspector at all times. The CONTRACTOR shall advise the Special Inspector of his/her readiness to proceed at least 2 working days prior to each concrete placement. The Special Inspector will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel and the alignment, cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the Special Inspector.

B. Sets of field control cylinder specimens will be taken by the ENGINEER (or Inspector) during the progress of the work, in compliance with ASTM C31. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than one set per day, nor less than one set for each 150 cu yds of concrete nor less than one set for each 5,000 sq ft of surface area for slabs or walls.

1. A "set" of test cylinders consists of five cylinders: one to be tested at 7 days and two to be tested and their strengths averaged at 28 days. The fourth and fifth cylinders may be used for a special test at 3 days or to verify strength after 28 days if 28 day test results are low. Compressive strength tests shall comply with ASTM C39.

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2. When the average 28 day compressive strength of the cylinders in any set falls below the specified design strength or below proportional minimum 7 day strengths (where proper relation between seven and 28 day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed by the CONTRACTOR to achieve the required strengths.

C. The CONTRACTOR shall cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated and closed, wood or metal curing box for specimens, affording protection to the specimens against injury or loss through the CONTRACTOR's operations and furnish material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the OWNER. The cleanup and disposal of test waste shall be the responsibility of the CONTRACTOR.

D. Slump tests will be made in the field by the Special Inspector immediately prior to placing the concrete. Such tests shall be made in accordance with ASTM C143. Slump test shall be taken at point of truck discharge for each set of test cylinders defined above. If the slump is outside the specified range, the concrete shall be rejected.

E. Air Content: Test for air content shall be made by the Special Inspector on fresh concrete samples. Air content test shall be taken at point of placement for each set of test cylinders defined above. Air content for concrete made of ordinary aggregates having low absorption shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173.

F. The ENGINEER may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection or determining the continuation of concrete work. The right of the ENGINEER to take such cores shall not be construed as creating any obligation to take such cores, and not exercising this right to do so shall not relieve the CONTRACTOR from meeting the requirements of these Specifications.

G. The CONTRACTOR shall cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding and such incidental equipment as may be required. The CONTRACTOR shall repair all core holes with non-shrink grout as specified in Section 03600. The work of cutting, testing, and repairing the cores will be at the expense of the CONTRACTOR if defective work is uncovered. If no defective work is found, such cost will be at the expense of the OWNER.

3.03 ADJUSTING

A. Failure to Meet Requirements

1. Should the strengths shown by the test specimens made and tested in compliance with the previous provisions fall below the values given in Table 03300-1, the ENGINEER shall have the right to require changes in the mix design to apply to the remainder of the work. Furthermore, the ENGINEER shall have the right to require additional curing on those portions of the structure represented by the test

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specimens which failed. The cost of such mix design changes and additional curing shall be at no additional cost to the OWNER. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the ENGINEER shall have the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at no additional cost to the OWNER. In such cases of failure to meet strength requirements the CONTRACTOR and ENGINEER shall confer to determine what adjustment, if any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of ASTM C94. The "purchaser" referred to in ASTM C94 is the CONTRACTOR in this Section.

2. When the tests on control specimens of concrete fall below the specified strength, the ENGINEER will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In the case of cores not indicating adequate strength, the ENGINEER, in addition to other recourses, may require, at no additional cost to the OWNER, load tests on any one of the slabs, beams, piles, caps, and columns in which such concrete was used. Tests need not be made until concrete has aged 60 days.

3. Should the 28-day strength of test cylinders fall below 60 percent of the required minimum 28 day strength, the concrete shall be rejected and shall be removed and replaced.

B. Patching and Repairs

1. It is the intent of these Specifications to require quality work including forming, mixture and placement of concrete and curing so completed concrete surfaces will require no patching or repairs.

2. As soon as the forms have been stripped and the concrete surfaces exposed, remove fins and other projections; fill recesses left by the removal of form ties; and repair surface defects which do not impair structural strength. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.

3. Immediately after removal of forms, remove tie cones and metal portions of ties. Promptly fill holes upon stripping as follows: Moisten the hole with water, followed by a 1/16-in brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "balling"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spiderweb. Trowel smooth with heavy pressure. Avoid burnishing.

4. When filling tie cone holes and patching or repairing exposed surfaces, the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary by addition of proper amounts of white cement. Rub lightly with a fine Carborundum stone at an age of 1 to 5 days if necessary to

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bring the surface down with the parent concrete. Do not damage or stain the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.

5. Defective concrete as determined by the ENGINEER shall be repaired as specified in Section 03922 at no additional cost to the OWNER.

3.04 SCHEDULE

A. The following (Table 03300-3) are the general applications for the various concrete classes and design strengths:

TABLE 03300-3
CONCRETE SCHEDULE

Class	Design Strength (psi)	Description
B	3,000	Concrete fill, duct and pipe encasements, thrust blocks, concrete overlay slabs, pavements, sidewalk and curb
D	4,000	Seal slab for caisson construction (underwater concreting)
E	5,000	Walls, footings, slabs on grade, suspended slab and beam systems, and all other structural concrete

END OF SECTION

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SECTION 03305

ELECTRICAL AND INSTRUMENTATION DUCT ENCASEMENT CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Electrical and instrumentation duct (conduit or raceways) encasement concrete.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.
2. Section 03200 – Concrete Reinforcement.
3. Section 03250 – Concrete Joints and Joint Accessories.
4. Section 03300 – Cast-in-Place Concrete.
5. Section 03922 – Modifications and Repair to Concrete.
6. Section 16600 – Underground Raceway System.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cement, aggregate and all other concrete components shall be as specified in Section 03300 for Class B concrete except that aggregate size shall not exceed 3/8-in. Add a minimum of 6 pounds of red coloring pigment per cubic yard of concrete.

B. Encasement concrete reinforcement shall be in accordance with Section 03200. Submission of reinforcing steel mill certifications is not required.

PART 3 EXECUTION

3.01 INSTALLATION

A. Concrete shall conform to the requirements of Section 03300 and as specified herein. The ENGINEER may direct the Special Inspector to test the concrete in accordance with the field quality control measures described in Section 03300, with the modification of one set of cylinders every 150 cubic yards of concrete placed, and as determined by the ENGINEER. The CONTRACTOR shall assist in taking samples for such testing.

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B. Forms, where required by above grade encasement, shall comply with the requirements of Specification Section 03100.

C. All duct encasement concrete placements shall be continuous between manholes or handholes and between manholes or handholes and structures.

D. Where duct encasements pass through concrete building walls or concrete electrical structures (e.g. manholes, handholes, etc.), concrete encasements shall be extended through and finished flush with the inside surfaces unless otherwise noted.

E. Debris, rocks, standing water, and soil shall be kept off and out from between ducts before concrete encasement. Rebar shall be kept free of mud and shall be properly supported above ground contact.

F. Reinforce encasements as and where indicated on the Drawings.

G. Refer to Section 16600 and the Drawings for additional installation requirements.

END OF SECTION

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SECTION 03350

CONCRETE FINISHING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Concrete finishing and types of finishes

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.

2. Section 03200 – Concrete Reinforcement.

3. Section 03300 – Cast-in-Place Concrete.

4. Section 03600 – Grout.

5. Section 03922 – Modifications and Repair to Concrete.

6. Section 07100 – Bituminous Damp Proofing.

7. Section 09902 –Painting.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C33 - Standard Specification for Concrete Aggregates.

2. ASTM C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Product Data: Submit to the ENGINEER, in accordance with Section 01300, product data showing materials of construction and details of installation for:

1. Concrete sealer: Submit confirmation that the sealer is compatible with other finishes that will be applied to the surfaces.

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1.04 QUALITY ASSURANCE

A. Pre-Installation Meetings

1. The CONTRACTOR shall make available at no additional cost to the OWNER, upon 72 hours notification, the services of a qualified field representative of the manufacturer of curing compound or sealer to instruct the user on the proper application of the product under prevailing job conditions.

B. For concrete which will receive additional applied finishes or materials, the surface finish specified is required for the proper application of the specified manufacturer's products. Where alternate products are approved for use, determine if changes in finish are required and provide the proper finish to receive these products.

C. Changes in finish made to accommodate products different from those specified shall be performed at no additional cost to the OWNER. Submit the proposed new finish and their construction methods to the ENGINEER for approval.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 PREPARATION

A. Formed Surfaces

1. Forms shall not be removed before the requirements of Section 03100 have been satisfied.

2. Do not damage edges or obliterate the lines of chamfers, rustications or corners when removing the forms or performing any other work adjacent thereto.

3. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete. Surfaces to remain exposed showing white surface deposits (calcium carbonate, etc.) shall be cleaned of such deposits until a uniform gray color is achieved.

4. Cure concrete as specified in Section 03300, unless otherwise noted by the ENGINEER. Modify curing methods to be compatible with the written instructions of special concrete coating manufacturers.

B. Floors and Slabs

1. Immediately after floor or slab placement, screed concrete to the grades and surfaces shown on the Drawings. Complete screeding before any excess moisture or bleeding water is present on the surface.

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a. Level floors and slabs to a tolerance of plus or minus 1/8-in when checked with a 10-ft straightedge placed anywhere on the slab in any direction.

b. Pitch floors uniformly toward low points, sumps, or drains and as shown on the Drawings, such that there are no low spots left undrained.

c. At dished floor drains, depress drain inlet one inch, and taper the one inch depression over a two foot radius, unless indicated otherwise.

d. Failure to meet either of the above requirements shall be cause for removal, grinding, or other correction, as directed by the ENGINEER.

2. Immediately after final screeding, evenly sprinkle the surface with a dry cement/sand shake in the proportion of two sacks of portland cement to 350 lbs of coarse natural concrete sand at the rate of approximately 500 lbs /1,000 sq ft of floor. Do not sprinkle neat, dry cement on the surface.

a. The application of the cement/sand shake may be eliminated at the discretion of the ENGINEER, if the base slab concrete exhibits adequate fattiness and homogeneity and the need is not indicated.

3. Immediately after sprinkling, float the surface, filling all surface voids and slightly embedding the coarse aggregate.

4. After floating, defer additional finishing operations until the concrete has stiffened sufficiently to sustain foot pressure with an indentation of not more than 1/4-in.

5. After all bleed water and excess moisture has left the surface, edge and joint concrete as specified or shown.

a. Edge concrete sidewalks, driveways, and steps.

b. Do not edge floor slabs that will be covered with tile or carpet unless noted on the Drawings. Slab edges at joints may be lightly stoned after forms are stripped and before adjacent placements are made in such areas.

c. Place tooled joints using a straightedge at locations shown on the Drawings.

d. Where acceptable to the ENGINEER, saw-cut contraction joints with a power blade 4 to 12 hours after slab placement and finishing.

6. Water shall not be used to supplement hand or power troweling.

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3.02 CONSTRUCTION

A. Rough-Form Finish

1. Immediately after stripping forms and before concrete has changed color, carefully remove all fins and projections. Clean surfaces of tie holes.

2. Promptly fill holes left by tie cones and repair defects as specified in Section 03100 and 03300.

B. Sacked Finish

1. Provide rough-form finish as specified. While the wall is still damp apply a thin coat of medium consistency neat cement slurry by means of bristle brushes to provide a bonding coat within all pits, air holes or blemishes in the parent concrete. Avoid coating large areas of the finished surfaces with the slurry at one time.

2. Before the slurry has dried or changed color, apply a dry (almost crumbly) grout consisting of 1 volume cement to 1-1/2 volumes of clean masonry sand having a fineness modulus of approximately 2.25 and complying with the gradation requirements of ASTM C144. Uniformly apply grout using damp (neither dripping nor dry) pads of coarse burlap approximately 6-in square used as a float. Scrub grout into the pits and air holes to provide a dense mortar in the imperfections to be patched.

3. Allow the mortar to partially harden for 1 or 2 hours depending upon the weather. If the air is hot and dry, keep the wall damp during this period using a fine, fog spray. When the grout has hardened sufficiently so it can be scraped from the surface with the edge of a steel trowel without damaging the grout in the small pits or holes, cut off all that can be removed with a trowel.

4. Allow the surface to dry thoroughly and rub it vigorously with clean dry burlap to completely remove any dried grout. No visible film of grout shall remain after this rubbing. The entire cleaning operation for any area must be completed the day it is started. Do not leave grout on surfaces overnight. Allow sufficient time for grout to dry after it has been cut off with the trowel so it can be wiped off clean with the burlap.

5. On the day following the repair of pits, air holes and blemishes, the surfaces shall again be wiped off clean with dry, used pieces of burlap containing old hardened mortar which will act as a mild abrasive. After this treatment, there shall be no built-up film remaining on the parent surface. If, however, such a film is present, a fine abrasive stone shall be used to remove all such material without breaking through the surface film of the original concrete. Such scrubbing shall be light and sufficient only to remove excess material without changing the texture of the concrete.

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6. Follow the final bagging or stoning operation with a thorough wash-down with stiff bristle brushes to remove extraneous materials from the surface. Spray the wall with a fine fog spray periodically to maintain a continually damp condition for at least 3 days after the application of the repair grout.

C. Floated Finish

1. Float the concrete surface when the concrete has hardened sufficiently to support a power float without its digging into or disrupting the surface or a finisher and knee boards with no more than 1/4-in indentation. Start floating along walls and around columns, and in areas most exposed to sun or wind, and then move systematically across the surface leaving a matte finish.

2. Restore edging or jointing removed by floating. Maintain joint uniformity and line.

D. Steel Trowel Finish

1. Screed and float concrete as described in the preceding paragraphs. Immediately after surface moisture has disappeared, steel trowel to produce a smooth, impervious surface, free from trowel marks. Provide a minimum of two trowelings unless otherwise specified or noted. The final troweling shall produce a ringing sound from the trowel. Do not use dry cement or additional water in troweling.

2. For surfaces to receive the traffic-bearing or other special coatings, trowel the surface to meet the recommendations of the coating manufacturer for best performance of their products. Complete the first troweling keeping the trowel blade as flat against the surface as possible. Increase the pitch or tilt between the trowel blade and the surface for each successive troweling. Permit the concrete to harden slightly between successive trowelings.

3. Restore edging or jointing removed by floating. Maintain joint uniformity and line.

a. Power floats shall be heavy, revolving disk type power compacting machines capable of providing a 200 lb compaction force distributed over a 24-in diameter disk.

b. Troweling machines equipped with float (shoe) blades that are slipped over the trowel blades may be used for floating. However, floating with a troweling machine equipped with normal trowel blades will not be permitted. The use of any floating or troweling machine, which has a water attachment for wetting the concrete surface during finishing, will not be permitted.

c. In lieu of power floating, small areas may be hand floated. While the concrete is still green, but sufficiently hardened to support a finisher and kneeboards with no more than 1/4-in indentation, float the surface to a

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true, even plane with no coarse aggregate visible. Use sufficient pressure on the floats to bring moisture to the surface.

E. Light Broomed Finish

1. Steel trowel finish the concrete, as specified above but omit the final troweling and finish the surface by drawing a fine-hair broom lightly across the surface. Broom in the same direction and parallel to expansion joints, or in the case of inclined slabs, perpendicular to the slope, or except as directed otherwise.

F. Broomed Finish

1. Steel trowel finish the concrete, as specified above but omit the final troweling. While the concrete is still soft enough, finish the surface with a stiff coarse fiber broom to produce the pattern and depth of scoring as approved by the ENGINEER.

2. Before placing grout, clean surface of debris, dust, and loose concrete, and prepare as indicated in Section 03600.

G. Power Machine Finish

1. In lieu of hand steel trowel finishing, an approved power machine for finishing concrete floors and slabs may be used in accordance with the directions of the machine manufacturer and as approved by the ENGINEER. Do not use a power machine until the concrete has attained the necessary set to allow finishing without introducing high and low spots in the slab. Hand steel trowel the areas of slabs not accessible to power equipment. Provide a final steel troweling done by hand over all areas.

3.03 APPROVAL OF FINISHES

A. All concrete surfaces, when finished, will be inspected by the ENGINEER.

B. Refinish or rework unsatisfactory finishes until approved by the ENGINEER, at no additional cost to the Owner.

C. After finishing horizontal surfaces, regardless of the finishing procedure specified, the concrete shall be cured in compliance with Section 03300 unless otherwise directed by the ENGINEER.

3.04 SCHEDULE OF FINISHES

A. Concrete shall be finished as specified either to remain as natural concrete or to receive an additional applied finish or material under another Section.

B. Concrete for the following conditions shall be finished as noted on the Drawings. If not noted on the Drawings concrete shall be finished as follows:

1. Concrete to receive dampproofing or waterproofing: Rough-form finish.

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2. Concrete not exposed to view in the finished work, and not scheduled to receive an additional applied finish or material: Rough-form finish at vertical surfaces, consolidate and screed to grade at horizontal surfaces.

3. Exterior vertical concrete above grade exposed to view (and to 12-in below grade): Sacked finish.

4. Interior overhead and vertical concrete exposed to view except in water containment areas and except where scheduled to be painted: Sacked finish. See

5. Interior overhead and vertical concrete exposed to view and scheduled to be painted: Rough-form finish.

6. Vertical and overhead concrete in water containment areas: Sacked finish on surfaces exposed to view and extending to two feet below normal operating water level; rough-form finish on remainder of submerged areas.

7. Interior or exterior horizontal concrete exposed to view and not scheduled to receive an additional finish: steel-trowel finish.

8. Concrete for exterior walking surface and exterior stairs: Broomed finish perpendicular to direction of traffic.

9. Concrete for interior stairs: Light broomed finish, non-slip.

10. Concrete slabs on which process liquids flow or in contact with sludge: Steel trowel finish.

11. Concrete to receive an applied coating: Refer to manufacturer's written directions and on-site direction by manufacturer's representative.

12. Concrete tank bottoms to be covered with grout: Broomed finish. See Section 03600 for additional requirements.

END OF SECTION

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SECTION 03600

GROUT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Grout installation, and sampling and testing of materials and products by an independent testing laboratory acceptable to the ENGINEER but engaged by and at the expense of the CONTRACTOR.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.

2. Section 03200 – Concrete Reinforcement.

3. Section 03250 – Concrete Joints and Joint Accessories.

4. Section 03300 – Cast-in-Place Concrete.

5. Section 03922 – Modifications and Repair to Concrete.

6. Section 05500 – Metal Fabrications.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts and Monolithic Surfacings and Polymer Concretes

2. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts and Monolithic Surfacings and Polymer Concretes

3. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures

4. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

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1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:

1. Commercially manufactured nonshrink cementitous grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.

2. Commercially manufactured nonshrink epoxy grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.

3. Cement grout. The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures and the proposed mix of the grout.

4. Concrete grout. The submittal shall include data as required for concrete as delineated in Section 03300 and for fiber reinforcement as delineated in Section 03200. This includes the mix design, constituent quantities per cubic yard and the water/cement ratio.

B. Samples

1. Samples of commercially manufactured grout products when requested by the ENGINEER.

2. Aggregates for use in concrete grout when requested by the ENGINEER.

C. Laboratory Test Reports

1. Submit laboratory test data as required under Section 03300 for concrete to be used as concrete grout.

D. Qualifications

1. Submit documentation that manufacturers of commercially manufactured grout products have at least 10 years experience in the production and use of the proposed grouts which they will supply.

1.04 QUALITY ASSURANCE

A. Qualifications

1. Manufacturers of commercially manufactured grout products shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.

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2. The independent testing laboratory shall be a reputable laboratory, acceptable to the ENGINEER, having experience with testing procedures and associated equipment as required by this Section. Laboratories affiliated with the CONTRACTOR or in which the CONTRACTOR or its officers have a beneficial interest are not acceptable.

B. Pre-installation Conference

1. Well in advance of grouting, hold a pre-installation meeting to review the requirements for surface preparation, mixing, placing and curing procedures for each product proposed for use. Parties concerned with grouting shall be notified of the meeting at least 10 days prior to its scheduled date.

C. Services of Manufacturer's Representative

1. A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout. Additional services shall also be provided, as required, to correct installation problems.

D. Field Testing

1. All field testing and inspection services required will be provided by the OWNER. The CONTRACTOR shall assist in the sampling of materials and shall provide any ladders, platforms, etc, for access to the work. The methods of testing will comply with the applicable ASTM Standards.

2. The field testing of Concrete Grout will be as specified for concrete in Section 03300.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers and printed instructions.

B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.

C. Material which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the OWNER.

D. Nonshrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.

E. Nonshrink epoxy grouts shall be delivered as premeasured, prepackaged, three component systems requiring only blending as directed by the manufacturer.

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1.06 DEFINITIONS

A. Nonshrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base plate.

PART 2 - PRODUCTS

2.01 GENERAL

A. The use of a manufacturer's name and product or catalog number is for the purpose of establishing the standard of quality desired.

B. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

2.02 MATERIALS

A. Nonshrink Cementitious Grout

1. Nonshrink cementitious grouts shall conform to ASTM C1107. Grouts shall be portland cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents and require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.

a. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; Construction Grout by BASF Building Systems; NS Grout by The Euclid Chemical Co.; or equal.

b. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by BASF Building Systems; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; or equal.

B. Nonshrink Epoxy Grout

1. Nonshrink epoxy grout shall be pre-proportioned, prepackaged, three component, 100 percent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 10,000 psi in 7 days when tested in conformity with ASTM C579 and have a maximum thermal expansion of 30×10^{-6} when tested in conformity with ASTM C531. The grout shall be Masterflow 648 CP by BASF Building Systems; Sikadur 42 Grout-Pak by Sika Corp.; E^3-G by the Euclid Chemical Co. or equal.

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C. Cement Grout

1. Cement grouts shall be a mixture of one part portland cement conforming to ASTM C150, Types I, II, or III and 1 to 2 parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.

D. Concrete Grout

1. Concrete grout shall conform to the requirements of Section 03300 except as specified herein. It shall be proportioned with cement, coarse and fine aggregates, water, water reducer and air entraining agent to produce a mix having a nominal strength of 3000 psi at 28 days. Coarse aggregate size shall be 3/8-in maximum. Slump should not exceed 5-in.

2. Add synthetic reinforcing fibers as specified in Section 03200 to the concrete grout mix at the rate of 1.5 lbs of fibers per cubic yard of grout. Add fibers from the manufacturer's pre-measured bags and according to the manufacturer's recommendations to ensure complete dispersion of the fiber bundles as single monofilaments within the concrete grout

E. Water

1. Potable water, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

PART 3 - EXECUTION

3.01 PREPARATION

A. Placed grout where indicated or specified over cured concrete which has attained its specified design strength unless otherwise approved by the ENGINEER.

B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance and paints and free of all loose material or foreign matter which may affect the bond or performance of the grout.

C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to bond the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.

1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the airline to prevent oil from being blown onto the surface.

D. Remove all loose rust, oil or other deleterious substances which may affect the bond or performance of the grout from metal embedments or bottom of baseplates prior to the installation of the grout.

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E. Wash concrete surfaces clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the ENGINEER. Upon completion of the 24 hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the ENGINEER for each specific location of grout installation.

F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.

G. Provide forms for grout. Line or coat forms with release agents recommended by the grout manufacturer. Provide forms anchored in place and shored to resist the forces imposed by the grout and its placement.

1. Forms for all grout other than concrete grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.

H. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.

I. Support equipment during alignment and installation of grout by shims, wedges, blocks or other approved means. The shims, wedges and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the ENGINEER. Grout voids created by the removal of shims, wedges and blocks.

3.02 INSTALLATION - GENERAL

A. Mix, apply and cure products in strict compliance with the manufacturer's recommendations and this Section.

B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.

C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40 and 90 degrees F during grouting and for at least 24 hours thereafter or as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.

D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60 and 90 degrees F range.

E. Install grout in a manner which will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.

F. Reflect all existing underlying expansion, control and construction joints through the grout.

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3.03 INSTALLATION - CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel or admixtures without prior approval by the ENGINEER.

B. Do not mix by hand. Mix in a mortar mixer with moving blades. Pre-wet the mixer and empty excess water. Add premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.

C. Placements greater than 3-in in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.

D. Provide forms as specified in Paragraph 3.01G. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner which will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.

E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.

F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise approved by the ENGINEER. Finish this surface with a wood float (brush) finish.

G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

3.04 INSTALLATION - NONSHRINK EPOXY GROUTS

A. Mix in accordance with manufacturer’s recommendations. Mix full batches only, to maintain proper proportions of resin, hardener and aggregate. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not overmix. Do not entrain air bubbles by mixing too quickly.

B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90 degrees F.

C. Place grout rapidly and continuously to avoid cold joints. Place grout in lifts in accordance with manufacturer’s recommendations.

D. Provide forms as specified in Paragraph 3.01G. Place grout into the designated areas and prevent entrapment of air. Fill all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes and vent holes as necessary.

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E. Minimize "shoulder" length (extension of grout horizontally beyond base plate). In no case shall the shoulder length of the grout be greater than the grout thickness.

F. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.

G. Epoxy grouts are self curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placement, until grout compressive strength reaches 1000 psi or as recommended by the manufacturer, whichever is longer.

3.05 INSTALLATION - CONCRETE GROUT

A. Inspect slabs finished under Section 03350 and scheduled to receive concrete grout. Protect and keep the surface clean until placement of concrete grout.

B. Remove the debris and clean the surface by sweeping and vacuuming of all dirt and other foreign materials. Pressure wash the surface. Do not flushing of debris into drain lines.

C. Saturate the concrete surface for at least 24 hours prior to placement of the concrete grout by use of saturated burlap bags, soaker hoses, or ponding. Remove excess water just prior to placement of the concrete grout. Place a cement slurry immediately ahead of the concrete grout so that the slurry is moist when the grout is placed. Work the slurry over the surface with a broom until it is coated with approximately 1/16 to 1/8-in thick cement paste.

D. Steel trowel finish as specified in Section 03350. Cure the concrete grout as specified for cast-in-place concrete in Section 03300.

3.06 GROUT SCHEDULE

A. The following list indicates where the particular types of grout are to be used:

1. General purpose nonshrink cementitious grout: Use at all locations where nonshrink grout is indicated on the Drawings except for base plates greater in area than 3-ft wide by 3-ft long and except for the setting of anchor rods, anchor bolts or reinforcing steel in concrete.

2. Flowable nonshrink cementitious grout: Use under all base plates greater in area than 3-ft by 3-ft. Use at all locations indicated to receive flowable nonshrink grout by the Drawings. The CONTRACTOR, at his/her option and convenience, may also substitute flowable nonshrink grout for general purpose nonshrink cementitious grout. Provide confinement for nonshrink grout as required by the manufacturer.

3. Nonshrink epoxy grout: Use at all locations specifically indicated to receive epoxy grout. Provide confinement for nonshrink grout as required by the manufacturer.

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4. Cement grout: Use where indicated on the Drawings.

5. Concrete grout: Use for overlaying the base concrete as indicated on the Drawings.

END OF SECTION

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SECTION 03922

CONCRETE REPAIR

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Cutting, removing, repairing or otherwise modifying parts of existing concrete structures or appurtenances as shown on the Drawings and as specified herein. Work under this Section shall also include bonding new concrete to existing concrete.

B. In general, work under this Section will be performed as a remedy for improperly placed or poorly placed concrete. Such work shall be performed only after receiving written directions from the ENGINEER. Remedies for improperly placed or poorly placed concrete shall be performed at no additional cost to the OWNER.

C. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.

2. Section 03200 – Concrete Reinforcement.

3. Section 03250 – Concrete Joints and Joint Accessories.

4. Section 03300 – Cast-in-Place Concrete.

5. Section 03600 – Grout.

6. Section 05500 – Metal Fabrications.

1.02 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

2. ASTM C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Sheer.

3. ASTM C883 - Standard Test Method for Effective Shrinkage of Epoxy-Resin Systems Used with Concrete.

4. ASTM D570 - Standard Test Method for Water Absorption of Plastics.

5. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.

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6. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics.

7. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool.

8. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

B. International Concrete Repair Institute (ICRI):

1. ICRI Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Submit manufacturer's technical literature on all product brands proposed for use, to the ENGINEER for review. The submittal shall include the manufacturer's installation and/or application instructions.

B. When substitutions for acceptable brands of materials specified herein are proposed, submit brochures and technical data of the proposed substitutions to the ENGINEER for approval before delivery to the project.

1.04 QUALITY ASSURANCE

A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the ENGINEER.

B. When removing materials or portions of existing structures and when making openings in existing structures, all precautions shall be taken and all necessary barriers, shoring and bracing and other protective devices shall be erected to prevent damage to the structures beyond the limits necessary for the new work, protect personnel, control dust and to prevent damage to the structures or contents by falling or flying debris. Unless otherwise permitted, shown or specified, line drilling will be required in cutting existing concrete.

C. Manufacturer Qualifications: The manufacturer of the specified products shall have a minimum of 10 years experience in the manufacture of such products and shall have an ongoing program of training, certifying and technically supporting the CONTRACTOR's personnel.

D. Contractor Qualifications: Contractors shall complete a program of instruction in the application of the approved manufacturer's material specified in this Section and provide certification from the manufacturer attesting to their training and status as an approved applicator.

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E. Furnish a notarized certificate stating that the materials specified meet the requirements and have the manufacturer's current printed literature on the specified product.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver the specified products in original, unopened containers with the manufacturer's name, labels, product identification and batch numbers.

B. Store and condition the specified product as recommended by the manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. Materials shall comply with this Section and any state or local regulations.

B. Epoxy Bonding Agent

1. General

a. The epoxy bonding agent shall be a two-component, solvent-free, asbestos-free moisture insensitive epoxy resin material used to bond plastic concrete to hardened concrete complying with the requirements of ASTM C881, Type II and the additional requirements specified herein.

2. Material

a. Properties of the cured material:

1) Compressive Strength (ASTM D695): 8500 psi minimum at 28 days.

2) Tensile Strength (ASTM D638): 4000 psi minimum at 14 days.

3) Flexural Strength (ASTM D790 - Modulus of Rupture): 6,300 psi minimum at 14 days.

4) Shear Strength (ASTM D732): 5000 psi minimum at 14 days.

5) Water Absorption (ASTM D570 - 2 hour boil): One percent maximum at 14 days.

6) Bond Strength (ASTM C882) Hardened to Plastic: 1500 psi minimum at 14 days moist cure.

7) Effective Shrinkage (ASTM C883): Passes Test.

8) Color: Gray.

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3. Product shall be Sikadur 32, Hi-Mod by Sika Corporation, Lyndhurst, NJ; -; Concresive Liquid (LPL) by BASF, Shakopee, MN; or equal.

C. Epoxy Paste

1. General

a. Epoxy Paste shall be a two-component, solvent-free, asbestos free, moisture insensitive epoxy resin material used to bond dissimilar materials to concrete such as setting railing posts, dowels, anchor bolts and all-threads into hardened concrete and shall comply with the requirements of ASTM C881, Type I, Grade 3 and the additional requirements specified herein. It may also be used to patch existing surfaces where the glue line is 1/8-in or less.

2. Material

a. Properties of the cured material:

1) Compressive Properties (ASTM D695): 10,000 psi minimum at 28 days.

2) Tensile Strength (ASTM D638): 3,000 psi minimum at 14 days. Elongation at Break - 0.3 percent minimum.

3) Flexural Strength (ASTM D790 - Modulus of Rupture): 3,700 psi minimum at 14 days.

4) Shear Strength (ASTM D732): 2,800 psi minimum at 14 days.

5) Water Absorption (ASTM D570): 1.0 percent maximum at 7 days.

6) Bond Strength (ASTM C882): 2,000 psi at 14 days moist cure.

7) Color: Concrete gray.

3. Product shall be:

a. Overhead applications: Sikadur Hi-mod LV 31 by Sika Corporation, Lyndhurst, NJ; or equal.

b. Other applications; Sikadur Hi-mod LV 32 by Sika Corporation, Lyndhurst, NJ; or equal.

D. Non-Shrink Precision Cement Grout, Non-Shrink Cement Grout, Non-Shrink Epoxy Grout and Polymer Modified mortar are included in Section 03600.

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E. Cement Crack Repair Compound

1. Cement crack repair compound shall be a non-shrink, high-bond-strength, hydraulic cement crystalline waterproofing compound for concrete patching and repair. It shall have a minimum compressive strength of 2,100 psi at 24 hours and 4,500 psi at 28 days.

F. Cementitious Repair Mortar

1. For shallow repairs of vertical or overhead surfaces, cementitious repair mortar shall be a two-component, polymer-modified, Portland cement, fast-setting, non-sag mortar. It shall contain a penetrating corrosion inhibitor. Repair mortar shall be Sikatop 123 PLUS by Sika Corp., Lyndhurst, NJ, or approved equal.

2. For deeper repairs of horizontal, vertical or overhead concrete surfaces, cementitious repair mortar shall be a two-component, polymer-modified, Portland cement, fast-setting, screed mortar. It shall contain a penetrating corrosion inhibitor. The repair mortar may be extended with 3/8-in coarse aggregate in accordance with manufacturer's recommendations, and may be used in a form and pour application. Repair mortar shall be Sikatop 111 PLUS by Sika Corp., Lyndhurst, NJ, or approved equal.

PART 3 EXECUTION

3.01 GENERAL

A. Modify and/or repair concrete as specified herein, or necessary to permit completion of the Work, and as directed by the ENGINEER. Finishes, joints, reinforcements, sealants, etc., are specified in respective Sections. All work shall comply with other requirements of this of Section and as shown on the Drawings.

B. All commercial products specified in this Section shall be stored, mixed and applied in strict compliance with the manufacturer's recommendations.

C. In all cases where concrete is repaired in the vicinity of an expansion joint or control joint the repairs shall be made to preserve the isolation between components on either side of the joint.

D. When drilling holes for dowels/bolts at new or existing concrete, drilling shall stop if rebar is encountered. As approved by the ENGINEER, the hole location shall be relocated to avoid rebar. Rebar shall not be cut without prior approval by the ENGINEER. Where possible, rebar locations shall be identified prior to drilling using "rebar locators" so that drilled hole locations may be adjusted to avoid rebar interference.

3.02 CONCRETE REMOVAL

A. Concrete designated to be removed to specific limits as shown on the Drawings or directed by the ENGINEER, shall be done by line drilling at limits followed by chipping or jack-hammering as appropriate in areas where concrete is to be taken out. Remove

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concrete in such a manner that surrounding concrete or existing reinforcing to be left in place and existing in place equipment is not damaged. Sawcutting at limits of concrete to be removed shall only be done if indicated on the Drawings, or after obtaining written approval from the ENGINEER. When sawcutting is performed, do not overcut corners.

B. Where existing reinforcing is exposed due to saw cutting/core drilling and no new material is to be placed on the sawcut surface, a coating or surface treatment of epoxy paste shall be applied to the entire cut surface to a thickness of 1/4-in.

C. In all cases where the joint between new concrete or grout and existing concrete will be exposed in the finished work, except as otherwise shown or specified, the edge of concrete removal shall be a 1-in deep saw cut on each exposed surface of the existing concrete.

D. Concrete specified to be left in place which is damaged shall be repaired by approved means to the satisfaction of the ENGINEER.

E. The ENGINEER may from time to time direct the CONTRACTOR to make additional repairs to existing concrete. These repairs shall be made as specified or by such other methods as may be appropriate.

3.03 CONNECTION SURFACE PREPARATION

A. Connection surfaces shall be prepared as specified below for concrete areas requiring patching, repairs or modifications as shown on the Drawings, specified herein, or as directed by the ENGINEER.

B. Remove all deteriorated materials, dirt, oil, grease, and all other bond inhibiting materials from the surface by dry mechanical means, i.e. - sandblasting, grinding, etc, as approved by the ENGINEER. Be sure the areas are not less than 1/2-in in depth. Irregular voids or surface stones need not be removed if they are sound, free of laitance, and firmly embedded into parent concrete, subject to the ENGINEER's final inspection. Surfaces that will be in contact with freshly placed concrete shall be roughened to minimum Concrete Surface Profile (CSP) 9 per ICRI Guideline 03732 with minimum 1/4-in amplitude.

C. If reinforcing steel is exposed, it must be mechanically cleaned to remove all contaminants, rust, etc, as approved by the ENGINEER. If half of the diameter of the reinforcing steel is exposed, chip out behind the steel. The distance chipped behind the steel shall be a minimum of 1/2-in. Reinforcing to be saved shall not be damaged during the demolition operation.

D. Reinforcing from existing demolished concrete which is shown to be incorporated in new concrete shall be cleaned by mechanical means to remove all loose material and products of corrosion before proceeding with the repair. It shall be cut, bent or lapped to new reinforcing as shown on the Drawings and provided with 1-in minimum cover all around.

E. The following are specific concrete surface preparation "methods" to be used where called for on the Drawings, specified herein or as directed by the ENGINEER.

1. Method A: After the existing concrete surface at connection has been roughened and cleaned, thoroughly saturate and maintain saturation for a period of at least 12

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hours. Brush on a 1/16-in layer of cement and water mixed to the consistency of a heavy paste. Immediately after application of cement paste, place new concrete or grout mixture as detailed on the Drawings.

2. Method B: After the existing concrete surface has been roughened and cleaned, apply epoxy bonding agent at connection surface. The field preparation and application of the epoxy bonding agent shall comply strictly with the manufacturer's recommendations. Place new concrete or grout mixture to limits shown on the Drawings within time constraints recommended by the manufacturer to ensure bond.

3. Method C: Install adhesive anchors or dowels strictly comply with the manufacturer’s recommendations.

4. Method D: Combination of Method B and C.

3.04 GROUTING

A. Grouting shall be as specified in Section 03600.

3.05 CRACK REPAIR

A. All concrete cracks in non-liquid-containing structures greater than 0.020-in in width shall be repaired as directed by the ENGINEER.

B. All concrete cracks in liquid-containing structures greater than 0.010-in in width shall be repaired in the following manner:

1. Rout out crack by chiseling or chipping a square groove 1-in wide by a minimum depth of 1-in (do not use a vee-notch). Flush away loose materials and dirt from the cavity with water and stiff brush.

2. Mix cement repair compound in accordance with the manufacturer’s recommendations.

3. Form cement plug with gloved hand, pressing firmly into groove until plug is hardened.

C. Should cracks in liquid-containing structures leak following cement-repair-compound repair, the cracks shall be repaired by pressure injecting crack sealant through valves sealed to surface with crack repair epoxy adhesive per manufacturer’s recommendations. “Leaking” shall be defined as water flowing or seeping from the structure, or if moisture can be transferred from the exterior surface to a dry hand.

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3.06 HONEYCOMBING / ROCK POCKETS

A. Defective and honeycombed areas as determined by the ENGINEER shall be repaired.

1. Chip down square and at least 1-in deep to sound concrete with hand chisels or pneumatic chipping hammers. If honeycomb exists around reinforcement, chip to provide a clear space at least 3/8-in wide all around the steel.

2. Roughen surface to minimum Concrete Surface Profile (CSP) 9 per ICRI Guideline 03732 with minimum 1/4-in amplitude.

3. Thoroughly clean the surface of loose or weakened materials by waterblasting (preferable) or sandblasting.

4. 12 hours before and again immediately prior to the concrete or mortar being deposited, saturate the joints and adjacent concrete surfaces to at least 12-in past the joint with water.

5. Pack the void with either 4,000 psi concrete using ½-in maximum rock size, SikaTop 123 PLUS (or approved equal), or SikaTop 111 PLUS (or approved equal) extended with aggregate as allowed per the Manufacturer's recommendations.

6. A form and pour application using a bird's mouth may be used pending written approval by the ENGINEER. Submit repair method for approval.

END OF SECTION

Division 5 Metals

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SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Anchors, bolts, and fastening devices.
2. Prefabricated access hatches.
3. Miscellaneous steel.
4. Miscellaneous stainless steel.
5. Miscellaneous aluminum.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03250 – Concrete Joints and Joint Accessories.
2. Section 03300 – Cast-in-Place Concrete.
3. Section 04220 – Concrete Masonry Units and Masonry Assemblies.
4. Section 09902 – Painting.
5. Section 10200 – Louvers and Vents.

1.02 REFERENCES

A. Aluminum Association (AA):

1. ASD-1 Aluminum Standards and Data.
2. Specifications for Aluminum Structures.

B. American Institute of Steel Construction (AISC):

1. Steel Construction Manual – 13th Edition.

C. American Society for Testing and Materials (ASTM):

1. ASTM A36 - Standard Specification for Carbon Structural Steel.

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2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

3. ASTM A108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality.

4. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

5. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

6. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

7. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

8. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.

9. ASTM A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

10. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 Psi Tensile Strength.

11. ASTM A312 – Specification for Seamless and Welded Austenitic Stainless Steel Pipe.

12. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

13. ASTM A366 - Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.

14. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

15. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.

16. ASTM A992 – Standard Specification for Structural Steel Shapes.

17. ASTM F436 - Standard Specification for Hardened Steel Washers.

18. ASTM F594 - Standard Specification for Stainless Steel Nuts.

19. ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

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D. American National Standards Institute (ANSI):

1. ANSI B18.22.1 - Plain Washers.

E. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code – Steel.

2. AWS D1.2 - Structural Welding Code – Aluminum.

3. AWS D1.6 - Structural Welding Code - Stainless Steel.

4. AWS A2.0 - Standard Welding Symbols.

F. Society for Protective Coatings (SSPC):

1. SSPC SP-1 - Surface Preparation Specification No. 1 Solvent Cleaning.

2. SSPC SP-2 - Surface Preparation Specification No. 2 Hand Tool Cleaning.

3. SSPC SP-3 - Surface Preparation Specification No. 3 Power Tool Cleaning.

4. SSPC SP-6 - Surface Preparation Specification No. 6 Commercial Blast Cleaning.

5. SSPC SP-10 - Surface Preparation Specification No. 10 Near-White Blast Cleaning.

1.03 SUBMITTALS

A. Prior to fabrication, submit to the ENGINEER, in accordance with Section 01300, shop drawings, erection or setting drawings, product data, etc, showing methods of assembly, anchorage and connection to other members. Indicate welded connections in accordance with AWS A2.0. Shop drawings are required for all items included under this Section.

B. Submit samples as requested by the ENGINEER during the course of construction.

1.04 QUALITY ASSURANCE

A. Coordinate completely the work of this Section with the work of other Sections. Verify at the site both the dimensions and work of other trades adjoining items of work before fabrication and installation of the items specified.

B. Furnish to the pertinent trades all items that are to be built into the work of other Sections.

C. Field welding shall be done by certified welders and shall be in accordance with the appropriate AWS Specification.

1. Qualify welders in accordance with the appropriate AWS for each process, position, and joint configuration.

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2. WPS's for each joint type shall indicate proper AWS qualification and be available where welding is performed.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.

B. Delivery anchorage devices with setting drawings, templates and instructions for installation.

C. Store delivered items off the ground and protected from dirt and weather.

D. Repair items which have become damaged or corroded to the satisfaction of the ENGINEER prior to incorporating them into the work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel

1. Structural steel wide flange shapes: ASTM A992.

2. Other structural steel shapes, plates, bars and rods: ASTM A36.

3. Steel sheets: ASTM A366.

4. Welded and seamless steel pipe: ASTM A53, Type S, Grade B Schedule 40. Use standard malleable iron fittings, galvanized for exterior work.

5. Welded and seamless rectangular steel tubing: ASTM A500, Grade B.

6. Cast-in anchor bolts: ASTM F1554, Grade 36.

7. High strength bolts, nuts and washers for structural steel:

a. Elevated temperature exposures: ASTM A325, Type I.

b. General application: ASTM A325, Type I or II.

8. Headed Anchor Studs: Nelson Type H4L or S3L by Nelson Stud Welding Company or equal.

9. Welding Materials: AWS D1.1 with a minimum strength of 70 ksi.

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10. Galvanizing:

    a. General: ASTM A123.

    b. Hardware: ASTM A153.

    c. Assembled steel products: ASTM A123.

11. Shop and Touch-up Primer: SSPC Paint 15 Type I red oxide.

B. Stainless Steel

1. Plates, bars and structural shapes:

    a. Exterior, submerged or industrial use: ASTM A167, Type 316.

    b. Interior and architectural use: ASTM A167, Type 304.

2. Pipes: ASTM A312.

3. Bolts, nuts and washers ASTM: A276, Type 316 or Type 304.

C. Aluminum Framing

1. Aluminum structural shapes and plates: Alloy 6061-T6.

2. Extruded aluminum pipe: Alloy 6063-T6.

3. Stainless steel fasteners: ASTM A276, Type 316 or Type 304.

2.02 ANCHORS, BOLTS AND FASTENING DEVICES

A. Furnish anchors, bolts, fasteners, etc., as necessary for installation of the work or for securing the work of other Sections to in-place construction.

B. Unless otherwise noted, bolts for the connection of carbon steel or iron shall be steel machine bolts; bolts for the connection of galvanized steel or iron shall be galvanized steel or stainless steel machine bolts; and bolts for the connection of aluminum or stainless steel shall be stainless steel machine bolts. Attach aluminum or stainless steel to concrete or masonry by means of stainless steel anchors.

C. Bolt heads and nuts shall be hex type unless noted otherwise.

D. Cast-in anchors shall conform to the requirements of ASTM F1554, Grade 36 unless otherwise noted.

E. For structural purposes, unless otherwise noted, post-installed anchors shall be adhesive type or expansion type anchor bolts. Post-installed anchors shall have current ICC Evaluation Service Reports.

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1. Adhesive anchors and dowels shall be a two-part stud and cartridge resin anchoring system. Stud assembly spacing and minimum embedment shall be as shown on the Drawings. The assembly shall include all-thread anchor rod with nut and washer, or deformed reinforcing steel complying with the requirements of Section 03200. Provide manufacturer's recommended drive units and adaptors for installing studs. Install anchors in full compliance with the manufacturer's recommendations. Adhesive anchors for use in concrete shall be Simpson SET-XP Epoxy Adhesive Anchors by Simpson Strong-Tie Company, Inc., Pleasanton, CA; Powers PE1000+ Epoxy Adhesive Anchor System by Powers Fasteners, Inc., Brewster, NY, or approved equal. Adhesive anchors for use in grouted masonry shall be Simpson SET Adhesive Anchor Systems by Simpson Strong-Tie Company, Inc., or approved equal.

2. Expansion anchors shall be drilled-in wedge type anchors of the sizes noted on the Drawings complete with nuts and washers. Unless otherwise noted, provide zinc plated carbon steel anchors. Stainless steel anchors, where required shall be all AISI Type 316 construction. When the length or embedment of the bolt is not noted on the Drawings, provide length sufficient to place the wedge and expansion sleeve portion of the bolt at least one inch behind the reinforcing steel within the concrete. Install anchors in full compliance behind the reinforcing steel within the concrete. Expansion anchors for use in concrete shall be Redhead Trubolt + Wedge Anchor by ITW Red Head, Addison, Illinois; or approved equal. Expansion anchors shall not be used for anchorage into masonry.

3. Headed anchor studs shall be flux ended, welded to plates or other embeds as shown on the Drawings. Studs shall be made from cold drawn steel Grades C-1010 through C-1020 per ASTM A108 and shall be welded per the manufacturer's recommendations. Headed anchor studs shall be Nelson Stud Welding Company, Loraine, OH - Type H4L or S3L, or equal.

2.03 PREFABRICATED ACCESS HATCHES

A. Prefabricated access hatches shall be a flush type mounted on a concrete slab with single or double leaf doors as indicated on the drawings.

B. Hatch door shall be a 1/4"-in minimum Type 316 stainless steel checkered plate with welded stiffeners as necessary. Hatches shall have a 1/4-in stainless steel channel frame with a perimeter anchor flange or strap anchors for concrete embedment around the perimeter. Hardware shall be Type 316 stainless steel.

C. Hatches shall be watertight and shall have a 1-1/2-in drainage coupling connect to the channel frame.

D. The door shall be designed to withstand H-20 wheel load.

E. Door shall open to 90 degrees and shall have a spring operator with automatic hold-open arm with release handle.

F. Provide a recessed hasp for a padlock that is covered by a hinged lid flush with the surface.

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G. Access hatches shall be Type J or Type JD stainless steel hatches by Bilco Company, New Haven, CT, or equal.

2.04 FABRICATION

A. Form all miscellaneous metal work true to detail, with clean, straight, sharply defined profiles, and smooth surfaces of uniform color and texture. Provide fabrications free from defects impairing strength or durability. Drill or punch holes and smooth edges. Ease exposed edges to a small, uniform radius. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.

B. Supply components required for anchorage of fabrications. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connections to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.

C. Welded joints shall be rigid and continuously welded or spot welded as specified or shown. Dress the face of welds flush and smooth. Continuously weld and grind smooth welds that will be exposed. Exposed joints shall be close fitting and jointed where least conspicuous. Conceal fastenings where practical. Punch or drill for temporary field connections and for attachment of the work of other trades.

D. Welding of parts shall be in compliance with the latest edition of the AWS structural welding code for steel (D1.1); aluminum (D1.2) or stainless steel (D1.6) as appropriate, and shall only be done where shown, specified, or permitted by the ENGINEER. Welding shall be performed only by welders certified to perform the required welding in compliance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.

E. Castings shall be of good quality, strong, tough, even-grained, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Thoroughly clean castings. Castings may be subjected to a hammer inspection in the field by the ENGINEER. All finished surfaces shown on the Drawings and/or specified herein shall be machined to a true plan surface allowing pieces to seat at all points without rocking. Make allowances in the patterns so that thicknesses specified or shown will not be reduced in obtaining finished surfaces. Castings will not be acceptable if the actual weight is less than 95 percent of the theoretical weight computed from the dimensions shown. Provide facilities for weighing castings in the presence of the ENGINEER and show true weights, certified by the supplier.

F. Shop painting will not be required for galvanized metal, stainless steel, aluminum, copper, brass and bronze unless specifically specified.

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G. Thoroughly clean steel fabrications of all loose mill scale, rust, grease or oil, moisture, dirt, or other foreign matter.

1. Remove scale, rust and other deleterious materials before shop coat of paint is applied.

2. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2, SSPC SP-3 or SSPC SP-6.

3. Remove oil, grease and similar contaminants in accordance with SSPC SP-1.

H. Fabricate miscellaneous aluminum shapes and plates as shown. Furnish welded and mitered angle frames and other fabrications complete with welded anchors attached. Structural shapes and extruded items shall comply with the dimensions on the Drawings within the tolerances published by the Aluminum Association. Weld aluminum work on the unexposed side when possible in order to prevent pitting or discoloration of exposed aluminum surfaces.

2.05 FINISHES

A. Steel

1. Items in areas which are not exposed to weather or moisture, shall have exposed surfaces painted with a shop coat of primer compatible with the finish coatings specified in Section 09902, after fabrication but before shipping. Apply two shop coats of primer to surfaces that will be inaccessible after erection.

a. Remove scale, rust and other deleterious material before shop coat of paint is applied. Clean off heavy rust and loose mill scale in accordance with SSPC-2, SSPC-3 or SSPC-6. Remove oil, grease and similar contaminants in accordance with SSPC SP-1.

b. Immediately after surface preparation, brush or spray on metal primer paint, applied in accordance with manufacturer's instructions and at rate to provide a uniform dry film thickness of 3.0 mils per coat applied. Use painting methods which will result in full coverage of joints, corner, edges and all exposed surfaces.

c. As soon as possible after erection, touch up any scraped, abraded or unpainted surfaces using primer as specified for shop coats.

2. Items exposed to weather, submerged in water or subject to splashing, or located in corrosive environments shall be hot dip galvanized after fabrication unless otherwise noted on the Drawings or specified.

a. Following all manufacturing operations, items to be galvanized shall be thoroughly cleaned, pickled, fluxed and completely immersed in a bath of molten zinc. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten

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zinc and allowing them to remain in the batch until their temperature becomes the same as the bath. Coating shall be not less than 2 oz/sq ft of surface.

b. Where field welding of galvanized material is necessary, welds shall be wire brushed clean and immediately regalvanized in the field using galvanizing compound or coating. Materials shall comply with local regulations controlling use of volatile organic compounds.

B. Stainless Steel

1. Mill Finish

C. Aluminum

1. All exposed aluminum surfaces shall have fabricator's standard mill finish unless otherwise specified.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Install all items finished except items to be embedded in concrete which shall be installed under Division 3.

B. Items to be attached to concrete after such work is completed shall be installed in compliance with the details shown. Furnish to appropriate trades all anchors, sockets, or fastenings required for securing work to other construction.

C. Set metal work level, true to line and plumb as indicated.

D. Weld field connections and grind smooth where practicable. Clean and strip primed, steel items to bare metal where site welding is required. Conceal fastenings where practicable.

1. Weld only in accordance with approved WPS's which are to be available to welders and inspectors during the production process.

E. Secure metal to wood with lag screws or bolts, of adequate size, with appropriate washers and nuts.

F. Touch-up abrasions to finish or primer coatings immediately after erection and prior to both final coating and final acceptance.

G. Break contact between dissimilar metals as shown on the Drawings or as specified in Paragraph 3.01H below.

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H. Field-apply coatings for installation of metal fabrications according to the following schedule. (For embedded items, coat the embed.)

1. All steel surfaces in contact with exposed concrete shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in compliance with the manufacturer's instructions prior to installation.

2. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal.

3. Where aluminum contacts concrete, apply a heavy coat of alkali resistant bituminous paint to the surface of the aluminum.

4. Where aluminum contacts wood, apply two coats of aluminum metal and masonry paint to the wood.

3.02 FIELD QUALITY CONTROL - INSPECTION

A. Notify the ENGINEER in writing 4 working days in advance of high strength bolting or field welding operations.

B. High strength bolting will be inspected visually. All high strength bolts shall have the turned portion marked with reference to the steel being connected after the nut has been made snug and prior to final tightening. Retighten rejected bolts or remove and provide new bolts. In cases of disputed bolt installations, the bolts in question shall be checked using a calibrated wrench certified by an independent testing laboratory approved by the ENGINEER. The certification shall be at no additional cost to the OWNER.

C. Field welding will be inspected visually and by non-destructive testing by AWS certified welding inspectors provided by an Independent Testing Agency. This work will be paid for by the OWNER. Testing procedures will include ultrasonic testing. CONTRACTOR shall comply with all requests of inspectors to correct deficiencies.

D. The fact that steel work has been accepted at the shop and mill will not prevent its final rejection at the site, before or after erection, if it is found to be defective.

E. Remove rejected steel work from the site within 10 working days after notification of rejection.

END OF SECTION

Division 9 Finishes

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SECTION 09901

SURFACE PREPARATION AND SHOP PRIME PAINTING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required for the surface preparation and application of shop primers on ferrous metals, excluding stainless steels, as specified herein.

1.02 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings, manufacturer's specifications and data on the proposed primers and detailed surface preparation, application procedures and dry mil thicknesses.

B. Submit representative physical samples of the proposed primers, if required by the ENGINEER.

1.03 REFERENCE STANDARDS

A. The Society for Protective Coatings (SSPC)

1. SSPC-SP 6/NACE No. 3 - Joint Surface Preparation Standard SSPC-SP 6/NACE No. 3: Commercial Blast Cleaning

2. SSPC-SP 10/NACE No. 2 - Joint Surface Preparation Standard SSPC-SP 10/NACE No. 2: Near-White Blast Cleaning.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

PART 2 PRODUCTS

2.01 MATERIALS

A. Non-Submerged Surfaces: Shop primer for ferrous metals which will not be in contact with water, not submerged and not subject to splash action shall be shop primed with the following:

1. Shop Prime Coat: (Zinc Micaceous Iron Oxide Polyurethane Aromatic Shop Primer)

a. TNEMEC: Series 1 Omnithane

b. Carboline: Carboguard 561

c. Sherwin-Williams Company (The): Corothane I Zinc Primer 1K Mio-Zinc.

d. PPG PMC Durathane MCZ 97-679 Series or PPG PMC Amercoat 68HS

e. Or equal.

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B. Submerged Surfaces - Shop primer for ferrous metals which will be in contact with water, either submerged or which are subject to splash action or which are specified to be considered submerged service shall be shop primed with the following

1. Shop Prime Coat for Ductile Iron Pipe: (Epoxy, Polyamidoamine Shop Primer)

a. TNEMEC: Series N140 Pota-Pox-Plus

b. Carboline: Carboguard 561

c. Sherwin-Williams Company (The): Macropoxy 846 NSF Winter Grade Epoxy Mill White

d. PPG PMC Aquapon HB Potable Water Epoxy Coating 95-132 Series or PPG PMC Amerlock 2 Epoxy.

e. Or equal.

2. Shop Prime Coat for Ferrous Metal Surfaces: (Zinc Micaceous Iron Oxide Polyurethane Aromatic Shop Primer)

a. TNEMEC: Series 1 Omnithane

b. Carboline: Carboguard 561

c. Sherwin-Williams Company (The): Corothane I Zinc Primer 1K Mio-Zinc.

d. PPG PMC Durathane MCZ 97-679 Series

e. Or equal.

C. Non-Primed Surfaces - Gears, bearings surfaces and other similar surfaces obviously not to be painted shall be given a heavy shop coat of grease or other suitable rust-resistant coating. This coating shall be maintained as necessary to prevent corrosion during all periods of storage and erection and shall be satisfactory to the ENGINEER up to the time of the final acceptance test.

D. Compatibility of Coating Systems - Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with their corresponding primers and finish coats specified in Section 09902 for use in the field and which are recommended for use together.

PART 3 EXECUTION

3.01 APPLICATION

A. Surface Preparation and Priming

1. Non-submerged components scheduled for priming, as defined above, shall be blast cleaned in accordance with SSPC-SP 6/NACE No. 3, immediately prior to priming. Submerged components scheduled for priming, as defined above, shall be blast cleaned in accordance with SSPC-SP 10/NACE No. 2 , immediately prior to priming. Consult manufacturer regarding required surface profiles.

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2. Surfaces shall be dry and free of dust, oil, grease and other foreign material before priming.

3. Shop prime in accordance with approved manufacturer's recommendations.

B. Non-Primed Surfaces

1. Apply approved coating per manufacturer's recommendations.

3.02 FABRICATED ITEMS

A. All items to be shop primed shall be blast cleaned as specified for applicable service prior to priming. If, in the opinion of the ENGINEER, any prime coating that has been improperly applied or if material contrary to this Section has been used, that coating shall be removed by abrasive blasting to white metal and reprimed in accordance with this Section.

B. All shop prime coats shall be of the correct materials and applied in accordance with this Section. Remove any prime coats not in accordance with this Section by blast cleaning and apply the specified prime coat at no additional cost to the OWNER.

C. Shop primed surfaces shall be cleaned thoroughly and damaged or bare spots prepared as approved and retouched with the specified primer before the application of successive paint coats in the field.

D. Shop finish coats, if proposed and allowed, shall be equal in appearance and protection quality to a field applied finish coat. If, in the opinion of the ENGINEER, a shop finish coat system does not give the appearance and protection quality of other work of similar nature, prepare the surfaces and apply the coat or coats of paint as directed by the ENGINEER to accomplish the desired appearance and protection quality. Submit to the ENGINEER substantial evidence that the standard finish is compatible with the specified finish coat.

E. Properly protect the shop prime and finish coats against damage from weather or any other cause.

F. Wherever fabricated equipment is required to be blast cleaned, protect all motors, drives, bearings, gears, etc, from the entry of grit. Equipment found to contain grit shall be promptly and thoroughly cleaned.

END OF SECTION

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SECTION 09902

PAINTING

PART 1 GENERAL

1.01 WORK INCLUDED

Work includes, but is not necessarily limited to:

A. Interior and Exterior protective clear coating of Concrete Block Masonry

B. Exterior and interior unfinished louvers and vents

C. All doors and frames

D. Concrete floor sealer

E. Interior gypsum drywall ceilings

F. Exposed glue-lams, rafters, and framing elements

G. Interior wall finishes including but not limited to: Concrete Block, gypsum board, exposed wood framing elements and trim.

H. Exposed wood trim,

I. Exposed piping

J. All other exterior and interior attachments and accessories adjacent to painted surfaces

1.02 RELATED WORK DESCRIBED ELSEWHERE

A.	Section 03	Cast-in-Place Concrete
B.	Section 04	Concrete Block Masonry
C.	Section 05	Miscellaneous Metals and Fabrications
D.	Section 06	Rough Carpentry
E.	Section 06	Finish Carpentry
F.	Section 07	Sheet Metal Flashing and Trim
G.	Section 07	Joint Sealers and Caulking
H.	Section 08	Standard Steel Doors and Frames

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I. Section 08 Finish Hardware

J. Section 09 Gypsum Drywall

K. Section 10 Fire Extinguishers and Cabinets

L. Division 15 Plumbing and Mechanical

M. Division 16 Electrical

1.03 QUALITY ASSURANCE

A. Manufacturer – As approved by Architect. Colors selected are from a single manufacturer.

B. Installer – Work to be performed only by workers thoroughly skilled and specially trained in the techniques of painting, and who are completely familiar with the published recommendations of the manufacturer of the paint material being used.

C. Single-Source Responsibility – Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

1.04 REFERENCES

In addition to complying with all pertinent codes and regulations:

A. Woodworking Institute of California (WIC).

B. Specification manual of selected manufacturer

C. Air Pollution Control District regulations and federal lead content laws.

D. VOC Compliance regulations

1.05 SUBMITTALS

A. Product Data – Submit material specifications, manufacturer's installation, and maintenance instructions under provisions of Section 01300.

B. Samples under provisions of Section 01300 to include:

1. Two (2) 8" x 8" brush-outs of each color and finish specified.

C. Sample of quality control log

1.06 PRODUCT HANDLING

A. Protection

1. Paints to be stored at the job site in a safe, dry place with all labels intact and legible at time of installation.

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2. Use all means to protect paint before, during and after installation.

B. Replacements – In the event of damage, including water intrusion, immediately make all repairs and replacements necessary to the approval of the ENGINEER and at no additional cost to the OWNER.

1.07 WARRANTY

Under provisions of Section 01700.

1.08 EXTRA STOCK

Provide ENGINEER with extra stock of two one-gallon containers of each paint type and color used. All containers are to be tightly sealed and clearly marked.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Exterior

1. No exterior painting shall be undertaken if air or surface temperature is below 50 degrees F, or is anticipated to be below 50 degrees F within 24 hours.

2. No coating is to be applied if the temperature is less than 5 degrees F above the dew point and rising.

3. No coating is to be applied immediately following rain, power washing, or until frost, dew, or condensation has evaporated.

4. Surfaces must always be tested with a moisture meter and surface temperature gauge before proceeding. Do not apply finishes unless moisture is below:

a. Exterior Masonry : 17%

b. Exterior Wood: 15%

5. Record moisture test result and location of tests in daily work log.

6. Newly applied coatings, which are damaged by the elements, shall be replaced by the CONTRACTOR at no additional charge.

7. No exterior painting shall be done under windy or dusty conditions.

8. Avoid painting surfaces while they are exposed directly to the hot sun.

B. Interior

1. Interior temperature must be above 50 degrees F for 24 hours before, during, and for 48 hours after application of finishes or longer to obtain full cure as indicated by manufacturer's instructions.

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2. Provide temporary lighting to achieve a well-lit surface with a level of at least 80-foot candles measured mid-height.

3. Provide continuous ventilation and heating to prevent accumulation of hazardous fumes and to maintain surface and ambient temperatures.

4. Surfaces must always be tested with a moisture meter and surface temperature gauge before proceeding. Do not apply finishes unless moisture is below:

   a. Interior Plaster and Wallboard: 12%

   b. Interior Wood: 12%

5. Record moisture test result and location of tests in daily work log.

PART 2 PRODUCTS

2.01 PAINT MATERIALS

A. Manufacturer

1. All paint materials selected for coating systems for each type of surface shall be the product of a single manufacturer.

2. Paints listed herein, unless otherwise designated in the "Painting Schedule", are based on the products of Benjamin Moore and/or Sherwin Williams Co. (Epoxy Coatings) as a basis of specification, Other manufacturers listed below are approved, provided they meet the quality and intent of the specified item, material or product.

   (a) The Sherwin-Williams Company

   (b) Fuller O'Brien

   (c) ICI Dulux

   (d) PPG Industries, Pittsburgh Paints

   (e) Pratt and Lambert

   (f) Devoe and Raynolds Co.

   (g) Frazee Paint

   (h) Other manufacturers complying with Section 01600.

B. Compatibility

1. All paint materials and equipment shall be compatible in use: finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating to be applied.

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2. Thinners, when used, shall be only those thinners recommended for that purpose by the manufacturer of the material to be thinned.

C. Color

1. Color of all paints and products shall be per approved samples, as prepared from manufacturer's standard color line.

2. All primers and undercoats are to be tinted to the approximate shade of the selected finish coat. Where the color schedule calls for the use of DEEP TONES, it is the responsibility of the painting contractor to utilize appropriate DEEP BASE PRIMER as manufactured by BENJAMIN MOORE & CO. for use on the surface for which they are intended.

D. Work Quality

1. All materials shall be applied free from runs, sags, wrinkles, streaks, shiners, holidays, and brush marks.

2. All materials shall be applied uniformly. If any reduction on the coating's viscosity is necessary, it shall be done in accordance with the manufacturer's label directions.

3. Carry all finish coats to natural breaks and transitions.

4. Allow each coat to dry before re-coating, adjusting manufacturer's MINIMUM time recommendations between coats to job conditions.

5. Apply each coat to achieve the specified dry film thickness per coat. Achieving the total system recommended dry mil thickness with application rates in excess of those recommended and fewer coats than specified will not be accepted.

6. Apply each coat of paint slightly darker (or lighter depending on the finish color) than the preceding coat unless otherwise approved.

7. Enamels and undercoats are to be sanded smooth prior to topcoating.

8. Tops, bottoms, and sides of doors and garage doors are to be finished with the same number of coats as the face.

9. Where spray application is used, backrolling should immediately follow. Spraying alone without backrolling is unacceptable. Wet film gauges are to be used after backrolling to insure acceptable wet film thickness.

10. A quality control log, recording weather and surface conditions must be completed each day prior to beginning painting. Paint batches are to be recorded as used showing which building each is applied to and when.

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PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that all paint finishes may be applied in strict accordance with all pertinent codes and regulations and the requirements of these specifications.

B. Discrepancies

1. In the event of discrepancy, immediately notify the architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 SITE PREPARATION

A. Exterior

1. Trench all ground contact surfaces down to the foundation prior to power washing. Pay special attention to wood surfaces coming into ground contact.

2. Remove spider webs by brush prior to power washing.

3. All existing surfaces are to be cleaned by power washing with a commercial mildew wash. Remove all mildew and chalking by scrubbing or power washing. Power washing alone without mildew wash is not acceptable. Chalk deposits must be removed, down to a sound substrate.

4. Surfaces under caves, or other areas protected from weathering, must be carefully washed. Crystalline deposits that develop on these areas are a major cause of peeling.

5. Any plant residue on surfaces is to be completely removed. If for any reason a surface cannot be cleaned, this condition shall be promptly reported to the ENGINEER.

6. Remove attached light fixtures electrical plates, hardware, and other fittings before preparing, priming, or finishing surfaces.

7. Exercise care not to deface adjoining work. Use suitable cover cloths or other protection materials to cover adjoining work, and surfaces not to be painted. Avoid wind carried overspray.

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8. The CONTRACTOR will be liable for any and all claims arising from overspray or otherwise misapplied paint.

9. Where rust, water, or bleeding stains are present, the source of these stains must be identified and corrected. Surfaces should then be cleaned and spot primed with a stain sealer.

B. Interior

1. Remove attached light fixtures electrical plates, hardware, and other fittings before preparing, priming, or finishing surfaces.

2. Exercise care not to deface adjoining work. Use suitable cover cloths or other protection materials to cover adjoining work, and surfaces not to be painted.

3. The CONTRACTOR will be liable for any and all claims arising from overspray or otherwise misapplied paint.

4. Where rust, water, or bleeding stains are present the source of these stains must be identified and corrected. Surfaces should then be cleaned and spot primed with a stain sealer.

3.03 PREPARATION OF SURFACES, GENERAL

A. Protection – Prior to all surface preparation and painting operations, completely mask, remove, or otherwise adequately protect all hardware, accessories, machined surfaces, plates, lighting fixtures, and similar items in contact with painted surfaces but not schedule to receive paint.

B. Spot prime all exposed nails and other exposed metals.

C. Cleaning

1. Before applying paint or other surface treatment, thoroughly clean all surfaces involved.

2. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

D. Prime coat should be applied soon after the surface preparation has been completed to prevent contamination of the substrate.

3.04 PREPARATION OF WOOD SURFACES FOR PAINT OR STAIN APPLICATION

A. Cleaning – Clean all wood surfaces until they are free from dirt, oil, and all other foreign substance.

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B. Smoothing

1. Unless specifically noted to be left rough, smooth all finished wood surfaces exposed to view, using the proper sandpaper.

2. Where so required, use varying degrees of coarseness in sandpaper to product uniformly smooth and unmarred wood surfaces.

3. Smooth planed clapboards or siding must be sanded thoroughly to break the "mill glaze" to allow proper penetration and adhesion.

C. Knots

1. On small, dry, seasoned knots, thoroughly scrape and clean the surface and apply one coat of compatible knot-sealer before application of the priming coat.

2. On large, open, unseasoned knots, scrape off all pitch and thoroughly clean the area, followed by an application of one coat of compatible knot-sealer.

3. Remove and treat all pitch surfaces as required for large knots.

D. Dryness

1. Unless specifically approved by the architect, do not proceed with the painting of wood surfaces until the moisture content of the wood is 15 percent or less.

2. Pressure Treated Wood (PTW) must be tested prior to coating to determine proper penetration of coating. Surface must be sprinkled with water to determine absorption into substrate. If water drops remain on PTW surface, do not paint. If water drops penetrate immediately into surface, prepare surface as you would any wood and then prime.

E. Trim

1. Trim must be re-primed on all sides.

2. Thorough caulking of horizontal applications or any areas where water may collect is essential.

3. Fill all joints, nail holes, cracks, and blemishes after undercoater has been applied.

4. Countersink, prime, and fill all nails or screws to retard rust stains.

F. Primer

1. Cedar and Redwood are bleeding woods, they must be primed to help retard bleed.

2. Prime and countersink all nails or screws to retard rust stains.

3. If nails are rusted, coat with RUST CONVERTER.

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4. Fill all joints, nail holes, cracks, and blemishes after undercoater has been applied.

3.05 PREPARATION OF MASONRY, PRECAST CONCRETE, CONCRETE BLOCK, AND FIBER CEMENT SURFACES

A. Precast concrete must be allowed to cure for 60 – 90 days; block and fiber cement surfaces must be allowed to cure for 30 – 60 days.

B. New fiber cement or other masonry surfaces shall not be primed until it has been determined these surfaces have dried sufficiently to safely accept paint.

C. Alkalinity must be approved prior to priming.

D. Form release agents are to be removed with appropriate solvents.

E. All surfaces must be thoroughly brushed with a stiff fiber brush to remove loose particles, with particular emphasis on stucco surfaces and mortar courses.

F. Laitance deposits must be removed by hand or power wire brushing, or other appropriate means.

G. If efflorescence is present, first dampen the wall with water, then scrub the surface with a 10% solution of muriatic acid. Caution: Wear rubber boots and gloves, work goggles, and protective clothing. After treatment, thoroughly flush the surface with clean water to remove all acid and allow to dry thoroughly before painting.

H. Prime all bare surfaces and opened cracks.

I. Cracks, joints, and large voids are to be filled by repointing, caulking, or other approved means.

J. Care must be taken to blend patches into surrounding texture and minimize their appearance in the finished project.

K. Cracks over ¼ inch are defined as structural cracks and must be reviewed by a structural engineer prior to painting.

L. Spot prime surface repairs after they have been patched, sandwiching repairs between two layers of primer.

3.06 PREPARATION OF METAL SURFACES

A. Galvanized Metal

1. Clean all surfaces thoroughly with solvent until they are completely free from dirt, oil, grease, and contaminants per SSPC-SP1-63.

2. Thoroughly treat the cleaned surface with phosphoric acid etch.

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3. Remove all excess etching solution and allow to dry completely before application of paint.

4. Abraded surfaces should be sanded smooth and spot primed.

5. Weathered, unpainted galvanized metal surfaces must be wire brushed or power washed to remove deposits of "white rust", then primed.

6. Note: Some galvanized surfaces have stabilizers. Many of which are not soluble in solvents. These must be removed by either brush blasting or chemical treatment.

B. Other structural steel, miscellaneous metals, doors, exposed ducting, exposed piping, louvers, and miscellaneous metals

1. All metal surfaces shall be washed with solvent to remove extraneous dirt, grease, oil, and contaminants per SSPC-SP1-63 before painting.

2. Allow to dry thoroughly before application of paint.

3. Shop primed doors, vents, access panels and miscellaneous or structural metals surfaces are to be dulled by sanding prior to application of specified prime coat.

4. Where shop coat has abraded and rust developed, remove by sanding and spot prime immediately, prior to full prime coat indicated in the product application section.

C. Aluminum

1. All surfaces must be free of residual deposits of grease and oil, and shall be cleaned in accordance with SSPC-SP1-63, "solvent cleaning".

2. Weathered, unpainted aluminum surfaces must be wire brushed or power washed to remove deposits of "white rust", then primed.

3.07 PAINT APPLICATION

A. General

1. Paint all surfaces except glass, flat concrete, and similar items, unless otherwise noted.

2. Prime and paint all grilles and other pre-finished items where the factory pre-finish is not in accordance with the painting schedule and color selection. Unless otherwise scheduled, all grilles, frames, roof penetrations and other items shall be painted to match the color of the adjacent surface.

B. Drying

1. Allow sufficient drying time between coats.

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2. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.

3. Oil-base and oleo-resinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Environmental Conditions

1. Comply with the manufacturer's recommendations as to environmental conditions under which the coating system may be applied.

2. Do not apply paint in areas where dust is being generated.

D. Defects – Sand and dust between coats to remove all dust defects visible to the unaided eye from a distance of five (5) feet.

3.08 DRYWALL

A. All surfaces must be free of sanding dust, and joint treatment cement should be thoroughly dry.

B. Damaged or defective surfaces are to be repaired by spackling or by other appropriate measures.

C. Steel corner beading is to be coated with rust retardate primer prior to a general prime coat being applied.

3.09 REINSTALLATION OF REMOVED ITEMS

Following completion of painting in each space, promptly re-install all items removed for painting, using only workmen skilled in the particular trade.

3.10 CLEANING UP

A. General

1. During progress of the work, do not allow the accumulation of empty containers or other excess items except in areas specifically set aside for that purpose.

2. Prevent accidental spilling of paint materials and in event of such spill, immediately remove all spilled material and the waste or other equipment used to clean up the spill and return the surfaces to their original undamaged condition, all at no additional cost to the OWNER.

B. Prior to Final Inspection – Upon completion of this portion of the work, visually inspect all surfaces and remove all paint and traces of paint from surfaces not schedule to be painted.

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3.11 PAINT APPLICATIONS

Exterior

A. Galvanized Metal – Flat

1. Primer: Ironclad Galvanized Metal Latex Primer (155)

2. Finish: Two coats Moore's Flat Exterior Latex House Paint (105)

B. Galvanized Metal – Medium Gloss

1. Primer: Ironclad Galvanized Metal Latex Primer (155)

2. Finish: Two coats MoorGlo Latex House and Trim Paint (170)

C. Unfinished Aluminum – Medium Gloss

1. Finish: Two coats MoorGlo Latex House and Trim Paint (170)

D. Ferrous Metal – Flat

1. Primer: Ironclad Retardo Rust Inhibitive Paint (163)

2. Finish: Ironclad Retardo Rust Inhibitive Paint (105)

E. Ferrous Metal – High Gloss (doors, jambs, bollards, exposed metals, etc.)

1. Primer: Ironclad Retardo Rust Inhibitive Paint (163)

2. Finish: Two coats Urethane Alkyd Gloss Enamel (CM22)

F. Exposed Wood Framing and Trim –

1. Two (2) coats Moorwood semi-transparent stain and wood preservative (081)

G. Exterior Concrete Block and Masonry (Satin Sheen)

1. Primer: Acrylic masonry sealer (066) (1 coat min.)

2. Finish: Moorlastic Acrylic Elastomeric Waterproof Coating (2 coats min.)

Interior

A. Drywall Ceiling – Eggshell

1. Primer: Regal First Coat (216)

2. Finish: Two coats Regal Aqua Velvet (319)

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B. Ferrous Metal – Semi-Gloss

1. Primer: Moorecraft Alkyd Enamel Underbody and Primer Sealer (245)

2. Finish: Moorecraft Alkyd Semi-Gloss Enamel (271)

C. Galvanized Metal – Semi-Gloss

1. Primer: Ironclad Galvanized Metal Latex Primer (155)

2. Finish: Two coats Regal AquaGlo (333)

D. Concrete Block Masonry – Semi-Gloss

1. EPOXY COATING – NO SUBSTITUTIONS

a. First Coat: Macropoxy Primer (B58)

b. Second Coat: Macropoxy 646 (B58-600)

c. Third Coat: Macropoxy 646 (B58-600)

E. INTERIOR CONCRETE FLOORS (Clear EPOXY Sealer):

1. EPOXY COATING – NO SUBSTITUTIONS

a. First Coat: ArmorSeal Rexthane I Floor Coating (B65-60) w/o grit

b. Second Coat: ArmorSeal Rexthane I Floor Coating (B65-60) w/ grit

F. COLORS: As selected by Architect; doors and frames shall be one color; interior walls and other structure shall have one field color and one trim color.

3.12 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

1. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen, as required, to remove

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glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

(a) Use abrasive blast-cleaning methods if recommended by the paint manufacturer.

(b) Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

(c) Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.

2. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).

(a) Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

C. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3. Use only thinners approved by the paint manufacturer and only within recommended limits.

D. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.13 APPLICATION

A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

(a) Paint colors, surface treatments, and finishes are indicated in the schedules.

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(b) Provide finish coats that are compatible with primers used.

(c) The number of coats and the film thickness required are the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.

(d) Apply additional coats if undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.

(e) The term exposed surfaces includes areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.

(f) Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

(g) Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, nonspecular black paint.

(h) Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

2. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

   a. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

3. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.

   a. Brushes: Use brushes best suited for the material applied.

   b. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

   c. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

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4. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

5. Mechanical and Electrical Work: Painting mechanical and electrical work is limited to items exposed in mechanical equipment rooms and in occupied spaces.

6. Mechanical items to be painted include, but are not limited to, the following:

   (a) Piping, pipe hangers, and supports.
   (b) Supports.
   (c) Motors and mechanical equipment.
   (d) Accessory items.

7. Electrical items to be painted include, but are not limited to, the following:

   (a) Conduit and fittings.
   (b) Switchgear.

8. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

3.14 CLEANING

A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.15 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

Division 11 Equipment

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SECTION 11257

ACTIVATED CARBON ODOR CONTROL SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install the activated carbon adsorption odor control system, including all piping as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Earthwork is included in Section 02200.

B. High Density Polyethylene (HDPE) Pipeline and Fittings are included in Section 02623.

C. Valves and appurtenances are included in Section 15100.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings and schedules. Submittals shall include the following:

1. Certified shop and erection drawings showing all details of construction, dimensions and anchor bolt locations.

2. Descriptive literature, bulletins and/or catalogs of each item of equipment.

3. All information required by Section 01170.

4. The weight of each major item of equipment (include weight of vessel when filled with caustic solution during regeneration).

5. A complete total bill of materials for all equipment.

6. A list of the manufacturer's recommended spare parts. Include gaskets, seals, etc on the list.

7. Complete data on the activated carbon showing it to be in conformance with this Section. Include a complete analysis of the capacity of the activated carbon to adsorb hydrogen sulfide. Also include a complete description of the methods required to regenerate the carbon.

8. Complete description of shop painting of painted surfaces.

B. All details on shop drawings submitted for approval shall show clearly the relations of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

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C. In the event that it is impossible to conform with certain details of this Section, describe completely all non-conforming aspects.

D. Samples of the fiberglass laminate shall be submitted. These samples shall be from plant production and shall be representative of the quality and hardness of the vessel to be furnished. If the vessel does not meet the standard of the samples, it may be rejected.

E. Operation and Maintenance Data

1. Operating and maintenance instructions shall be furnished to the ENGINEER as provided in Section 01730. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, maintenance schedule, carbon replacement, etc, that are required to instruct operating personnel that are unfamiliar with such equipment.

2. A factory representative who has a complete knowledge of proper operation and maintenance shall be provided for 1 day to instruct representatives of the OWNER on proper operation and maintenance of the equipment. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no additional cost to the OWNER.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride)(PVC) Compounds and Chlorinated Poly (Vinyl Chloride (CPVC) Compounds.

2. ASTM D6646 – Standard Test Method for Determination of the Accelerated Hydrogen Sulfide Breakthrough Capacity of Granular and Pelletized Activated Carbon

B. American National Standards Institute (ANSI)

1. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

C. Occupational Safety and Health Administration (OSHA)

D. National Electrical Manufacturers Association (NEMA)

E. National Electrical Code (NEC)

F. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All carbon adsorption equipment specified in this Section shall be furnished by a single manufacturer who is fully experienced reputable and qualified in the design, construction and operation of odor control systems incorporating activated carbon. Provide evidence of successful operation of such units in commercial application for a period of at least 1 year.

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B. The manufacturer shall furnish certified test results indicating H_2S adsorption capacity in pounds per pound of dry carbon for the carbon actually furnished.

C. Should equipment which differs from this Section or as shown on the Drawings be offered and determined equal to that specified and shown, such equipment shall be acceptable only on the basis that any revisions to the design and/or construction of the structure, piping, appurtenant equipment, etc, required to accommodate such a substitution shall be made at no additional cost to the OWNER.

1.06 SYSTEM DESCRIPTION

A. Air shall be discharged from the Air and Vacuum Release Valves (AVRV), through the carbon adsorption filter.

B. Odor Control System on Forcemain

1. Max. Capacity: 20 lbs

2. Source: Sewer Forcemain odors at AVRV

3. Number of Units: 1 per AVRV

C. The carbon shall be suitable for continually removing concentrations of hydrogen sulfide and organic compounds resulting from septage containing nitrogen and sulfur compounds such as mercaptans, indole, skatole and organic acids.

1.07 MAINTENANCE

A. Tools and Spare Parts

1. One set of all special tools required for normal operation and maintenance shall be provided.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. General

1. Activated Carbon Odor control system must exchange air every half hour to an hour for optimal operation.

B. Activated Carbon

1. Type: Product shall be Calgon Carbon Corporation CENTAUR HSV type carbon, or equal.

2. A 10-inch carbon filter shall be of slip-on or flanged type device connected near AVARs in sewer forcemain.

3. The activated carbon manufacturer and producer shall be certified for ISO 9001:2000 quality standards.

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4. The activated carbon shall be of a granular, non-impregnated, agglomerated bituminous coal base. Direct activated, broken pellet, pelleted and mixed media carbon shall not be acceptable.

5. The activated carbon can be thermally reactivated by the manufacturer, thus eliminating carbon disposal problems.

6. The carbon supplied shall be of a type that does not require chemicals to be regenerated in-place. Carbons which require hydroxide, permanganate, chlorine, organic, or other solutions, except clean water, to regenerate the material, will not be accepted.

7. The carbon filter, as outlined on the Drawings, consists of a slip-on or flanged device mounted on the vent of the forcemain.

8. Sufficient activated carbon shall be provided to fill each carbon filter. The activated carbon shall be virgin granular activated carbon, derived from bituminous coal. The activated carbon shall be suitable for the vapor phase adsorption of sewage treatment odors. No chemical impregnation of the activated carbon is permitted. The activated carbon shall have the following specifications:

a.	Iodine No., mg/g	800	min
b.	Butane Activity, weight %	15.6	min
c.	Ash, weight %	7	max
d.	Moisture, weight %	4	max
e.	Hardness No.	97	min
f.	Apparent Density, g/ml	0.56	min
g.	Mean Particle Diameter, mm	3.7	min
h.	H_2S Breakthrough Capacity, g H_2S removed/cc Carbon*	0.09	min

*The determination of H_2S breakthrough capacity will be made by passing a moist (85% R.H.) air stream containing 1% H_2S at a rate of 1,450 cc/min. through a 1-inch diameter by 9-inch deep bed of uniformly packed activated carbon and monitored to 50 ppm breakthrough. Results are expressed in grams H_2S removed per cc of carbon.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation shall be in strict accordance with the manufacturer's instructions and recommendations in the location as shown on the Drawings.

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3.02 INSPECTION AND TESTING

A. Furnish the services of a manufacturer's representative who has complete knowledge of proper installation, operation, and maintenance of the equipment to inspect the final installation, supervise test runs of the equipment and instruct representatives of the OWNER in the proper operation and maintenance.

B. The system shall be operated and checked to assure that no leaks are present in the system. The system shall also be checked for its ability to remove H_2S in accordance with Paragraph 1.06. Furnish all labor, materials and power required for the test. Furnish an H_2S analyzer complete with all accessories required to take inlet and outlet samples. All testing shall be supervised by a factory representative and shall be in the presence of the ENGINEER. The manufacturer's representative shall correct any defective workmanship and perform the test again to assure the system is tight and free from leaks.

END OF SECTION

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SECTION 15100

VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and provide all buried and exposed valves, valves in manholes and underground vaults, hydrants and appurtenances complete with actuators and all accessories as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Trenching, backfill, and compaction are included in Section 02200.

B. Concrete is included in Division 3.

C. Miscellaneous metal fabrication is included in Section 05500.

D. Surface preparation and shop painting is included in Section 09901.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, materials required to establish compliance with this Section for shop drawings. Submittals shall include the following:

1. Manufacturer's literature, illustrations, specifications and engineering data including:

a. Dimensions.

b. Size.

c. Materials of construction.

d. Weight.

e. Protection coating.

f. Actuator weight.

g. Calculations for actuator torque where applicable.

B. Test Reports

1. Four copies of all certified shop test results specified herein.

C. Operation and Maintenance Manuals

1. Submit complete operation and maintenance manuals including copies of all approved Shop Drawings.

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D. Certificates

1. Certificates of compliance where required by referenced standards: For each valve specified to be manufactured and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests and certification of proper installation.

1.04 REFERENCE STANDARDS

A. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Water Works Association (AWWA)

1. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron and Pressure Pipe and Fittings.

2. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.

4. AWWA C504 - Rubber-Seated Butterfly Valves.

5. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.

6. AWWA C515 - Reduced Wall, Resilient-Seated Gate Valves for Water Supply Service

7. AWWA C800 – Underground Service Lines and Fittings

C. American Society for Testing and Materials (ASTM)

1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

2. ASTM A536 - Standard Specification for Ductile Iron Castings.

D. The Society for Protective Coatings (SSPC)

1. SSPC SP-6 - Joint Surface Standard Commercial Blast Cleaning

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Valves and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least 10 years. If required, the manufacturer shall furnish evidence of installation in satisfactory operation.

2. All units of the same type shall be the product of one manufacturer.

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B. Design Criteria

1. All valves and appurtenances shall be new and in perfect working condition. Valves shall be designed for continuous use with a minimum of maintenance and service required and shall perform the required function without exceeding the safe limits for stress, strain or vibration. In no case will used or damaged valves be acceptable. The selection of equipment to meet the specified design conditions is the responsibility of the CONTRACTOR. Both workmanship and material shall be of the very best quality and shall be entirely suitable for the service conditions specified.

C. Source Quality Control

1. Valves shall be shop tested in accordance with the following:

a. Metal-seated gate valves: AWWA C500.

b. Rubber-seated butterfly valves: AWWA C504.

c. Resilient-seated gate valves: AWWA C509.

d. Reduced-wall, resilient-seated gate valves: AWWA C515.

2. Obtain each type of valve from no more than one manufacturer.

1.06 SYSTEM DESCRIPTION

A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of wastewater and recycled water as noted on the Drawings.

B. Valves, appurtenances and miscellaneous items shall be installed as shown on the Drawings and as specified, so as to form complete workable systems.

C. Unless otherwise noted all exposed powered valve operators shall have:

1. Valves larger than 3-in: electric operators 460 Volt, 3 Phase, 60 Hz.

2. See other paragraphs for additional requirements.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the site to ensure uninterrupted progress of the work.

B. Protect threads and seats from corrosion and damage. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until time of use.

C. Furnish covers for all openings.

1. All valves 3-in and larger shall be shipped and stored on site until time of use with wood or plywood covers on each valve end.

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2. All butterfly valves shall be delivered with blind flanges bolted in place until valve is pressure-tested on site, before installation and burial.

D. Store equipment to permit easy access for inspection and identification. Any corrosion in evidence at the time of ENGINEER acceptance shall be removed, or the valve shall be removed from the job.

E. Store all equipment in covered storage off the ground.

1.08 COORDINATION

A. Review installation procedures under other Sections and coordinate with the work which is related to this Section including buried piping installation, and site utilities.

B. Coordinate the location and placement of concrete thrust blocks when required.

PART 2 PRODUCTS

2.01 GENERAL

A. All buried valves shall open counter-clockwise.

B. The use of a manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

C. Valves shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one manufacturer.

D. Valves shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard to which they are manufactured cast in raised letters on some appropriate part of the body.

E. Unless otherwise noted, valves shall have a minimum working pressure of 150 psi or be of the same working pressure as the pipe they connect to, whichever is higher, and suitable for the pressures noted where they are installed.

F. Valves shall be of the same nominal diameter as the pipe or fittings they are connected to. Except as otherwise noted, joints shall be mechanical joints, with joint restraint where the adjacent piping is required to be restrained.

G. Valves shall be constructed for buried service.

2.02 VALVE BOXES

A. All gate, butterfly and plug valves shall be provided with extension shafts, operating nuts and valve boxes as follows:

1. Extension shafts shall be Type 304 stainless steel and the operating nut shall be 2-in square. Shafts shall be designed to provide a factor of safety of not less than four. Operating nuts shall be pinned to the shafts.

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2. Top of the operating nut shall be located 2-in below the rim of the valve box.

3. Valve boxes shall be as manufactured by Clow; Mueller; Tyler; or equal and shall be a heavy-pattern cast iron, three-piece, telescoping type box with dome base suitable for installation on the buried valves. Inside diameter shall be at least 4-1/2-in. Barrel length shall be adapted to the depth of cover, with a lap of at least 6-in when in the most extended position. Covers shall be cast iron with integrally-cast direction-to- open arrow, and the word "RECYCLED WATER" for the recycled water valves or "SEWER" for the conveyance force main valves shall also be integrally cast. Aluminum or plastic are not acceptable. A means of lateral support for the valve extension shafts shall be provided in the top portion of the valve box.

4. The upper section of each box shall have a top flange of sufficient bearing area to prevent settling. The bottom of the lower section shall enclose the stuffing box and operating nut of the valve and shall be oval.

5. A position-indicating device shall be provided for each gate and butterfly valve. The position-indicating device shall be GPI Series Geared Position Indicator by Dyna-Torque Inc., Muskegon, MI or equal, which shall mount over the shaft and visually show the position of the valve at all times. All material shall be non-corrosive, nonmagnetic and shall require no lubrication. Unit shall be furnished and arranged for use with the valve box. The required valve box adapters and cover shall be furnished.

6. An approved operating key or wrench shall be furnished.

7. All fasteners shall be Type 316 stainless steel.

2.03 RESILIENT WEDGE GATE VALVES

A. General

1. All gate valves shall conform to the requirements of AWWA C509, except as may be specifically modified herein.

2. Valves 3-in and larger shall be iron body, bronze mounted.

B. Gate valves 3-in and larger

1. Valves shall be double disc-type with 150 psig working pressure rating with a minimum non-shock rating of 200 psig.

2. Buried valves shall have non-rising stems, mechanical joint ends and 2-in square operating nuts. Valves shall be furnished with O-ring seals.

3. Furnish valves and accessories as manufactured by one of the following:

a. Henry Pratt

b. DeZurik

c. Or equal

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2.04 TAPPING SLEEVES AND TAPPING VALVES

A. Tapping sleeves shall be of stainless steel, designated for working pressure not less than 200 psi. Armored end gaskets shall be provided for the full area of the sleeve flanges. Sleeves shall be as manufactured by A.P. Smith Division of U.S. Pipe; Mueller; Clow or equal. Nuts and bolts shall be Type 304 or Type 316 stainless steel.

B. Tapping valves shall conform to the requirements specified above for gate valves except that one end shall be flanged and one mechanical. Tapping valves shall be provided with an oversized opening to permit the use of full size cutters.

2.05 RUBBER-SEATED BUTTERFLY VALVES

A. Valves shall be manufactured in strict accordance with AWWA C504. Valves shall be bubble tight at rated pressures. Valve discs shall rotate 90 degrees from full closed to open. Operators shall be assembled to the valve by the valve manufacturer. The valve/operator shall be tested as a complete assembly by the valve manufacturer. The manufacturer shall have produced AWWA butterfly valves for a minimum of 5 years.

B. Valve bodies shall be constructed of cast iron ASTM A126, Class B. Valves in vaults shall be flanged. Flange drilling shall be in accordance with ANSI B16.1, Class 150. Laying length shall be short body as listed in AWWA C504. Buried valves shall be mechanical joint end conforming to ANSI C111.

C. Valve discs shall be constructed of cast iron ASTM A126 or A48, ductile iron ASTM A536. Material mating with the seat shall be either Type 304 or Type 316 stainless steel.

D. Rubber valve seats shall be Buna-N, Buna-S, or EPDM. If the seat is on the disc it shall be mechanically retained by Type 304 stainless steel fasteners. If the seat is in the valve body and seat retaining hardware such as screws and segments are used they shall be monel. If screws are used, monel plugs shall be affixed in the valve body and tapped to receive these screws.

E. Valve shafts shall be Type 304 stainless steel, ASTM A276 and shall be of a diameter not less than those listed in AWWA C504, Class 150B.

F. Shaft seals shall be furnished where the shaft projects thru the valve body. Shaft seals shall be standard split-v type packing or of an O-ring design.

G. Valves shall be fitted with sleeve type bearings contained in the trunions of the valve body. Bearing material shall be nylon for valves thru 20-in and fiberglass with teflon lining for valves 24-in and larger.

H. Valve manufacturer shall furnish and mount operator suitable for buried service. Operators shall be self-locking and suitable for submergence to 20-ft. A 2-in square operating nut shall be furnished. Operator stops shall be capable of withstanding an input of 450 ft-lbs.

I. All valves shall be hydrostatically and leak tested.

J. Valve class shall be AWWA Class 150B with operators sized for bi-directional flow.

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K. Valves shall be manufactured by Henry Pratt; DeZurik; or approved equal.

2.06 AIR RELEASE AND VACUUM RELIEF VALVES:

A. All valves shall be supplied with shutoff gate or ball valves with operator handle or lever in place. Valves shall be properly vented and piped to drain.

B. Valve pressure rating shall be at least 250 psi or equal to the attached pipeline rating.

C. Combination Air and Vacuum Relief Valves: Tag Type CAV

1. Valves shall be designed to release large amounts of air during pipeline filling, release small amounts of air accumulated during pipeline operation, and allow large volumes of air during pipeline drainage or pipe break. Valve shall be combination double orifice air/vacuum type for general service in sizes 1 to 6 inches housed in a conical body. Valve shall have an intake orifice area equal to the nominal size of the valve.

2. Air release/vacuum valves shall be compact single body design. When the pipeline is filled and pressurized, air shall be discharged through the small diameter orifice. Venting of large quantities of air during pipeline filling shall be accomplished through the large orifice at the top of the valve. Vacuum relief shall be accomplished through the large orifice when the control floats fail due to negative pressure in the pipeline.

3. Valves shall be rated for 150 psi service. Materials of construction shall be as follows: barrel- Cast Iron ASTM A126 GR. B; float - Stainless Steel ASTM A240 T304 or T316; small orifice nozzle seat - Buna-N; studs, nuts, washers - 316 stainless steel. End Connections shall be NPT up to 2 inch, 125 lb flange 3 to 6 inch.

4. Valves shall be manufactured by APCO (Dezurik) Series 440, Val-Matic Series 800, or Equal. Vent-O-Mat Series RGX and International Valve SWG-C are approved equals.

D. Combination Air and Vacuum Relief Valves: Tag Type CAV/SP

1. Valves shall be designed to release large amounts of air during pipeline filling, release small amounts of air accumulated during pipeline operation, and allow large volumes of air during pipeline drainage or pipe break. Valve shall be combination double orifice air/vacuum type for general service in sizes 1 to 6 inches housed in a conical body. Valve shall have an intake orifice area equal to the nominal size of the valve.

2. Air release/vacuum valves shall be compact single body design. When the pipeline is filled and pressurized, air shall be discharged through the small diameter orifice. Venting of large quantities of air during pipeline filling shall be accomplished through the large orifice at the top of the valve. Vacuum relief shall be accomplished through the large orifice when the control floats fail due to negative pressure in the pipeline.

3. Valves shall be rated for 150 psi service. Materials of construction shall be as follows: barrel- Cast Iron ASTM A126 GR. B; float - Stainless Steel ASTM A240 T304 or T316; small orifice nozzle seat - Buna-N; studs, nuts, washers - 316 stainless steel. End Connections shall be NPT up to 2 inch, 125 lb flange 3 to 6 inch.

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4. A throttling device shall be placed on the orifice to regulate and restrict air venting and to establish a pressure loading to eliminate shock.

5. Valves shall be manufactured by APCO (Dezurik) Series 440DAT, Val-Matic Series 800-S, or Equal. Vent-O-Mat Series RGX and International Valve SWG-C are approved equals.

2.07 CHECK VALVES

A. Check valves for 4-inch and larger diameter pipelines shall be swing type and shall meet the material requirements of AWWA C508. The valves shall be iron body, bronze mounted, single disc, matching or exceeding pipeline working pressure, non-shock and hydrostatically tested at 300 psi. Ends shall be 125 lb ANSI B16.1 flanges.

1. When there is no flow through the line the disc shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the waterway.

2. Check valves shall have bronze seat and body rings, extended bronze hinge pins and bronze nuts on the bolts of bolted covers.

3. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and spring. Springs with various tensions shall be provided and springs approved by the ENGINEER shall be installed.

4. Check valves shall have bronze seat and body rings, bronze or ductile clapper arm and bronze nuts on the bolts of bolted covers. Shaft assembly and key shall be A582 type 416 stainless steel. Hinge shaft shall extend from the body of the valve, sealed with stuffing box, packing and gland. Shaft side plug bearing, stuffing box and gland shall be bronze, packing shall be reinforced Teflon, both side plug and stuffing box shall be provided with grease fittings.

5. Check valves shall be manufactured by Henry Pratt; DeZurik; or approved equal.

2.08 PLASTIC SWING OR WYE-CHECK VALVES

A. General: Plastic swing or wye-check valves for corrosive fluids, in sizes up to 8 inches or as available, may be used for horizontal or vertical up-flow conditions.

B. Construction: The valve bodies and discs or piston shall be of PVC, PP, or PVDF construction, as best suited for each individual service condition. They shall have flanged ends conforming to ANSI/ASME B16.5 Class 150, and flanged top access covers, and they shall shut positively at no-flow conditions. The seats and seals shall be of EPDM, Teflon, or Viton. The PVC valves shall be rated for a maximum non-shock working pressure of 150 psi at 73 degrees F for sizes 3-inch and smaller. For larger sizes and other materials and temperatures the pressure rating may be lower.

C. Manufacturers, or Equal

1. ASAHI-AMERICA;

2. George Fischer, Inc.;

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3. Spears Mfg. Co. (Plastic Swing Check only).

2.09 SOLENOID VALVES

A. Solenoid valves shall be of the size, type, and class indicated and shall be designed for not less than 150 psi water-working pressure. Valves for water, air, or gas service shall have brass or bronze body with screwed ends, stainless steel trim and spring, Teflon or other resilient seals with material best suited for the temperature and fluid handled. Unless otherwise indicated, for chemicals and all corrosive fluids, solenoid valves with PVC, CPVC, polypropylene (PP), polyvinylidene fluoride (PVDF), or Teflon materials of construction, suitable for the specific application shall be provided. Enclosures shall be NEMA rated in accordance with the area designations of section 16050 – Electrical Work, General. All coil ratings shall be for continuous duty. For electrical characteristics see electrical drawings or specifications.

B. Manufacturers, or Equal

1. For general duty

a. Automatic Switch Co. (AXCO), Model “RED HAT”;

b. Skinner Valve (Parker Hannifin corporation):

c. Magnatrol Valve Corporation;

d. J. D. Gould Co.

2.10 SOLENOID FLOW CONTROL VALVE

A. Solenoid control valve shall be an on-off control valve which either opens fully or closes drip-tight upon receiving an electrical signal to the solenoid pilot control. This shall be of the size shown on the drawings and shall consist of a main valve, a three way solenoid and a high capacity three-way pilot valve. The solenoid control shall operate the three-way valve which alternately applies pressure to or relieves pressure from the diaphragm chamber of the main valve. The valve shall be furnished normally closed (energize solenoid to open). The valve shall have a check feature that upon pressure reversal, the downstream pressure shall be admitted into the main valve cover chamber and the valve closes to prevent return flow.

B. The valve materials shall be selected for use with reclaimed treated wastewater effluent. The diaphragm, disc and o-ring shall be Viton. The body and cover shall be ductile iron, with bronze trim. The valve shall be coated with fusion bonded epoxy meeting NSF 61.

C. Manufacturers, or Equal

1. Cla-Val Model 100-01

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2.11 SURFACE PREPARATION AND SHOP COATINGS

A. The interior ferrous metal surfaces, except finished or bearing surfaces, shall be blast cleaned in accordance with SSPC SP-10 and painted with two coats of an approved two component epoxy coating specifically formulated for potable water use. The coating shall be NSF certified to Standard 61.

B. Exterior ferrous metal surfaces of all buried valves shall be blast cleaned in accordance with SSPC SP-6 and given two shop coats of an approved two component coal tar epoxy paint.

C. Exterior ferrous metal surfaces of all non-buried valves shall be shop painted with one coat of primer in accordance with the requirements of Section 09901.

2.12 PROTECTIVE WRAPPING FOR BURIED METALIC ITEMS

A. The wax tape protective wrapping for flanged joints, flexible or mechanical couplings, flanged coupling adapters, valves, special areas and other exposed appurtenances and joints below final grade shall be protected by a primer, mastic, wrapping, and overwrapping system, Denso, Trenton, or equal.

2.13 FLEXIBLE (FLEX), MECHANICAL, OR SLEEVE COUPLINGS

A. This Specification and the Drawings use the terms flexible, flex, mechanical, sleeve, and Dresser couplings interchangeably. Standard and insulated flexible couplings shall be rated at the working pressure of the pipe joined or at a minimum of 150 psig, whichever is greater. Couplings shall also be designed for the actual soil loads for each installation condition if buried.

B. Couplings 12-inches in diameter and smaller shall have steel sleeves 7 inches long. Couplings 14-inches to 36-inches in diameter shall have steel sleeves at least 10 inches long. Couplings larger than 36-inches in diameter shall have steel sleeves at least 18 inches long. Sleeve type couplings shall not have pipe stops.

C. All couplings shall be factory cleaned and given a fusion bonded epoxy coating in accordance with AWWA C213. Anchor studs shall be provided if indicated on the Drawings.

D. Insulating sleeve type couplings shall have an insulating rubber boot adequate to stop the flow of electrical current across the coupling and piping. If couplings are restrained, the rods and nuts shall be insulated with dielectric sleeves and washers to maintain insulation.

E. Standard sleeve type flex couplings shall be Smith-Blair Style No. 411, Dresser Style No. 38, JCM 201, Romac 400, or equal. Insulated sleeve type couplings shall be Dresser 416, Romac, or equal.

F. Restrained Joints: Sleeve type couplings on pressure lines shall be harnessed unless thrust restraint is provided by other means. Harnesses shall be designed by the pipe manufacturer in accordance with Manual M11, or as indicated. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed. Where harness sets are installed near the suction and discharge of the pump, harness bolts hall have zero elongation to prevent misalignment of the pump imparted by the thrust within the piping system.

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G. Dismantling Joints shall be rated at a minimum working pressure of 150 psig and have restraint tie-rods. Dresser Style No. 131, Romac Style No. DJ 400, Smith-Blair Style No. 975, or equal.

2.14 STRUCTURE PENETRATION MECHANICAL SEALS FOR PIPING

A. Seals around piping and tubing shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to fit in the annular space. Tightening of bolts in each link shall cause the link to expand and seal the space. Hardware shall be Type 316 stainless steel. Mechanical seals shall be Innerlynx by Advance Products & Systems, Linkseal by Thunderline Corp., or equal.

2.15 MISCELLANEOUS ITEMS

A. Insulating Fittings: Fittings shall be of type to provide control of electrolysis and equal to "Dielectric" as manufactured by Watts Regulator Co., Ebco, or equal.

B. Quick Disconnect (Connect) for Pressure Cleanout Piping: Materials (including, but not limited to, body, gaskets, levers, and pins) shall be compatible with raw sewage service or as specifically indicated on the Drawings. Disconnects shall use a minimum of two cam action locking levers to complete connections. Unless otherwise noted, disconnects shall be a male coupler with socket weld, threaded, or solvent welded end as required for the connecting piping. Disconnect dimensions shall comply with the specifications of MIL-C-27487. Provide a dust cap of the same material (as the disconnect) for each disconnect. Quick disconnects shall be by PT-Hunt, OPW, Aeroquip, Harrington Plastics, or equal.

2.16 LUBRICATED PLUG VALVES (1/2-inch to 36-inch)

A. Construction: Lubricated plug valves shall be the tapered plug top or bottom entry type, with flanged ends for sizes 3-inch and larger, and flanged or screwed ends for smaller valves, as indicated. The body and top plate shall be of cast steel conforming to ASTM A 216 - Steel Castings, Carbon, Suitable for Fusion Welding for High- Temperature Service, or other acceptable cast or forged steel. The plug shall be of steel or cast iron and the stem shall be of stainless steel or alloy steel, with weather seal and Teflon impregnated packing. Valves up to and including 20-inch in size shall have an unobstructed port area of not less than 80 percent of full pipe area, and not less than 70 percent for larger valves. The valve body and plug shall have smoothly-finished water passages free from sharp corners when the plug is in the wide-open position. The valve shall be rated for ANSI class 300 or as indicated, between service temperatures of minus 20 to plus 100 degrees F.

B. Sealant System: The valves shall be provided with fittings designed to feed a sealant through a check-valve protected passage in the stem, through the side, or through a stainless steel tube for worm-gear actuated or buried valves. There shall be ducts or grooves in the face of the plug to insure the maintenance of a closed, pressurized sealant system between all contact surfaces of moving parts. All surfaces of the plug shall be coated with a dry film lubricant, such as polyfluoride or equal, to suit the service, permanently bonded to the metal surfaces. Sealant for LP gas service shall be the manufacturer’s recommended type. The plug shall be held toward the seat by factory- adjusted gland assemblies set for proper sealing and operating torque. The gland assemblies shall be adjustable from the valve exterior and shall utilize either spring washers or gland deflection to allow plug unseating when pressurized sealant is injected.

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C. Actuators: Unless otherwise indicated, valves 3-inch and smaller shall be lever actuated; larger valves shall be equipped with manual worm-gear actuators.

D. Lubricating Gun: The CONTRACTOR shall furnish a manual lubricating gun for lubricated plug valves in sizes up to 6-inch, inclusive. For larger valves, the CONTRACTOR shall furnish a pneumatically-operated lubricating gun and a manual lubricating gun. For installations of more than 6 lubricated plug valves, the number of guns shall be doubled. The guns shall be from the same manufacturer as the valves. Guns shall each be equipped with flexible connectors, pressure gauge, safety valve, and be furnished in labeled tool boxes with operating instructions.

E. Manufacturers, or Equal

1. Nordstrom Audco Valves, Inc.;

2. Rockwell.

2.17 ECCENTRIC PLUG VALVES (1/2-inch to 72-inch)

A. Construction: Eccentric plug valves shall be of the non-lubricated, eccentric plug design with cast iron bodies conforming to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings, with ANSI 125 lb. flanged ends for valves 3-inch and larger, and screwed or flanged ends for smaller sizes. The plugs and shafts shall be of cast iron or ductile iron conforming to ASTM A 536 - Ductile Iron Castings, and the plugs shall be lined with a resilient coating, best suited for the specific service. The body shall be lined with a suitable elastomer, where required for a special service, or it shall be epoxy- lined in accordance with Section 09800 - Protective Coating. The seats shall be of nickel or stainless steel welded to the body. All top and bottom shaft bearings shall be of permanently lubricated stainless steel or Teflon coated stainless steel. Grit seals of Teflon, Nylatron, or similar suitable material shall be at the top and bottom plug journals. Valves up to and including 20-inch in size shall have an unobstructed port area of not less than 80 percent of full pipe area, and not less than 70 percent for larger valves. All eccentric plug valves shall have a pressure rating of not less than 150 psi WOG, for bubble-tight shut-off in the standard flow direction, and 25 psi WOG in the reverse flow direction. When equipped with worm gear actuator, the pressure rating shall be 150 psi WOG in both directions. The stem seal shall consist of field adjustable packing, replaceable without removal of the actuator, or of self-adjusting U-cup packing.

B. Actuators: Unless otherwise indicated, eccentric plug valves 3-inch and smaller shall have operating levers; larger valves shall have worm-gear actuators.

C. Manufacturers, or Equal

1. DeZurik Corporation;

2. Clow Valve Company;

3. Pratt Valve;

4. Victaulic.

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2.18 REDUCED PRESSURE ZONE BACKFLOW PREVENTER (RPZ)

A. Shall be of the size shown on the Drawings and body shall be constructed of bronze for sizes less than 2-1/2-in and epoxy coated cast iron for sizes 2-1/2-in and larger..

B. Each unit shall be complete with two companion OS&Y gate valves equipped with test connections. Valves shall be of similar material as that of the backflow device body, including epoxy coating. Unit shall have replaceable bronze seats and captured springs.

C. Each unit shall be provided with a complete set of spare parts, which shall be stored adjacent to the unit in a wood crate labeled with list of contents.

D. Each unit shall be supported on galvanized steel floor stanchions with floor flange secured to floor.

E. Each unit shall be of the manufacture that meets the approval of the authority having jurisdiction.

F. Acceptable manufacturers shall include, or Equal

1. Febco;

2. Cla-Val Co;

3. Watts Regulator;

G. Provide enclosure equivalent to “GuardShack Model# The Protector” for each backflow preventer shown on the drawings. Provide enclosure pad and enclosure suitable for backflow preventer.

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION

A. During installation of all valves and appurtenances, verify that all items are clean, free of defects in material and workmanship and function properly.

B. All valves shall be closed and kept closed until otherwise directed by the ENGINEER.

3.02 INSTALLATION OF BURIED VALVES AND VALVE BOXES

A. Buried valves shall be cleaned and manually operated before installation. Buried valves and valve boxes shall be set with the stem vertically aligned in the center of the valve box. Valves shall be set on a firm foundation and supported by tamping pipe bedding material under the sides of the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade. The valve box shall be set so as not to transmit traffic loads to the valve.

B. Before backfilling, all exposed portions of any bolts shall be coated with two coats of bituminous paint.

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C. Install valve floor stand operators with stainless steel bolts.

D. Apply wax tape protective wrapping to all exposed metal appurtenances and joints below final grade in accordance with the manufacturer's written instructions. Apply primer to all surfaces. Fill void areas with mastic to produce a uniform surface for subsequent tape wrapping.

3.03 INSTALLATION OF TAPPING SLEEVES AND VALVES

A. The proper authority shall be contacted and their permission granted prior to tapping a "live" line. The required procedures and time table shall be followed exactly.

B. Installation shall be made under pressure and flow shall be maintained. The diameters of the tap shall be not less than 1/4-in less than the inside diameter of the branch line.

C. The entire operation shall be conducted by workers experienced in the installation of tapping sleeves and valves. The tapping machine shall be furnished by the CONTRACTOR.

D. Determine the location of the line to be tapped to confirm that the proposed location will be satisfactory and that no interference will be encountered such as joints or fittings. No tap or sleeve will be made closer than three feet from a pipe joint.

E. Tapping sleeve and valve with boxes shall be set squarely centered on the line to be tapped. Adequate support shall be provided under the sleeve and valve during the tapping operation. Thrust blocks or other permanent restraint acceptable to the ENGINEER shall be provided behind all tapping sleeves. Proper tamping of supporting pipe bedding material around and under the valve and sleeve is mandatory for buried installations.

F. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean. All proper regulatory procedures (including disinfection) shall be followed exactly.

3.04 FIELD TESTS AND ADJUSTMENTS

A. Conduct a functional field test of each valve, including actuators and valve control equipment, in presence of ENGINEER to demonstrate that each part and all components together function correctly. All testing equipment required shall be furnished by the CONTRACTOR.

3.05 MANUFACTURER'S SERVICE

A. Furnish the services of a qualified representative of the tapping equipment manufacturer to provide on-site instruction during wet tapping of the existing water mains indicated on the Drawings.

B. Following installation of the butterfly valves, furnish the services of a qualified, factory-trained representative of the manufacturer of the respective valves, to check the installations before they are placed in operation, supervise initial operations and testing in the presence of the ENGINEER, instruct the plant personnel in care and maintenance of the equipment, and make all necessary field adjustments. A minimum of one 8-hour day shall be provided for these services. In the event of trouble with the equipment, the representative of the respective manufacturer shall revisit the site as often as necessary until all troubles are corrected and the installation is entirely satisfactory.

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3.06 INSTALLATION OF ECCENTRIC PLUG VALVES

A. Plug valves shall be installed in strict accordance with the manufacturer's published recommendations and the applicable provisions of Section 15100.

B. Eccentric Plug Valves: Unless otherwise directed, the following rules shall be observed for the installation of eccentric plug valves on sewage, sludge, or other liquid systems containing solids, silt, or fine sand:

1. The valves shall be positioned with the stem in the horizontal direction.

2. In horizontal pipelines, the plug shall swing upwards when opening, to permit flushing out of solids.

3. The orientation of the valve shall prevent the valve body from filling up with solids when closed; however, where the pressure differential through the valve exceeds 25 psi, the higher pressure for valves without worm gear, electric, or air operators shall be through the valve to force the plug against the seat.

4. Valves which may be closed for extended periods (stand-by, bypass, or drain lines) and valves with reversed flow (higher pressure on downstream side, forcing the plug away from its seat), shall be equipped with worm gear operators for all sizes.

5. For special applications or when in doubt, consult with the manufacturer prior to installation.

END OF SECTION

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SECTION 15140

PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals and install required pipe hangers, pipe supports, concrete inserts and anchor bolts for supporting non-buried piping as shown on the Drawings and as specified herein.

B. The absence of pipe supports and details on the Drawings shall not relieve the CONTRACTOR of the responsibility for providing them. Pipe supports indicated on the Drawings are shown only to convey the intent of the design for a particular location and are not intended to represent a complete system.

1.02 RELATED WORK

A. Concrete is included in Division 3.

B. Miscellaneous metal is included in Section 05500.

C. Pipe and fittings are included in respective sections of Divisions 13 and 15.

D. Valves and appurtenances are included in Section 15100.

E. Hangers and supports pertaining to HVAC and Plumbing systems are included in their respective Sections.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, complete sets of shop drawings of all items to be furnished under this Section. Submittals shall include complete layouts, schedules, location plans and complete total bill of materials for all pipe support systems.

B. Submittals shall include a representative catalog cut for each different type of pipe hanger or support indicating the materials of construction, important dimensions and range of pipe sizes for which that hanger is suitable. Where standard hangers and/or supports are not suitable, submit detailed drawings showing materials and details of construction for each type of special hanger and/or support. Provide detailed information on anti-seize compound.

C. Submittals shall include complete piping drawings as submitted for each piping submittal indicating type of hanger and/or support, location, magnitude of load transmitted to the structure and type of anchor, guide and other pipe supporting appurtenances including structural fasteners.

D. Types and locations of pipe hangers and/or supports shall also be shown on the piping layouts for each piping submittal as specified in the respective Division 13 and 15 pipe sections. Service

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conditions for each piping system, including service temperatures, and operating and test pressures, are tabulated in the piping sections.

E. Submit complete design data for pipe support systems to show conformance with this Section.

F. Support System Design

1. Engage the services of an independent registered professional engineer ordinarily engaged in the business of pipe support systems analysis, to analyze system piping and service conditions and to develop a detailed support system, specific to the piping material, pipe joints, valves and piping appurtenances proposed for use.

2. The support system design shall include:

a. Criteria by piping system.

b. Summary of CONTRACTOR-selected related components including joints, class, valves appurtenances, etc, and commercial supports and especially including pipe materials.

c. All aspects of the analysis and design shall comply with the provisions of ANSI B31.1 and the referenced standards.

d. Support arrangements shall be coordinated to eliminate interference with similar systems to be installed under HVAC, Plumbing and Electrical; to account for structural expansion joints and to maintain access for both personnel and for the removal of equipment. Support systems shall not include the use of monorail or bridge crane support. Nor shall they rely on the horizontal structural struts.

e. Commercial hardware and custom supports shall comply with the requirements of this Section.

f. Expansion joints shall comply with the provisions of Section 15120.

1.04 REFERENCE STANDARDS

A. Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS)

1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture.

2. MSS SP-69 - Pipe Hangers and Supports - Selection and Application.

B. American Society for Testing and Materials (ASTM)

1. ASTM A36 - Standard Specification for Carbon Structural Steel.

2. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

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C. American National Standards Institute (ANSI)

1. ANSI B31.1 - Power Piping.

D. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. All hangers, supports and appurtenances shall conform to the latest applicable requirements of ANSI B31.1, except as supplemented or modified by the requirements of this Section.

B. All hangers, supports and appurtenances shall be of approved standard design where possible and shall be adequate to maintain the supported load in proper position under all operating conditions. The minimum working factor of safety for all supporting equipment, with the exception of springs, shall be five times the ultimate tensile strength of the material, assuming 10-ft of waterfilled pipe being supported.

C. All pipe and appurtenances connected to equipment shall be supported in such a manner as to prevent any strain being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, submit certification stating that such requirements have been complied with.

1.06 DELIVERY, STORAGE AND HANDLING

A. All supports and hangers shall be crated, delivered and uncrated so as to protect against any damage.

B. All parts shall be properly protected so that no damage or deterioration shall occur during a prolonged delay from the time of shipment until installation is completed.

C. Finished metal surfaces not galvanized, that are not of stainless steel construction, or that are not coated, shall be grease coated, to prevent rust and corrosion.

PART 2 PRODUCTS

2.01 GENERAL

A. All of the equipment specified herein is intended to support the various types of pipe and piping systems shown on the Drawings. It shall be the responsibility of the CONTRACTOR to develop final details and any details associated with special conditions not already covered to meet the system conditions (in particular system temperatures and pressures) specified in the respective Division 13 and 15 Pipe Sections.

B. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, fittings and other pipe appurtenances and to support and secure the pipe in the intended position and alignment. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces and all probable external forces such as equipment, pipe and personnel contact. Any structural

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steel members required to brace any piping from excessive dislocation shall conform to the applicable requirements of Section 05500 and shall be furnished and installed under this Section.

C. The CONTRACTOR may propose minor adjustments to the piping arrangements in order to simplify the supports, or in order to resolve minor conflicts in the work. Such an adjustment might involve minor change to a pipe centerline elevation so that a single trapeze support may be used.

D. Where flexible couplings are required at equipment, tanks, etc, the end opposite to the piece of equipment, tank, etc, shall be rigidly supported, to prevent transfer of force systems to the equipment. No fixed or restraining supports shall be installed between a flexible coupling and the piece of equipment.

E. All pipe and appurtenances connected to the equipment shall be supported in a manner to prevent any strain from being imposed on the equipment or piping system.

F. All rods, clamps, hangers, inserts, anchor bolts, brackets and components for interior pipe supports shall be furnished with galvanized finish, hot dipped or electro-galvanized coated, except where field welding is required, where cold-applied galvanizing may be used. Interior clamps on plastic pipe shall be plastic coated. Supports for copper pipe shall be copper plated or shall have a 1/16-in plastic coating. All rods, clamps, hangers, inserts, anchor bolts, brackets and components for exterior pipe, submerged pipe and pipe within outdoor structures shall be of Type 316 stainless steel.

G. Supports shall be sufficiently close together such that the sag of the pipe is within limits that will permit drainage and avoid excessive bending stresses from concentrated loads between supports.

H. All uninsulated non-metallic piping such as PVC, CPVC, etc, shall be protected from local stress concentrations at each support point. Protection shall be provided by galvanized steel protection shields or other method as approved by the ENGINEER. Where pipes are bottom supported 180 degrees, arc shields shall be furnished. Where 360 degree arc support is required, such as U bolts, protection shields shall be provided for the entire pipe circumference. Protection shields shall have an 18 gauge minimum thickness, not be less than 12-in in length and be securely fastened to pipe with stainless steel or galvanized metal straps not less than 1/2-in wide.

I. All insulated pipe shall be furnished with a rigid foam insulating saddle at each pipe support location as specified under respective pipe insulation. Provide protection shields as specified in at each support location.

J. Where pipe hangers and supports come in contact with copper piping provide protection from galvanic corrosion by; wrapping pipe with 1/16-in thick neoprene sheet material and galvanized protection shield; isolators similar to Elcen, Figure No. 228; or copper plated or PVC coated hangers and supports. All stainless steel piping shall be isolated from all ferrous materials, including galvanized steel by use of neoprene sheet material and protection shields, similar to above methods.

K. Pipe supports shall be provided as follows:

1. Cast iron and ductile iron, steel and stainless steel piping shall be supported at a maximum support spacing of 10-ft with a minimum of one support per pipe section at the joints.

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2. Insofar as is possible, floor supports shall be given preference. Typical concrete supports are shown on the structural drawings. Base elbow and base tees shall be used where possible.

3. Support spacing for steel and stainless steel piping 2-in and smaller diameter and copper tubing shall not exceed 5-ft.

4. For all stainless steel piping, provide neoprene isolators between the pipe and support components.

5. Supports for multiple PVC plastic piping shall be continuous wherever possible. Individually supported PVC pipes shall be supported as recommended by the manufacturer except that support-spacing shall not exceed 3-ft. Multiple, suspended, horizontal plastic PVC pipe runs, where possible, shall be supported by ladder type cable trays such as the Electray Ladder by Husky-Burndy; the Globetray by the Metal Products, a Division of United States Gypsum, or equal. Ladder shall be of galvanized steel construction. Rung spacing shall be 12-in. Tray width shall be approximately 6-in for single runs and 12-in for double runs. Ladder type cable trays shall be furnished complete with all hanger rods, rod couplings, concrete inserts, hanger clips, etc, required for a complete support system. Individual plastic pipes shall be secured to the rungs of the cable tray by strap clamps or fasteners similar to Globe, Model M-CAC; Husky-Burndy, Model SCR or equal. Spacing between clamps shall not exceed 9-ft. The cable trays shall provide continuous support along the length of the pipe. Individual clamps, hangers and supports in contact with plastic PVC pipe shall provide firm support but not so firm as to prevent longitudinal movement due to thermal expansion and contraction.

6. All vertical pipes shall be supported at each floor or at intervals of not more than 12-ft by approved pipe collars, clamps, brackets, or wall rests and at all points necessary to insure rigid construction. All vertical pipes passing through pipe sleeves shall be secured using a pipe collar.

7. Pipe supports shall not induce point loadings but shall distribute pipe loads evenly along the pipe circumference.

8. Supports shall be provided at changes in direction and elsewhere as shown in the Drawings or as specified herein. No piping shall be supported from other piping or from metal stairs, ladders and walkways, unless specifically directed or authorized by the ENGINEER.

9. Pipe supports shall be provided to minimize lateral forces through valves, both sides of split type couplings and sleeve type couplings and to minimize all pipe forces on pump housings. Pump housings shall not be utilized to support connecting pipes.

10. Effects of thermal expansion and contraction of the pipe shall be accounted for in the pipe support selection and installation.

L. Unless otherwise specified herein, pipe hangers and supports shall be standard catalogued components, conforming to the requirements of MSS-SP-58 and -69; and shall be as manufactured by Grinnell Co., Inc., Providence, RI; Carpenter & Patterson, Inc., Woburn, MA; F&S Central, Brooklyn NY; Elcen Metal Products Co., Franklin Park, IL and Unistrut Northeast,

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Cambridge, MA or equal. Any reference to a specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product and shall not be considered as proprietary.

M. Any required pipe supports for which the supports specified in this Section are not applicable shall be fabricated or constructed from standard structural steel shapes, concrete and anchor hardware similar to items previously specified herein and shall be subject to the approval of the ENGINEER.

N. Expansion anchors shall be equal to Kwik-Bolt as manufactured by the McCullock Industries, Minneapolis, MN or Wej-it by Wej-it Expansion Products, Inc., Bloomfield, CO. The length of expansion bolts shall be sufficient to place the wedge portion of the bolt a minimum of 1-in behind the steel reinforcement.

O. Hanger rods shall be hot rolled steel, machine threaded and galvanized after fabrication. The strength of the rod shall be based on its root diameter. Hanger rods shall be attached to concrete structures using concrete inserts similar to F&S, Figures 180, 571 or 150; or continuous concrete inserts per F&S. Inserts shall be malleable iron, or steel with galvanized finish. Beam clamps, C clamps or welded beam attachments shall be used for attaching hanger rods to structural steel members. Where necessary and approved by the ENGINEER, expansion anchors shall be used for attaching to concrete structures.

2.02 SINGLE PIPE HANGERS

A. Single pipes shall be supported by hangers suspended by hanger rods from structural steel members, concrete ceilings, bottom of trapeze hangers and wall mounted steel angle brackets.

B. Except as otherwise specified herein, pipe hangers shall be steel, of the adjustable clevis type similar to Grinnell, Figure No. 65, 260 and 590 as required.

C. Where pipes are near walls, beams, columns, etc, and located an excessive distance from ceilings or underside of beams, welded steel wall brackets similar to Carpenter and Patterson, Figure No. 69-68, 84 or 139 shall be used for hanging pipe. Where single pipes rest on top of bracket pipe supports, attachments shall meet requirements as specified under multiple pipe hangers.

2.03 MULTIPLE PIPE HANGERS

A. Suspended multiple pipes, running parallel in the same horizontal plane, which are adjacent to each other shall be suspended by trapeze type hangers or wall brackets. Trapeze hangers shall consist of galvanized structural steel channel supported from galvanized threaded rod or attached to concrete walls, columns or structural steel support members as required to meet the intent of this Section. Channel shall be similar to F&S, Figure 710, rods, concrete inserts, "C" clamps, beam clamps, welded beam attachments and expansion shields shall be as specified in Paragraph 2.02 above.

B. Except as otherwise specified herein pipe anchors used for attaching pipe to trapeze or multiple pipe wall brackets shall be anchor or pipe chairs similar to F&S, Figures 158, 419, 160A, 160B as required. Material of construction shall be galvanized steel. Chair "U" bolts shall be tightened to allow freedom of movement for normal expansion and contraction except where pipe must be anchored to control direction of movement or act as a thrust anchor.

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2.04 SINGLE AND MULTIPLE PIPE SUPPORTS

A. Single pipes located in a horizontal plane close to the floor shall be supported by one of the methods as shown on the Drawings and as specified herein.

B. Pipes 3-in in diameter and larger shall be supported by adjustable stanchions similar to F&S, Figure 427. Stanchions shall provide at least 4-in adjustment and be flange mounted to floor.

C. Pipes less than 3-in in diameter shall be held in position by supports fabricated from steel "C" channel, welded post base similar to Unistrut, Figure P2072A and pipe clamps similar to Unistrut, Figures P1109 thru P1126. Where required to assure adequate support, fabricate supports using two vertical members and post bases connected together by horizontal member of sufficient load capacity to support pipe. Wherever possible supports shall be fastened to nearby walls or other structural member to provide horizontal rigidity. More than one pipe may be supported from a common fabricated support.

D. Where shown on the Drawings, pipe shall be supported using concrete anchor posts. Pipe shall be securely fastened to the posts using suitable metal straps as required and as approved.

2.05 WALL SUPPORTED PIPES

A. Single or multiple pipes located adjacent to walls, columns or other structural members, whenever deemed necessary, shall be supported using welded steel wall brackets similar to Carpenter and Patterson, Figure No. 69-78, 84, or 134; or "C" channel with steel brackets similar to Unistrut pipe clamps. All members shall be securely fastened to wall, column, etc, using double expansion shields or other method as approved by the ENGINEER. Additional wall bearing plates shall be provided where required.

B. Pipe shall be attached to supports using methods specified herein to meet the intent of this Section.

2.06 BASE ANCHOR SUPPORT

A. Where pipes change direction from horizontal to vertical via a bend, a welded or cast base bend support shall be installed at the bend to carry the load. The base bend shall be fastened to the floor, pipe stanchion, or concrete pedestal using expansion anchors or other method as approved by the ENGINEER.

B. Where shown on the Drawings, pipe bends shall be supported using concrete anchor posts. Pipes shall be securely fastened to the concrete supports with suitable metal bands as required and approved by the ENGINEER. A felt insert shall be used to isolate the piping from the poured concrete.

2.07 VERTICAL PIPE SUPPORTS

A. Where vertical pipes are not supported by a Unistrut system as specified in Paragraph 2.08 below, they shall be supported in one of the following methods.

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1. For pipes 1/4-in to 2-in in diameter, an extension hanger ring shall be provided with an extension rod and hanger flange. The rod diameter shall be as recommended by the manufacturer for the type of pipe to be supported. The hanger ring shall be steel or PVC clad depending on the supported pipe. The hanger ring shall be equal to Carpenter & Paterson, Figure No. 81 or 81CT. The anchor flange shall be galvanized malleable iron similar to Carpenter and Patterson, Figure No. 85.

2. For pipes equal to or greater than 2-in in diameter extended pipe clamps similar to Carpenter and Patterson, Figure No. 267 may be used. The hanger shall be attached to concrete structures using double expansion shields, or to steel support members using welding lugs similar to Carpenter and Patterson, Figure No. 220.

3. Pipe riser clamps shall be used to support all vertical pipes extending through floor slabs. Riser clamps shall be steel similar to Carpenter and Patterson, Figure No. 126. Copper clad or PVC coated clamps shall be used on copper pipes. Insulation shall be removed from insulated pipes prior to installing riser clamps. Insulation shall not be damaged by clamp installation.

4. Unless otherwise specified, shown, or specifically approved by the ENGINEER, vertical runs exceeding 12-ft shall be supported by base elbows/tees, clamps, brackets, wall rests and pipe collars, all located as required to ensure a rigid installation.

2.08 SPECIAL SUPPORTS

A. Pipe supports shall be provided for closely spaced vertical piping systems required to provide a rigid installation. The interval of vertical support spacing shall be as specified, but in no case shall vertical interval exceed 10-ft. The support system shall consist of a framework suitably anchored to floors, ceilings or roofs.

B. Vertical and horizontal supporting members shall be U shaped channels similar to Unistrut, Series P1000. Vertical piping shall be secured to the horizontal members by pipe clamps or pipe straps. All components shall be of steel.

C. For piping 3-in and smaller, the framework shall be as manufactured by the Unistrut Corporation; Globe-Strut as manufactured by the Metal Products Division of U.S. Gypsum or equal. For piping larger than 3-in, the support frame shall be fabricated from structural steel shapes and secured through the use of expansion anchors.

D. The assemblies shall be furnished complete with all nuts, bolts and fittings required for a complete assembly including end caps for all unistruts members.

E. The design of each individual framing system shall be the responsibility of the CONTRACTOR. Shop drawings, as specified above shall be submitted and shall show all details of the installation, including dimensions and types of supports. In all instances the completed frame shall be adequately braced to provide a complete rigid structure when all the piping has been attached.

F. Supports not otherwise described in this Section shall be fabricated or constructed from standard structural steel shapes in accordance with applicable provisions of Section 05500, or unistrut-

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type frame; have anchor hardware similar to items previously specified herein, shall meet the minimum requirements listed below and be subject to the approval of the ENGINEER.

1. Pipe support systems shall meet all requirements of this Section and all related Sections.

2. Complete design details of the pipe support system and system components shall be submitted for review and approval as specified in PART 1. No hanger or support shall be installed without the written approval of the ENGINEER.

3. The pipe support system shall not impose loads on the supporting structures in excess of the loads for which the supporting structure is designed.

2.09 SUPPORTS FOR GROOVED DUCTILE IRON PIPING

A. Grooved ductile iron piping systems proposed by the CONTRACTOR as substitute to the flanged ductile iron piping system shown on the Drawings and specified in Section 15072 shall be acceptable, in part, subject to the following hanger and support system revised requirements.

1. Take extreme caution in any and all field cut grooves, due to the criticality of the dimensions and location of the grooves. No field grooved piping shall be assembled without the inspection and verification of the groove by the CONTRACTOR and in the presence of the ENGINEER. All couplings connected to a field groove shall be spot-painted.

2. At each change in direction the piping shall be restrained against the axial direction of movement and against resultant pressure thrust, due to potential joint movement due to out-of-spec grooving.

B. If, in the course of testing or operation there is any pipe movement, it shall require the removal of the length of pipe.

2.10 SURFACE PREPARATION AND SHOP PRIME PAINTING

A. All surfaces shall be prepared and shop painted as part of the work of this Section. Surface preparation and shop painting shall be as specified in Section 09901.

PART 3 EXECUTION

3.01 INSTALLATION

A. Proceed with the installation of piping and supports only after any building structural work has been completed and new concrete has reached its 28-day compressive strength.

B. The installation of pipe support systems shall in no way interfere with the operation of the overhead bridge cranes, monorails, access hatches, etc.

C. The installed systems shall not interfere with maintenance and operational access to any equipment installed under this Section, or any other related Section.

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D. All pipes horizontal and vertical, requiring rigid support shall be supported from the building structure by approved methods. Supports shall be provided at changes in direction and elsewhere as shown in the Drawings or as specified herein. No piping shall be supported from metal stairs, ladders and walkways unless specifically directed or authorized by the ENGINEER.

E. All pipe supports shall be designed with liberal strength and stiffness to support the respective pipes under the maximum combination of peak loading conditions to include pipe weight, liquid weight, liquid movement and pressure forces, thermal expansion and contraction, vibrations and all probable externally applied forces. Prior to installation, all pipe supports shall be approved by the ENGINEER.

F. Pipe supports shall be provided to minimize lateral forces through valves, both sides of split type couplings and sleeve type couplings (within four pipe diameters) and to minimize all pipe forces on pump housings. Pump housings shall not be utilized to support connecting pipes.

G. Inserts for pipe hangers and supports shall be installed on forms before concrete is placed. Before setting these items, all Drawings and figures shall be checked which have a direct bearing on the pipe location. Responsibility for the proper location of pipe supports is included under this Section.

H. Continuous metal inserts shall be embedded flush with the concrete surface.

I. Apply anti-seize compound to all nuts and bolts. Supports installed without the approved compound shall be dismantled and correctly installed, at no additional cost to the OWNER.

3.02 TESTING

A. All pipe support systems shall be tested for compliance with this Section. After installation, each pipe support system shall be tested in conjunction with the respective piping pressure tests. If any part of the pipe support system proves to be defective or inadequate, it shall be repaired or augmented under this Section to the satisfaction of the ENGINEER.

END OF SECTION

Division 16 Electrical

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SECTION 16001

ELECTRICAL - GENERAL PROVISIONS - PIPELINE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials and equipment required and install complete and make operational, electrical and process instrumentation systems as shown on the Drawings and as specified herein.

B. All material and labor required to furnish, install, and test the work specified in Division 16 shall be performed by a State of California C-10 licensed Electrical Contractor.

C. The work shall include furnishing, installing and testing the equipment and materials detailed in the following Sections:

Section No		Title
16001	-	Electrical - General Provisions
16110	-	Raceways, Boxes, Fittings and Supports
16600	-	Underground System
16800	-	Fiberoptic and Power Conduits Along Pipelines

D. The work shall include the following:

1. Precast manholes, handholes and conduit.

E. Review the electrical underground system and the civil yard piping. Install the electrical underground system in a manner that avoids conflicts with manholes, catch basins, etc. provided under other Divisions of the specifications.

F. Sequencing and Scheduling

1. Coordinate electrical equipment installation with other trades.

2. Arrange for chases, slots and openings in the building structures during the progress of construction to allow for the electrical installation.

3. Sequence, coordinate and integrate the installation of electrical materials and equipment for efficient flow of the work.

4. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be installed.

G. Excavation, bedding material, forms, and backfill for underground raceways; forms and concrete for electrical equipment furnished under Division 16, unless specifically noted otherwise.

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1.02 RELATED WORK

A. The following Sections apply to all Division 16 sections to the extent applicable.

1. Section 01300 – CONTRACTOR Submittals.

2. Section 01311 – Construction Scheduling.

3. Section 01313 – Construction and Scheduling Constraints.

4. Section 01720 – Project Record Documents.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings for equipment, materials and other items furnished under Division 16.

B. As a minimum all equipment specified in each Section of Division 16 shall be submitted at one time. As an example all manholes and pull boxes shall be submitted together, all motor control centers shall be submitted together, etc. Submittals that do not comply will be returned disapproved.

C. Mark submittals to clearly identify proposed equipment including accessories, options, and features and to exclude parts not applicable to the project. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submittal piece of literature and each submittal drawing shall clearly reference the Project Specification and/or Contract Drawing that the submittal is to cover. General catalogs will not be accepted as cut sheets to fulfill submittal requirements.

D. All dimensions shall be field verified at the job site and coordinated with the work of all other trades.

E. Exceptions to the Specifications or Drawings shall be clearly defined by the Electrical Subcontractor in a separate section of each submittal package. The submittal shall contain the reason for the exception, the exact nature of the exception and the proposed substitution so that a proper evaluation may be made by the ENGINEER. The acceptability of any device or methodology submitted as an "or equal" or "exception" to the Specifications shall be at the sole discretion of the ENGINEER

1.04 REFERENCE STANDARDS

A. Electric equipment, materials and installation shall comply with the National Electrical Code (NEC) and with the latest edition of the following codes and standards:

1. National Electrical Safety Code (NESC)

2. Occupational Safety and Health Administration (OSHA)

3. National Fire Protection Association (NFPA)

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4. National Electrical Manufacturers Association (NEMA)

5. American National Standards Institute (ANSI)

6. Underwriters Laboratories (UL)

7. Factory Mutual (FM)

8. International Electrical Testing Association (NETA)

9. Local Building Codes

10. Institute of Electrical and Electronics Engineers (IEEE)

11. Joint Industrial Council (JIC)

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 ENCLOSURE TYPES

A. Unless otherwise required, electrical enclosures shall be NEMA Types as follows:

1. NEMA 1 in dry, non-process indoor above grade locations (i.e. administration areas, laboratories, control rooms, storage rooms).

2. NEMA 12 in damp locations and maintenance shops.

3. NEMA 4 in outdoor locations, rooms below grade including basements and buried vaults, and wet locations.

4. NEMA 4X in corrosive locations.

5. NEMA 7 in hazardous classified indoor locations.

6. NEMA 7 (gasketed) in hazardous classified outdoor locations. Provide enclosures labeled for such use.

1.06 CODES, INSPECTION AND FEES

A. Equipment, materials and installation shall comply with the requirements of the local authority having jurisdiction.

1.07 INTERPRETATION OF DRAWINGS

A. Unless specifically stated to the contrary, the Drawings do not show exact locations of conduit runs. Coordinate the conduit installation with other trades and the actual supplied equipment.

B. Conduit shown exposed shall be installed exposed; conduit shown concealed shall be installed concealed.

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C. Except where dimensions are shown, the locations of manholes, equipment, fixtures, outlets and similar devices shown on the Drawings are approximate only. Exact locations shall be determined by the CONTRACTOR and approved by the ENGINEER during construction. Obtain information relevant to the placing of electrical work and in case of any interference with other work, proceed as directed by the ENGINEER and furnish all labor and materials necessary to complete the work in an approved manner.

D. Circuit layouts are not intended to show the number of fittings, or other installation details. Furnish all labor and materials to install and place in satisfactory operation all conduits, manholes, pull boxes and related raceway components.

E. Redesign of electrical or mechanical work, which is required due to the CONTRACTOR's use of an alternate item, arrangement of equipment and/or layout other than specified herein, shall be done by the CONTRACTOR at his/her own expense. Redesign and detailed plans shall be submitted to the ENGINEER for approval. No additional compensation will be provided for changes in the work, either his/her own or others, caused by such redesign.

1.08 RECORD DRAWINGS

A. As the work progresses, legibly record all field changes on a set of Project Contract Drawings, hereinafter called the "Record Drawings."

B. Record Drawings shall accurately show the installed condition of the following items:

1. Raceways, pull boxes and manholes.

2. Underground raceway and duct bank routing.

3. Fiber Optic Network raceway routing.

1.09 MATERIALS AND EQUIPMENT

A. Materials and equipment furnished under this contract shall be new.

B. Material and equipment of the same type shall be the product of one manufacturer and shall be UL listed.

1.10 MANHOLE AND PULL BOX IDENTIFICATION

A. Identify all manholes and pull boxes furnished under Division 16 with unique designations for each component. The CONTRACTOR shall develop the identification system and submit it to the ENGINEER for review and approval.

B. Identification shall be permanently attached to the manhole and pull box covers.

PART 2 PRODUCTS

NOT USED

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PART 3 EXECUTION

3.01 CUTTING AND PATCHING

A. Cutting and patching shall be done in compliance with generally accepted procedures.

B. Core drill holes in concrete floors and walls as required.

C. Install work at such time as to require the minimum amount of cutting and patching.

D. Cut opening only large enough to allow easy installation of the conduit.

E. Patching to be of the same kind and quality of material as was removed.

F. The completed patching work shall restore the surface to its original appearance or better.

G. Patching of waterproofed surfaces shall render the area of the patching completely waterproofed.

H. Remove rubble and excess patching materials from the premises.

3.02 INSTALLATION

A. Work not installed according to the Drawings and Specification shall be subject to change as directed by the ENGINEER at CONTRACTOR's expense.

B. Electrical equipment shall be protected against mechanical and water damage. Store all electrical equipment in dry permanent shelters. Do not install electrical equipment in place until structures are weather-tight.

C. Damaged equipment shall be replaced or repaired by the equipment manufacturer, at the ENGINEER's discretion and at the CONTRACTOR's expense.

D. Repaint any damage to factory applied paint finish using touch-up paint furnished by the equipment manufacturer. The entire damaged panel or section shall be repainted in accordance with the field painting requirements specified in Section 09902 at the CONTRACTOR's expense.

END OF SECTION

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SECTION 16110

RACEWAYS, BOXES, FITTINGS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish and install complete raceway systems as shown on the Drawings and as specified herein.

B. Conduit interconnections may not be shown completely on the Drawings, including but not limited to raceways and conductors: between lighting, switches, receptacles, other miscellaneous low voltage and signal systems Home runs indicated are to assist the CONTRACTOR in identifying raceways to be installed concealed or exposed. Raceways and conductors shall be provided for complete and operating systems. Raceways indicated to be run exposed on the Drawings shall be run near the ceilings or along the walls of the areas through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes and hoists, lighting fixtures, doors and hatches, etc. Raceways indicated to be run concealed shall be run in the below concrete floor slabs, in partitions, or above hung ceilings, as required.

C. Conduit and wire schedules (included on the Drawings) are prepared as a guide to the CONTRACTOR; however, omissions in the schedule shall not relieve the CONTRACTOR of the responsibility of furnishing and installing conduit and wire as required by the remainder of the Drawings and specifications.

1.02 RELATED WORK

A. Electrical General Provisions are included under 16000 (16001 for pipeline).

B. Underground duct system is included under Section 16600.

C. Conduit schedules are included on the Drawings.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300 and 16000 (16001 for pipeline), the manufacturers' names and product designation or catalog numbers with marked cut sheets of all materials specified.

PART 2 PRODUCTS

2.01 RACEWAYS AND FITTINGS

A. Rigid Steel Conduit and Fittings

1. Rigid metal conduit (GRS), couplings, factory elbows and fittings shall be heavy wall steel tubing with a hot-dipped galvanized finish inside and out after threading and shall comply with ANSI C 80.1 and UL/6.

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2. Acceptable manufacturers:

   a. Allied Tube & Conduit Corp.

   b. LTV Steel Tubular Products Corp.

   c. Triangular PWC Inc.

   d. Or equal.

3. Rigid conduit fittings shall be of the threaded type, and shall be steel or malleable iron, with a hot-dipped galvanized finish. Threadless fittings and split couplings are not allowed except in specific applications as approved by the ENGINEER.

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4. Acceptable manufacturers:

   a. Appleton Electric Co.

   b. O-Z Gedney Co.

   c. RACO Inc.

   d. Gould/Efcor

   e. Steel City

   f. Or equal

B. PVC Coated Rigid Steel Conduit and Fittings

1. PVC coated rigid steel conduit shall be heavy wall steel tubing with a hot-dipped galvanized finish inside and out after threading with a minimum 0.040-in thick, polyvinyl chloride coating permanently bonded to it and an internal chemically cured urethane or enamel coating. The rigid steel conduit shall comply with ANSI C80.1 and UL/6 prior to coating.

2. PVC coated couplings, factory elbows and fitting shall be furnished with a PVC coating bonded to steel the same thickness as used on the PVC coated conduit. The ends of all couplings, fittings, etc. shall have a minimum of one pipe diameter in length of PVC overlap.

3. Acceptable manufacturers:

   a. “OCAL” as manufactured by Thomas & Betts

   b. "Plasti-Bond Red" as manufactured by Robroy Industries

   c. Triangle PWC Inc

   d. Or equal

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C. Non Metallic Conduit and Fittings

1. PVC conduit shall be rigid polyvinyl chloride schedule 40. Rigid PVC conduit shall comply with NEMA TC-2 and UL/651 and shall be sunlight resistant, rated for use with 90 degree C conductors in exposed and direct or concrete encased applications.

2. Connectors, couplings, fittings and ancillary materials shall be supplied by the conduit manufacturer. Connectors, fittings and ancillary materials shall be rated for the environment for which they are installed.

3. Acceptable manufacturers:

   a. Carlon Corp.

   b. PW Eagle.

   c. Cantex Inc.

   d. Or equal.

D. Liquid-tight Flexible Metal Conduit, Couplings and Fittings

1. Liquid-tight flexible metal conduit shall be square locked, galvanized steel flexible conduit with a moisture proof, flame resistant, polyvinyl chloride jacket, for use with rigid metal conduit systems. Sealtite, Type UA, manufactured by the Anaconda Metal Hose Div.; Anaconda American Brass Co.; American Flexible Conduit Co., Inc.; Universal Metal Hose Co. or equal.

2. Liquid-tight conduit fittings shall be hot-dipped mechanically galvanized, positive grounding, screw in type. Provide external bonding lugs on sizes 1-1/4-in and larger. Box connectors shall have insulated throats as manufactured by the Thomas & Betts Co.; Crouse-Hinds Co. or equal.

3. Acceptable Manufacturers:

   a. American Flexible Conduit Co.

   b. Anaconda Metal Hose/ANAMET Inc.

   c. Electri-flex Co.

   d. Thomas & Betts

   e. O-Z Gedney

   f. Or equal

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E. Flexible Metallic Tubing

1. Flexible metallic tubing shall be for use under the provisions of NEC Article 360.

2. Flexible metallic tubing shall be hot-dipped galvanized steel strips shaped into interlocking convolutions firmly joined to one another assuring a complete lock.

3. Flexible metallic tubing shall be used only indoors for connection to lighting fixtures in NEMA 1 administration and office areas.

4. Furnish and install insulated bushings at terminations for conductor protection.

5. Acceptable manufacturers:

a. Tristeel as manufactured by Triangle - PWC, Inc.

b. Or equal

2.02 BOXES AND FITTINGS

A. Dry and Damp Location Boxes and Fittings

1. Outlet boxes shall be zinc-galvanized, extra depth, pressed steel with knockouts and of size and type suitable for the intended application.

2. Boxes that are less than 100 cubic inches in size used for junction or pull boxes shall be zinc galvanized pressed steel not less than 14 USS gauge with appropriate blank covers, minimum size 4-11/16-in square by 2-1/8-in deep.

3. Boxes that are 100 cubic inches and larger shall be constructed of hop dip galvanized sheet steel without knockouts. Covers shall be secured with round head brass machine screws. All joints shall be welded and ground smooth.

4. Terminal cabinets shall be NEMA 12 sheet steel unless otherwise shown on the Drawings. Boxes shall be painted and have continuously welded seams. Welds shall be ground smooth and galvanized. Box bodies shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Terminal boxes shall be furnished with latching hinged doors, terminal mounting straps and brackets. Terminal blocks shall be rated not less than 20A, 600V.

5. Acceptable Manufacturers:

a. Appleton

b. Raco

c. Steel City

d. Hoffman

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e. Electromate Division of Robroy Ind.

f. Wiegmann

B. Wet and Corrosive Location Boxes and Fittings

1. NEMA 3R and 12 terminal boxes, junction boxes, pullboxes, etc. shall be painted steel, and those in NEMA 4X areas, shall be sheet Type 316 stainless steel unless otherwise shown on the Drawings. Boxes shall have continuously welded seams and mounting feet. Welds shall be ground smooth. Boxes shall be flanged and shall not have holes or knockouts. Box bodies shall not be less than 14 gauge metal and covers shall not be less than 12 gauge metal. Covers shall be gasketed and fastened with stainless steel clamps. Terminal boxes shall be furnished with hinged doors, terminal mounting straps and brackets. Terminal blocks shall be NEMA type, not less than 20 Amps, 600 Volt.

2. Cast or malleable iron device boxes shall be Type FD. Boxes and fittings shall have cadmium-zinc finish with cast covers and stainless steel screws.

3. Acceptable Manufacturers:

a. Appleton

b. Crouse-Hinds

c. Steel City

d. Hoffman

e. Electromate - Division of Robroy Ind.

f. Or equal

4. NEMA 4X PVC coated outlet boxes shall be used with PVC coated conduit shall be furnished with a PVC coating bonded to the metal, the same thickness as used on the coated steel. Acceptable manufacturers:“OCAL” as manufactured by Thomas & Betts, "Plasti-Bond Red" as manufactured by Robroy Industries, Triangle PWC Inc, or equal

C. Hazardous (Classified) Location Boxes

1. Explosion-proof boxes shall be designed for Class 1, Group D, Division 1 hazardous locations, and shall also have O-ring seals to meet NEMA 4 requirements. Boxes and covers shall be aluminum, with stainless steel hinges and stainless steel bolts; Type EJB-N4 as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; Adalet-PLM or equal.

D. Hazardous Area Sealing

1. Conduit sealing fittings shall be approved for Class I, Division 1 and 2 areas, designed to minimize the passage of gas and vapor and to prevent the passage of flames. Crouse-Hinds,

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Killark EYS, EY, EYD, or ENY, or equal, listed for use with the specified sealing compound.

2. Sealing compound shall be Crouse-Hinds , Killark SC Series, or equal, used with Crouse-Hinds or Killark Packing Fiber.

E. Miscellaneous Fittings

1. Flexible couplings shall be type ECGJH as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; Killark Electric Manufacturing Co. or equal.

2. Conduit hubs shall be as manufactured by Myers Electric Products, Inc. or equal.

3. Conduit wall seals for new concrete walls below grade shall be O.Z./Gedney Co., Type WSK;; Spring City Electrical Manufacturing Co., Type WDP or equal.

4. Conduit wall seals for cored holes shall be Type CSMC as manufactured by the O.Z./Gedney Co. or equal.

5. Conduit wall and floor seals for sleeved openings shall be Type CSMI as manufactured by the O.Z./Gedney Co. or equal.

6. Combination expansion-deflection fittings embedded in concrete shall be Type XD as manufactured by the Crouse-Hinds Co.; Type DX as manufactured by O.Z./Gedney Co.; Type DF as manufactured by Appleton Electric Co. or equal.

7. Combination expansion-deflection fittings installed exposed shall be Type XD as manufactured by Crouse-Hinds Co.; Type DX as manufactured by O.Z. Gedney Co.; Type DF as manufactured by Appleton Electric Co. or equal.

8 Explosion proof fittings shall be as manufactured by the Crouse-Hinds Co.; Appleton Electric Co.; O.Z./Gedney Co. or equal.

9 Conduit sealing bushings shall be O.Z./Gedney, Type CSB or equal.

10. Grounding bushings shall be malleable iron with integral insulated throat rated for 150 degrees C, with solderless lugs as manufactured by Crouse Hinds/Cooper, Series HGLL; Appleton, Series GIB; O.Z./Gedney, Type HBLG or equal.

2.03 HARDWARE

A. Conduit Mounting Equipment

1. In dry indoor areas, hangers, rods, backplates, beam clamps, channel, etc shall be galvanized iron or steel.

2. PVC coated steel channel or Fiberglass channel with stainless steel hardware shall be used in areas designated "WET" or "CORROSIVE" on the Drawings and in outdoor locations. Fiberglass channel shall be resistant to the chemicals present in the area in which it is used.

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3. Furnish any and all necessary supports, brackets, conduit sleeves, racks and bracing as required. All boxes and hardware shall be galvanized zinc plated steel except that stainless steel shall be used in areas designated as designated NEMA 3R, 4, or 4X on the Drawings.

B. Conduit Identification Plates

1. Conduit identification plates shall be embossed stainless steel with stainless steel band, permanently secured to the conduit without screws.

2. Identification plates shall be as manufactured by the Panduit Corp. or equal.

C. Wall and Floor Slab Opening Seals

1. Wall and floor slab openings shall be sealed with a UL approved expending material which equals or exceeds the fire rating of the wall or floor construction as manufactured by the Thomas & Betts Corp.; Pro Set Systems; Neer Mfg. Co.; Specified Technologies, Inc. or equal.

D. Cold Galvanizing Compound

1. Cold galvanizing compound shall be as manufactured by ZRC Products Company, a Division of Norfolk Corp. or equal.

E. Conduit Supports

1. Trapezes

a. In dry indoor areas, beams, channels, struts, hangers, bracing, rods, beam clamps, accessories and components shall be galvanized steel.

b. PVC coated steel beams, channels, struts or fiberglass beams, channels, struts with stainless steel hangers, bracing, rods, beam clamps, accessories and components shall be used in areas designated NEMA 3R, 4, or 4X and in outdoor locations. Fiberglass channels shall be resistant to the chemicals resent in the area in which it is used.

2. Flush Mounted Supports

a. In dry indoor areas, channels, struts, accessories and components shall be galvanized steel.

b. PVC coated steel channels, struts or fiberglass channels, struts with stainless, accessories and components shall be used in areas designated NEMA 3R, 4, or 4X and in outdoor locations. Fiberglass channels, struts shall be resistant to the chemicals present in the area in which it is used.

3. Conduit Racks

a. In dry indoor areas, conduit racks, accessories and components shall be galvanized steel.

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b. PVC coated steel conduit racks or fiberglass conduit racks with stainless, accessories and components shall be shall be used in areas designated NEMA 3R, 4, or 4X and in outdoor locations. Fiberglass channels shall be resistant to the chemicals present in the area in which it is used.

4. Conduit Hangers

a. In dry indoor areas, conduit clamps, rods, beam clamps, bracing, accessories and components shall be galvanized steel.

b. Stainless steel conduit clamps, rods, beam clamps, bracing, accessories and components shall be shall be used in areas designated NEMA 3R, 4, or 4X and in outdoor locations.

5. Adjustable steel and plastic band hangers, adjustable band hangers, adjustable swivel ring hangers and J-hangers shall not be allowed.

6. All hangers, bracing, rods, beam clamps, accessories and components shall be as manufactured by the Carpenter & Paterson Inc.; Grinnell Corporation; B-Line Systems Inc. or equal.

PART 3 EXECUTION

3.01 RACEWAY APPLICATIONS

A. Refer to Table 16110-1 for specific raceway application requirements.

B. All conduit of a given type shall be the product of one manufacturer.

C. Refer to Section 16600 for underground applications.

3.02 BOX APPLICATIONS

A. Unless otherwise specified or shown on the Drawings, all boxes shall be metal.

B. Exposed switch, receptacle and lighting outlet boxes and condulet fittings shall be cast or malleable iron, except that non-metallic PVC shall be used with PVC.

C. Concealed switch, receptacle and lighting outlet boxes shall be pressed steel.

D. Terminal boxes, junction boxes and pull boxes shall have NEMA ratings suitable for the location in which they are installed.

E. Boxes flush in block, brick or tile walls shall be located at a course line and provided with square tile covers. Flush boxes shall not project beyond the finished surfaces nor shall surfaces project more than 1/8-in beyond the box enclosure. Wiring devices located in close proximity to each other shall be installed in one solid gang box with single cover.

F. All conduit bodies and pulling outlets shall comply with NEC wire bending space requirements. Mogul type fittings shall be used for sizes 2-1/2-in and larger.

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TABLE 16110-1 ***Raceway Application Guidelines***	
Location/Circuit Type	***Raceway Type***
All locations (except as modified by entries below)	▪ Exposed (General)- Galvanized rigid steel (GRS) conduit. ▪ Concealed - Do not embed within structure. If this is not possible, use Schedule 40 PVC conduit. ▪ Underground - PVC duct (as specified) in concrete reinforced duct bank. ▪ Avoid running through corrosive locations.
All locations	▪ Stub outs through concrete, asphalt, etc: PVC coated GRS
All locations Fiber Optic wiring systems	▪ Exposed - Galvanized rigid steel (GRS) conduit. ▪ Concealed - Schedule 40 PVC conduit.
Clean, dry finished areas - offices, administrative areas, lobbies, control room, lunch room, toilets, and laboratories, etc.	▪ Conceal raceways in walls and above hung ceilings in rooms and areas that have finished interiors. ▪ Surface raceway for multiple receptacle, voice, and data outlets in labs and control rooms or in offices where specified. ▪ Galvanized rigid steel (GRS)
Clean, dry non-finished areas - electrical rooms, generator rooms, mechanical rooms, shops, dry storage, etc.	▪ Exposed conduit for power wiring, lighting, switch, and receptacle circuits - Galvanized rigid steel (GRS). ▪ Concealed conduit for power wiring, lighting, switch, and receptacle circuits - Schedule 40 PVC conduit when embedded within concrete floor slabs. GRS when embedded within masonry block walls.
Process areas - non-corrosive, non-hazardous DAMP or WET locations	▪ Exposed conduit for power wiring, lighting, switch, and receptacle circuits - Galvanized rigid steel (GRS) ▪ Concealed conduit for power wiring, lighting, switch, and receptacle circuits - Schedule 40 PVC conduit when embedded within concrete floor slabs or below slab on grade. GRS when embedded within masonry block walls.
Corrosive areas - chemical storage and handling areas, underground vaults, within tanks or clearwells, filter pipe galleries and locations where designated corrosive on the Drawings.	▪ Exposed conduit for power wiring, lighting, switch, and receptacle circuits – PVC coated rigid steel. ▪ Concealed conduit for power wiring, lighting, switch, and receptacle circuits - Schedule 40 PVC conduit when embedded within concrete floor slabs or structures or below slab on grade.
Hazardous areas -- Class 1, Division 1 and 2.	▪ Exposed conduit for power wiring, lighting, switch, and receptacle circuits - PVC coated GRS ▪ Concealed conduit for power wiring, lighting, switch, and receptacle circuits - PVC coated GRS

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TABLE 16110-1 ***Raceway Application Guidelines***	
Location/Circuit Type	***Raceway Type***
Outdoor areas - all locations.	▪ Exposed conduit for power wiring, lighting, switch, and receptacle circuits - Galvanized rigid steel (GRS). PVC conduit shall not be used exposed. ▪ Concealed conduit for power wiring, lighting, switch, and receptacle circuits - Schedule 40 PVC conduit when embedded within concrete structures or below slab on grade.

3.03 FITTINGS APPLICATIONS

A. Combination expansion-deflection fittings shall be used where exposed conduits cross structure expansion joints or in straight runs where expansion is anticipated. Combination expansion-deflection fittings shall be installed where embedded conduits cross structural expansion joints. Refer to Structural Drawings for expansion joint locations. Provide bonding jumpers around fittings.

B. All underground conduit penetrations at walls or other structures shall be sealed watertight. Conduit wall seals and sleeves shall be used in accordance with the manufacturer's installation instructions and the details shown on the Drawings.

C. Conduit sealing bushings shall be used to seal conduit ends exposed to the weather and at other locations shown on the Drawings.

D. Insulated throat grounding bushings shall be used where specified herein, in Section 16660, and where conduits stub up into electrical equipment such as MCC's, switchboards, etc.

3.04 INSTALLATION

A. No conduit smaller than 3/4-in electrical trade size shall be used, nor shall any have more than the equivalent of three 90 degree bends in any one run. Pull boxes shall be provided as required by the NEC after every 270 degrees of bends and for straight run not to exceed 200 feet or as directed.

B. No wire shall be pulled until the conduit system is complete in all details; in the case of concealed work, until all rough plastering or masonry has been completed; in the case of exposed work, until the conduit system has been completed in every detail.

C. All conduit which may under any circumstance contain liquids such as water, condensation, liquid chemicals, etc, shall be arranged to drain away from the equipment served. If conduit drainage is not possible, conduit seals shall be used to plug the conduits. The ends of all conduits shall be temporarily plugged to exclude dust, moisture and debris from entering during construction.

D. Conduit ends exposed to the weather shall be sealed with conduit sealing bushings.

E. Conduits noted as spare shall be capped or plugged at both ends with easily removable fittings.

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F. Conduit terminating in NEMA 3R, 4, 4X and 12 enclosures shall be terminated with Myers type conduit hubs.

G. Conduit terminating in pressed steel boxes shall have double locknuts and insulated bushings.

H. Conduits containing equipment grounding conductors and terminating in sheet steel boxes shall have insulated throat grounding bushings.

I. Conduits, except for PVC, shall be installed using threaded fittings.

J. The use of running threads is prohibited. Where such threads are necessary, a 3-piece union shall be used.

K. All conduits entering or leaving a motor control center, switchboard or other multiple compartment enclosure shall be stubbed up into the bottom horizontal wireway or other manufacturer's designated area, directly below the vertical section in which the conductors are to be terminated. The 3-in extension of conduit above the floor slab or concrete equipment pad may be reduced to a dimension that suits the equipment manufacturer's installation requirements if the 3-in stub-up interferes with the equipment being provided.

L. Rigid galvanized steel conduits buried in earth shall be completely painted with bitumastic.

M. Rigid galvanized steel conduits which have been field cut and threaded shall be painted with cold galvanizing compounds.

N. PVC coated rigid galvanized steel conduit shall be used for elbows at risers at the utility pole for electrical and telephone service conduits. Rigid galvanized steel conduit shall be used at utility pole for electrical and telephone service and fire alarm conduits to a height of 10-ft above finished grade. Furnish and install weather heads at service pole riser if required by utility company.

O. PVC coated rigid galvanized steel conduit and elbows shall be used for pad-mounted transformer stub-ups.

P. In hazardous locations, conduits terminating at boxes enclosing circuit opening equipment shall be sealed at the entrance to the enclosure with approved compound filled sealing fittings to prevent passage of explosive or combustible gases through the conduits. All conduits leading from or entering hazardous locations shall be similarly sealed at points of exit or entrance. Exposed conduits passing through hazardous locations shall be sealed at both the entrance to and the exit from the hazardous locations. A sealing compound installation schedule shall be submitted for approval. Each installation shall be signed off by the CONTRACTOR and the ENGINEER and each fitting shall be legibly marked with red paint to indicate that the sealing compound has been installed.

Q. Conduit sealing and drain fittings shall be installed in all hazardous (classified) areas designated Class 1, Division 1, and Class 1, Division 2.

R. Liquid-tight flexible metal conduit shall be used for all motor terminations, the primary and secondary of transformers, generator terminations and other equipment where vibration is present or may require removal. The length of liquid-tight flexible metal conduit shall not exceed 36"

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when used for vibration isolation, and shall not exceed 72" in length when attaching to luminaires. Non-metallic flexible conduit shall only be allowed for use with rigid PVC conduit systems.

S. Flexible couplings shall be used in hazardous locations for all motor terminations and other equipment where vibration is present.

T. PVC coated rigid steel conduit shall be used as a transition section where concrete embedded conduit stubs out of floor slabs or through below grade walls or where conduit installed under building slabs on grade stub out of floors. The PVC coated rigid steel conduit shall extend a minimum of 3-in into and out of the floor slab, concrete pad, or wall to allow for proper threading of the conduit.

U. PVC conduit to non-metallic box connections shall be made with PVC socket to male thread terminal adapters with neoprene O-ring and PVC round edge bushings.

V. PVC conduit shall be supported with non-metallic clamps, PVC coated steel or non-metallic racks and stainless steel hardware.

W. Expansion fittings shall be used on exposed runs of PVC conduit where required for thermal expansion. Installation and number of fittings shall be as recommended by manufacturer.

X. PVC boxes, conduit fittings, etc, with integral hubs shall be solvent welded directly to the PVC conduit system.

Y. Non-metallic boxes with field drilled or punched holes shall be connected to the PVC conduit system with threaded and gasketed PVC Terminal Adapters.

Z. Conduit supports, other than for underground raceways, shall be spaced at intervals not exceeding the distance required by the NEC to obtain rigid construction.

AA. Single conduits shall be supported by means of one-hole pipe clamps in combination with one-screw back plates, to raise conduits from the surface. Multiple runs of conduits shall be supported on fabricated channel trapeze type racks with steel horizontal members and threaded hanger rods. The rods shall be not less than 3/8-in diameter. Surface mounted panel boxes, junction boxes, conduit, etc, shall be supported by spacers to provide a minimum of 1/2-in clearance between wall and equipment.

AB. Conduit Supports (Other than Underground Raceways)

1. Trapezes

a. Conduit support trapezes shall be vertically supported every 10-ft or less, as required to obtain rigid conduit construction.

b. Lateral seismic restraints (Sway Bracing) shall be spaced 30-ft or less.

c. Horizontal seismic restraints shall be spaced at 40-ft or less. There shall be at least one horizontal restraint per horizontal run.

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d. Attachment to structural steel shall be by beam clamps or welded beam attachment. C-clamps will not be allowed for vertical hangers. Side beam clamps with beam hooks shall be used for seismic restraint only.

e. Attachment to concrete shall be cast-in-place inserts, cast-in place welded plates with welded studs or stainless steel adhesive anchors.

2. Flush Mounted Supports

a. Support shall be spaced 10-ft or less, as required to obtain rigid conduit construction.

b. Attachment to concrete shall be with cast-in-place inserts, cast-in place welded plates with welded studs or stainless adhesive anchors.

3. Conduit Racks

a. Support shall be spaced 10-ft or less, as required to obtain rigid conduit construction.

b. Horizontal seismic restraints shall be spaced at 30-ft or less.

c. Attachment to concrete shall be with cast-in-place inserts, cast-in place welded plate with welded studs or stainless adhesive anchors.

4. Conduit Hangers

a. Conduit hangers shall be vertical supported 10-ft or less, as required to obtain rigid conduit construction.

b. Lateral seismic restraints (Sway Bracing) shall be spaced 20-ft or less.

c. Horizontal seismic restraints shall be spaced at 30-ft or less. There shall be at least one horizontal restraint per horizontal run.

d. Attachment to structural steel shall be by beam clamps or welded beam attachment. C-clamps will not be allowed for vertical hangers. Side beam clamps with beam hooks shall be used for seismic restraint only.

e. Attachment to concrete shall be cast-in-place inserts, cast-in place welded plates with welded studs or stainless steel adhesive anchors.

5. All reinforcing bars shall be located by the Electrical Subcontractor with the use of a rebar locator prior to installing adhesive capsule type anchors. Mark the location of all reinforcing bars in an area bounded by a line drawn at least 18-in from the edge of the support bearing/weld plates on all four sides of the bearing/weld plates prior to fabricating and installing bearing/weld plates.

6. Where interference occurs, adjust anchor locations to clear reinforcing bars and alter support configuration at no additional cost to the OWNER.

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AC. Miscellaneous steel for the support of fixtures, boxes, transformers, starters, contactors, panels and conduit shall be furnished and installed. Channel supports shall be ground smooth and fitted with plastic end caps.

AD. Steel channels, flat iron and channel iron shall be furnished and installed for the support of all electrical equipment and devices, where required, including all anchors, inserts, bolts, nuts, washers, etc, for a rigid installation. Channel supports shall be ground smooth and fitted with plastic end caps

AE. All conduits on exposed work, within partitions and above suspended ceilings, shall be run at right angles to and parallel with the surrounding wall and shall conform to the form of the ceiling. No diagonal runs will be allowed. Bends in parallel conduit runs shall be concentric. All conduits shall be run perfectly straight and true.

AF. Where conduits pass through openings in walls or floor slabs, the remaining openings shall be sealed against the passage of flame and smoke in accordance with UL requirements and the details shown on the Drawings. The sealing method shall have a UL fire rating, which equals or exceeds the fire rating of the wall or floor construction.

AG. Conduits shall not cross pipe shafts, access hatches or vent duct openings. They shall be routed to avoid such present or future openings in floor or ceiling construction.

AH. Conduits passing from heated to unheated spaces, exterior spaces, refrigerated spaces, cold air plenums, etc, shall be sealed with "Duxseal" as manufactured by Manville or seal fitting to prevent the accumulation of condensation.

AI. Conduits shall be located a minimum of 3-in from steam or hot water piping. Where crossings are unavoidable, the conduit shall be kept at least 1-in from the covering of the pipe crossed.

AJ. Mandrels shall be pulled through all existing conduits which will be reused and through all new conduits 2-in in diameter and larger prior to installing conductors.

AK. 3/16-in polypropylene pull lines shall be installed in all conduits noted as spares or designated for future equipment. Conduit noted as spare shall be capped or plugged at both ends with easily removable fittings

AL. Emergency (generator) source and normal (power company) source feeders shall not be run through the same pull box.

AM. Where no type or size is indicated for junction boxes, pull boxes or terminal cabinets, they shall be sized in accordance with the requirements of NEC Article 314. Enclosure type and material shall be as specified herein.

AN. Pull or junction boxes shall be furnished and installed where shown on the Drawings, in every 200 feet of straight conduit runs or in runs where more than the equivalent of four 90 degree bends occur or at any point necessary for wire pulling and splicing. Splices shall not be made in pulling elbows.

AO. A conduit identification plate shall be installed on all power, instrumentation, alarm and control conduits at each end of the run and at intermediate junction boxes, manholes, etc. Conduit plates

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shall be installed before conductors are pulled into the conduits. Exact identification plate location shall be coordinated with the ENGINEER at the time of installation to provide uniformity of placement and ease of reading. When a master conduit numbering system is used, the conduit tag numbers shall be exactly as shown on the drawings, if a master conduit numbering system is not used the conduit identification tags shall provide detailed "to" and "from" information.

END OF SECTION

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SECTION 16600

UNDERGROUND SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish and install a complete underground system of raceways, manholes and handholes as shown on the Drawings and as specified herein. All below grade raceways that are not inside a below grade structure or encased in the walls, floor, or ceiling of a below grade structure are considered a portion of the underground duct system and shall comply with this Specification Section.

B. Where referred in this Section, raceways are underground conduits. Ductbanks are a collection of underground raceways. Underground system is the collection of underground raceways, manholes and handholes.

C. Set manholes and handholes at the proper elevation such that the pitch of raceways will be towards manholes and handholes and away from structures, vaults and buildings.

D. Ductbank, manhole and handhole depths vary. Coordinate with other utilities, piping, structures and field conditions to determine required depths and install raceways, manholes and handholes at that required depth at no additional cost to the OWNER.

E. Ductbank routing and manhole/handhole locations shown on the Drawings are shown diagrammatically unless specifically dimensioned. Coordinate with other utilities, piping, structures and field conditions to determine required paths and depths and install at that routing and depth at no additional cost to the OWNER. Submit all changes in routing alignment to the OWNER for approval before installation.

1.02 RELATED WORK

A. Excavation and backfilling, including gravel and sand bedding, are included in Division 2.

B. Electrical General Conditions are included in Section 16000 (16001 for pipeline).

C. Fiber Optic Conduits Along Pipelines are included in Section 16800.

D. Power Conduits Along Pipelines are included in Section 16800

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300 and 16000 (16001 for pipeline), shop drawings and product data, for the following:

1. Manholes and handholes.

2. Plastic duct spacers.

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3. Manhole and handhole frames, covers and extension rings.

4. Buoyancy calculations for manholes.

5. Warning tape.

6. Drawings indicating the locations of all manholes with station (location) numbers.

7. Manhole identification number schedule.

PART 2 PRODUCTS

2.01 MATERIALS

A. Raceways shall be polyvinyl chloride conduit unless otherwise specified or shown on the Drawings. Refer to Section 16110 and detail drawings for material requirements.

B. Cable racks, supports, pulling-in irons, manhole steps and hardware shall be galvanized steel as manufactured by Line Materials Co.; Underground Devices, Inc.; Chance or equal.

C. Precast manholes shall be designed as specified below for precast concrete structures.

1. Refer to the drawings for inside dimensions, headroom requirements and minimum thickness of concrete for precast reinforced concrete structures. Dimensions shown on Drawings are the minimum nominal interior dimensions. If dimensions shown do not correspond to a manufacturer's standard sizes, the next larger standard size shall be furnished. Manhole depth shall be increased as necessary to accommodate the depth of the associated ductbanks.

2. Manholes shall be furnished with sump pits and sump pumps as indicated on the drawings.

3. Structural design calculations shall be prepared and stamped by a professional engineer registered in the State of California.

4. Design criteria. Unless otherwise specified, the precast manholes shall comply with the following minimum requirements:

a. Precast concrete

1) Minimum compressive strength shall be 5,000 psi at 28 days.

2) Maximum water to concrete ratio shall be 0.40 by weight.

3) Minimum cement content shall be 600 lbs of cement per cubic yard of concrete.

b. Manufactured Products.

1) Conform to ACI 318.

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2) Products shall support their own weight, weight of soil above at 130 pcf and a live load equal to AASHTO H20 applied to top slab. Depth of soil will be calculated from finished grade.

3) Cast base slab and walls together to form a monolithic base section.

4) Structure walls shall be designed for an equivalent lateral fluid pressure of 90 pcf. Originate pressure diagram at finished ground surface. Include lateral pressure from vehicles in accordance with AASHTO.

5) Consider discontinuities in structure produced by openings and joints. Provide additional reinforcing around openings. Frame openings to carry full design loads to support walls.

6) Prevent flotation, with ground water level at finished ground surface, by dead weight of structure and soil load above structure. Do not consider skin friction, soil friction, or weight of equipment or contents in structure. Factor of safety against buoyancy shall be 1.15. If a concrete slab is required to prevent flotation, design the slab and provide anchorage of the structure to the slab.

7) Design structure with a minimum number of joints.

8) Provide lifting hooks for the top slab.

9) Locate access openings, knockouts, and penetrations as indicated.

5. The date of manufacture, name and trademark of manufacturer shall be marked on the inside of each precast section.

6. Provide integrally cast knock-out panels in precast concrete manhole sections at locations indicated and with sizes indicated. Knock-out panels shall have no steel reinforcing.

7. Seal tongue and groove joints of precast manhole and handhole sections with rubber O-ring gasket. O-ring gasket shall conform to ASTM C443. In lieu of the O-ring gasket, a flexible joint sealant may be used. Sealant shall be Kent Seal No. 2; ConSeal No. 2; Ram-Nek or equal. Completed joints shall withstand 15 psi internal water pressure without leakage or displacement of gasket or sealant.

D. Precast manholes and handholes shall be as manufactured by Christy Concrete, Chase Precast Corp.; Jensen Precast, Utility Vault, or equal and constructed to the nominal dimensions as shown on the Drawings.

E. Manhole and handhole frames and covers shall be cast iron, heavy duty type for Class H-20 wheel loading. Covers shall be marked and sized as shown on the Drawings.

F. Ground rods and other grounding materials and methods shall be as specified in Section 16660.

G. Bell ends and plastic duct spacers shall be as manufactured by Carlon; Underground Devices Inc. or equal.

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H. Pull Line: Pull line shall be low friction, polyethylene jacketed, polypropylene rope with 1800 PSI tensile strength (minimum).

I. Handholes

1. Handholes shall be precast high-density reinforced concrete heavy duty type, designed for a HS20-44 wheel load plus the weight of the soil above (using 120 pcf for the soil weight), impact loads, and hydrostatic loads in accordance with ASTM C857. Frames and covers shall be heavy duty galvanized steel type for Class HS20-44 wheel loading.

2. Handholes and covers shall be as manufactured by Quazite; Jensen Precast, Christy Concrete, Hanson, or equal. or equal.

J. Detectable Warning Tape

1. Each ductbank section shall be marked by means of a detectable warning tape (tracer tape) as shown on the Drawings. The detectable warning tape shall be capable of being detected or located by either conductive or inductive location techniques.

2. The detectable warning tape shall consist of 5 mil (.005-in) overall thickness; five-ply composition; ultra-high molecular weight; virgin polyethylene; acid; alkaline and corrosion resistant; with 150 pounds of tensile break strength minimum per 6-in width.

3. The top side of the tape shall be color banded red for electrical and high voltage lines, and orange for signal, communication, telephone and fire alarm lines. Tape shall be 4-in wide with four color bands. The tape shall be inscribed with the warning message for the utility such as “CAUTION – ELECTRICAL LINED BURIED BELOW”. Tape shall be as manufactured by Mutual Industries, Inc.; Terra Tape, Div. of Reef Industries Inc. or equal.

K. Manhole extension and grade rings.

1. Manhole extension rings shall be round high density polyethylene (HDPE) rings. The HDPE rings shall be manufactured from polyethylene plastic as identified in ASTM designation D-1248 Standard Specifications for Polyethylene Plastic Molding and Extrusion Materials. Material properties shall be tested and qualified for usage to assure compliance with impact and loading requirements for use in roadways. The annular space between rings and cone basin, the rings, the rings and cover frame shall be sealed using an manufacturer approved butyl sealant.

2. Adjustment for matching finished grade slopes shall be made utilizing manufacturer provided molded HDPE indexed slope rings. The CONTRACTOR shall be responsible for providing the quantity of rings and adjustment slope rings to match the finished grade.

3. The installation of the HDPE rings shall be done in full compliance with the manufacturer’s recommendations/requirements. HDPE rings and adjustment slope rings shall be as manufactured by LADTECH Inc. or approved equal.

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L. Fiberoptic (FOMH) Manholes

1. Fiberoptic manholes shall be precast and approximately 32 inches wide by 49-5/8 inches long by 36 inches deep, designed for H-20 traffic loading unless otherwise indicated. Covers shall be galvanized steel with the words “Fiber Optics” in raised letters on the upper surface. Covers shall have locking devices and form a watertight seal to prevent surface water from entering. Knockouts in the sidewalls shall permit underground conduit side entry and exit.

2. Minimum manhole inside dimensions shall exceed or equal NEC requirements involving large wire sizes #4 AWG and larger. If larger dimensions are shown in the Drawings the larger size shall be provided.

3. Each fiberoptic manholes shall be provided with a unique identification to specifically identify it in the system. The CONTRACTOR shall develop the identification system. The identification number shall be marked on the manhole cover by arc welding or other permanent method.

PART 3 EXECUTION

3.01 INSTALLATION

A. Existing utilities shall be identified and excavated prior to the start of trenching for underground raceways as specified in Division 2.

B. Install raceways to drain away from buildings. Raceways between manholes or handholes shall drain toward the manholes or handholes. Raceway slopes shall not be less than 3-in per 100-ft.

C. Steel reinforced and concrete encased duct banks shall be provided as and where shown on the Drawings. See Section 03305 and duct bank detail on the Drawings.

D. The minimum cover for raceway (duct) banks shall be 30 inches unless otherwise permitted by the ENGINEER. Cover shall be deeper as required to cross or avoid other existing and new utilities, thrust blocks, and structures. Cover shall also be deeper where required to enter structures. CONTRACTOR shall coordinate depths between electrical, mechanical, yard piping, plumbing, etc., trades. Provide 8 inches minimum separation of duct banks and other utilities.

E. Make raceway entrances to buildings, structures and vaults (except manholes and handholes) with rigid steel conduit not less than 10-ft long.

F. Conduits run below floor slabs in slab-on-grade construction shall be PVC Schedule 40. Concrete encasement is not required for conduits below slab-on-grade.

G. Raceway terminations at manholes and handholes shall be with end bells for PVC conduit and insulated throat grounding bushings for steel conduit.

H. Where bends in raceways are required, use long radius elbows, sweeps and offsets. Elbows and sweeps are to be rigid steel or PVC-coated rigid steel where shown on the drawings.

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I. Swab all raceways clean before installing cable.

J. Plug and seal spare raceways watertight at all manholes, buildings and structures.

K. Seal the ends of raceways and make watertight at all manholes, buildings and structures.

L. Install pulling-in irons opposite all raceway entrances to manholes.

M. Train cables in manholes and support and restrain them on racks and hooks. Furnish inserts on all manhole walls for mounting future racks as well as racks required for present installation.

N. PVC-coated rigid steel conduit shall be used for elbows and risers at the utility pole for electrical and telephone service conduits.

O. PVC coated rigid galvanized steel elbows shall be used for pad-mounted transformer stub-ups and all stub-ups through asphalt and concrete floors, walls and slabs.

P. A pull line shall be installed and left in all spare raceways.

Q. Install detectable warning tape above all ductbanks as shown on the Drawings. Where trench exceeds 24-in width, provide additional detectable tape runs to mark each side of the ductbank in addition to the one in the center.

R. Use plastic spacers to hold raceways in place as detailed on the Drawings.

S. Provide shields where cables enter and leave manholes, handholes, and other entrances. Shields shall be of a suitable type manufactured for the purpose of protecting the cable from abrasion or other damage.

T. Restore paved and unpaved surfaces disturbed during the installation of duct or conduit to their original elevation and condition in accordance with Division 2.

U. Manhole and Handhole Installation

1. Set base grade to bring the manhole and handhole frame and cover to final grade. Use HDPE grade rings to adjust manhole frame and cover to final grade.

2. Set precast sections plumb with a 1/4-in maximum out-of-plumb tolerance. Seal joints of precast sections with either a rubber O-ring set in a recess or a flexible joint sealant used in sufficient quantity to fill 75 percent of the joint cavity. Fill the outside and inside joint with non-shrink grout and finished flush with the adjoining surfaces. Caulk the inside of leaking barrel section joints with non-shrink grout. If leaks appear in the manholes or handholes the inside joints shall be cleaned out and remade in a manner that will result in a watertight joint.

3. Allow joints to set for 24 hours before backfilling. Backfilling shall be performed by bringing the fill up evenly on all sides.

4. Plug holes in concrete with non-shrink grout or non-shrink grout in combination with concrete plugs. Finish flush on the inside.

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5. Cut holes in precast sections to accommodate conduits prior to setting manhole and handhole sections in place.

6. Ground all cable rack supports, manhole steps and manhole hardware to ground rod.

7. Slope soil uniformly away from each manhole and handhole in unimproved areas for a minimum distance of 3 feet. Compact surrounding soils to a minimum of 90 percent relative compaction in unpaved areas.

3.03 CLEANING

A. All new manholes and handholes shall be thoroughly cleaned of all silt, debris and foreign matter prior to final inspection.

END OF SECTION

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SECTION 16800

FIBEROPTIC AND POWER CONDUITS ALONG PIPELINES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish and install a complete underground system of raceways, manholes and handholes as shown on the Drawings and as specified herein.

B. Where referred in this Section, raceways are underground conduits. Ductbanks are a collection of underground raceways. Underground system is the collection of underground raceways, manholes and handholes.

C. Set manholes and handholes at the proper elevation such that the pitch of raceways will be towards manholes and handholes and away from structures, vaults and buildings.

D. Ductbank, manhole and handhole depths vary. Coordinate with other utilities, yard piping, yard structures and field conditions to determine required depths and install raceways, manholes and handholes at that required depth at no additional cost to the OWNER.

E. Ductbank routing and manhole/handhole locations shown on the Drawings are diagrammatically depicted. Coordinate with other utilities, yard piping, yard structures and field conditions to determine required paths and depths at no additional cost to the OWNER.

F. The Pipeline Contracts shall be responsible for the following general work items:

1. Furnishing and installing all conduit, pull boxes, manholes, pull rope, detectable warning tape along the pipeline routes and other locations as shown on the Drawings. Electrical Drawings indicate only the approximate locations of manholes, underground conduits and related appurtenances. Refer to the Civil Plan and Profile Drawings for additional location details.

2. Mandreling conduits to ensure a clear unobstructed raceway.

3. Furnishing and installation of additional conduit, pull boxes, manholes and pull rope as required by this Section when installation conditions differ from the Drawings.

4. Unless noted otherwise, conduits at Pocket Pump Station wetwells, Submersible Pump Station wetwells, and valve vaults shall be extended into the wetwell or vault and sealed to make a watertight connection. Install explosion proof conduit fittings.

5. Unless noted otherwise, conduits at Standby Power Buildings shall be terminated at the site property line.

6. Prepare and submit cable pulling tensions calculations as detailed in Paragraph 3.03A. Complete pulling tension calculations shall be submitted and receive a “No Exceptions Noted” review status from the ENGINEER before any conduit installation begins.

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G. The Pump Station Contract shall be responsible for the following:

1. Furnishing and installing all conduit, pull boxes, manholes, detectable warning tape at the Pump Stations, Standby Power Buildings, and other locations as shown on the Drawings.

2. Furnish, install and test all fiberoptic cable, medium voltage cable and low voltage cable as detailed in the remainder of these Specifications.

3. Furnish and install all electrical service conduit, transformer pads, pullboxes, and other equipment required by PG&E.

4. Furnish and install all conduit, pull boxes, wiring and equipment within the Pump Station wet wells and valve vaults.

1.02 RELATED WORK

A. Excavation and backfilling, including gravel and sand bedding, are included in Division 2.

B. Section 16000 (16001 for pipeline) – Electrical General Conditions.

C. Section 16110 – Raceways, Boxes, Fittings and Supports.

D. Section 16600 – Underground System.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300 and 16000 (16001 for pipeline), shop drawings and product data, for the following:

1. Manholes, handholes, and pullboxes.

2. Plastic duct spacers.

3. Manhole, handhole and pullbox, covers and extension rings.

4. Buoyancy calculations for manholes, handholes, and pullboxes.

5. Warning tape.

6. Drawings indicating the locations of all pull boxes with station numbers.

7. Fiberoptic manhole identification number schedule.

8. Pulling tension calculations.

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PART 2 PRODUCTS

2.01 MATERIALS

A. Refer to Sections 16110, 16600 and detail drawings for material requirements.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Existing utilities shall be identified and excavated prior to the start of trenching for underground raceways as specified in Division 2.

B. Install raceways to drain away from buildings. Raceways between manholes or handholes shall drain toward the manholes or handholes. Raceway slopes shall not be less than 3-in per 100-ft.

C. The minimum cover for raceway (duct) banks shall be 30 inches unless otherwise permitted by the ENGINEER. Cover shall be deeper as required to cross or avoid other existing and new utilities, thrust blocks, and structures. Cover shall also be deeper where required to enter structures. CONTRACTOR shall coordinate depths between electrical, mechanical, piping, plumbing, etc. Provide 8 inches minimum separation of duct banks and other utilities.

D. Raceway terminations at manholes and handholes shall be with end bells for PVC conduit.

E. Where bends in raceways are required, use long radius elbows, sweeps and offsets.

F. Swab all raceways clean before installing cable.

G. Seal the ends of raceways and make watertight at all manholes, buildings and structures.

H. Install detectable warning tape above all ductbanks.

I. For locations containing multiple conduits, furnish and install plastic spacers to maintain conduit separation.

J. Restore paved and unpaved surfaces disturbed during the installation of duct or conduit to their original elevation and condition in accordance with Division 2.

3.02 INSTALLATION - CONDUIT

A. Conduits shall be installed on one side of the trench as detailed on the Drawings. The conduits shall not cross over the pipe unless specifically shown on the Civil Drawings.

B. Conduits shall clear concrete structures and vaults associated with the pipeline by a minimum of 1 foot.

C. The conduit shall gradually and smoothly slope up to the elevation of the pull box entrance. Use of manufactured bends shall be limited to an absolute minimum. Factory bends, if required, shall be no more than 22-1/2 degrees.

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D. Conduit sections shall be joined in accordance with the manufacturers' recommendations. Joints shall be watertight.

E. Install a pull rope in all conduit.

F. Conduits entering pull boxes shall be capped or sealed watertight.

G. Bedding and backfill shall be in accordance with Section 02200 – Earthwork and as detailed on relevant Civil and Electrical Drawings.

3.03 INSTALLATION – PULL BOXES AND MANHOLES

A. The Drawings diagrammatically indicate the desired location of pull boxes, conduit runs and other items. Exact locations shall be determined by the CONTRACTOR based on physical size and arrangement of equipment, finished elevations, calculated cable pulling tensions, field obstructions, and the criteria below. Indicated locations should be followed as closely as possible; however, pull boxes shall be located according to the following criteria:

1. At no point shall the cable pulling tension exceed 600 pounds. If cable pulling tension is calculated to exceed 600 pounds, additional pull boxes shall be furnished and installed at no extra cost to the OWNER.

2. The maximum distance between any 2 pull boxes shall not exceed 1,200 feet.

3. Within the 1,200 feet distance, the CONTRACTOR shall install pull boxes at locations wherever the cumulative change of direction of the conduit exceeds 180 degrees.

4. The minimum bending radius for conduit shall be 3 feet.

5. A pull box shall be installed on one side of a tunneled or bored crossing. However, for any crossing which requires more than 180 degrees of conduit bends to account for elevation differences or route adjustments, a pull box shall be installed on both sides of the crossing.

B. Pull box covers shall be installed so that the top of the cover is flush with the restored pavement. Pull boxes in soil areas shall be installed so that the top of the cover is at least one-inch but not more than 4 inches above the final grade level of the restored surface to prevent accumulation of dirt, silt and debris on the top of the hand hole cover.

C. Perform conduit integrity tests for each section between the pull boxes after backfilling and compaction using the test and procedures described in this Section. These tests shall be performed prior to installation of the pull rope.

D. Unless otherwise detailed on the Drawings, manholes conduit entries shall be sealed with mortar to prevent the intrusion of water and debris into the pull boxes.

E. Pull boxes shall be installed on a compacted level foundation consisting of a minimum of 4 inches of granular material complying with Section 02200 - Earthwork and as detailed on relevant Civil and Electrical Drawings.

F. Backfilling around pull boxes shall not be done until mortar sealant has thoroughly set.

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G. Compaction around pull boxes and associated details shall be performed in accordance with Section 02200 - Earthwork and as detailed on relevant Civil and Electrical Drawings.

3.04 CLEANING

A. All new manholes and handholes shall be thoroughly cleaned of all silt, debris and foreign matter prior to final inspection.

B. A test mandrel 3/8-inch smaller than the inside diameter shall be passed through all conduits to detect alignment and deformation problems. Mandrel shall be passed in both directions.

C. Cleaning and testing of the conduit shall be performed by the CONTRACTOR and witnessed by the ENGINEER. The cleaning and testing operation shall be conducted for each conduit section between adjacent pull boxes, a section at a time, for the entire route. The results of tests shall be documented by the CONTRACTOR and signed by the ENGINEER and the CONTRACTOR.

D. The CONTRACTOR shall provide a 5 day minimum advance notice of the schedule and location of test to the ENGINEER.

E. The CONTRACTOR shall remove and replace noncompliant conduit and shall repeat the test.

END OF SECTION