

Alderpoint Road Tank Replacement Project

Project Manual

December 19, 2014

Prepared For:
Garberville Sanitary District

Prepared By:
LACO Associates, Inc.
21 W. 4th Street
Eureka, California 95501
707 443-5054

Project No. 7714.02



LACO

advancing the
quality of life for
generations to come

Design
Planning
Engineering
Geology and Geotechnical
Environmental Science
Materials Testing
Survey
Drilling

800 515-5054
www.lacoassociates.com
Eureka | Ukiah | Santa Rosa



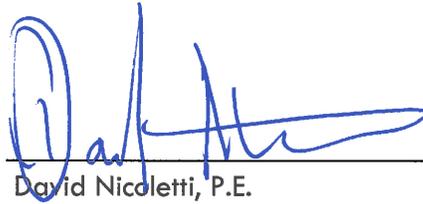
Alderpoint Road Tank Replacement Project

Project Manual

December 19, 2014

Prepared for:
Garberville Sanitary District

LACO Project No. 7714.02



David Nicoletti, P.E.

Project Specifications Table of Contents

C – PROCUREMENT, CONTRACTING, AND GENERAL REQUIREMENTS

C-052	Owner's Instructions to Engineer Concerning Construction Bonds and Insurance for Construction
C-111	Advertisement for Bids for Construction Contracts
C-200	Instructions to Bidders for Construction Contracts
C-410	Bid Form for Construction Contracts
C-430	Bid Bond (Penal Sum Form)
C-510	Notice of Award
C-520	Agreement Between Owner and Contractor for Construction Contract (Stipulated Price)
C-550	Notice to Proceed
C-610	Performance Bond
C-615	Payment Bond
C-700	Standard General Conditions of the Construction Contract
C-800	Guide to the Preparation of Supplementary Conditions

01 – GENERAL REQUIREMENTS

01 10 00.00	Summary
01 30 00.00	Shop Drawings and Submittals
01 50 00.00	Temporary Connection
01 51 00.00	Temporary Facilities and Controls

02 – EXISTING CONDITIONS

02 10 00.00	Mobilization and Demobilization
02 41 16.00	Structure Demolition

03 – CONCRETE

03 10 00.00	Concrete Forming and Accessories
03 20 00.00	Concrete Reinforcing
03 30 00.00	Cast-in-Place Concrete

05 – METALS

05 50 13.00	Miscellaneous Metalwork
-------------	-------------------------

09 – FINISHES

09 90 00.00	Painting and Coatings
09 90 05.00	Protective Coatings for Welded Steel Reservoirs

15 – TRAFFIC CONTROL

15 10 00.00	Traffic Control
-------------	-----------------

22 – PLUMBING

22 12 00.00	Potable Welded Steel Water Storage Tanks
-------------	--

31 - EARTHWORK

- 31 05 13.00 Soils for Earthwork
- 31 05 16.00 Aggregates for Earthwork
- 31 10 00.00 Site Clearing
- 31 22 13.00 Rough Grading
- 31 23 17.00 Trenching
- 31 25 00.00 Erosion and Sedimentation Controls

32 - EXTERIOR IMPROVEMENTS

- 32 31 13.00 Fences and Gates
- 32 93 05.00 Tree Planting and Irrigation

33 - UTILITIES

- 33 05 17.00 Precast Concrete Valve Vaults, Valve Boxes, and Drop Inlets
- 33 05 19.00 Thrust Restraint
- 33 05 48.00 Vibration and Seismic Controls for Utilities Piping and Equipment
- 33 11 16.00 Site Water Utility Distribution Piping
- 33 41 00.00 Storm Utility Drainage Piping

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

	Page
ARTICLE 1 – Defined Terms	1
ARTICLE 2 – Copies of Bidding Documents	1
ARTICLE 3 – Qualifications of Bidders	1
ARTICLE 4 – Site and Other Areas; Existing Site Conditions; Examination of Site; Owner’s Safety Program; Other Work at the Site	1
ARTICLE 5 – Bidder’s Representations	3
ARTICLE 6 – Pre-Bid Conference	4
ARTICLE 7 – Interpretations and Addenda.....	4
ARTICLE 8 – Bid Security	5
ARTICLE 9 – Contract Times	5
ARTICLE 10 – Liquidated Damages.....	5
ARTICLE 11 – Substitute and “Or-Equal” Items.....	5
ARTICLE 12 – Subcontractors, Suppliers, and Others	6
ARTICLE 13 – Preparation of Bid	6
ARTICLE 14 – Basis of Bid	7
ARTICLE 15 – Submittal of Bid.....	7
ARTICLE 16 – Modification and Withdrawal of Bid.....	8
ARTICLE 17 – Opening of Bids	8
ARTICLE 18 – Bids to Remain Subject to Acceptance	8
ARTICLE 19 – Evaluation of Bids and Award of Contract	8
ARTICLE 20 – Bonds and Insurance.....	9
ARTICLE 21 – Signing of Agreement.....	9
ARTICLE 22 – Prevailing Wage	9

**Garberville Sanitary District
Garberville, California
Alderpoint Road Tank Replacement Project**

ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of the **Alderpoint Road Tank Replacement Project** will be received, by the **Garberville Sanitary District** at the office of the **Garberville Sanitary District located at 919 Redwood Drive, Garberville, Ca. 95542**, until **5:00PM** local time on **Thursday, March 5, 2015**, at which time the Bids received will be publicly opened and read. The Project consists of demolition of an existing 30,000 gallon redwood tank, erosion and sediment control, connection of a temporary tank, tree removal and replanting, site grading, yard piping, fencing, and construction of a new 200,000 gallon welded steel, epoxy coated tank.

Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis, with additive alternate bid items as indicated in the Bid Form.

The Issuing Office for the Bidding Documents is: Garberville Sanitary District, located at 919 Redwood Drive, Garberville, California, 95542. Direct questions to Ralph Emerson, General Manager, Phone: 707-923-9566, or Email: remerson@garbervillesd.org. Prospective Bidders may examine the Bidding Documents at the Issuing Office on Mondays through Fridays between the hours of 8:00AM – 5:00PM, and may obtain copies of the Bidding Documents from the Issuing Office as described below.

Bidding Documents also may be examined at Humboldt Builders Exchange located at 624 C Street, Eureka, California 95501, or their Website at www.humbx.com.

Printed copies of the Bidding Documents may be obtained from the Issuing Office, during the hours indicated above, upon a nonrefundable payment of \$115 for each set. Checks for Bidding Documents shall be payable to Garberville Sanitary District. Upon request and receipt of the document deposit indicated above plus a non-refundable shipping charge, the Issuing Office will transmit the Bidding Documents via delivery service. The shipping charge amount will depend on the shipping method selected by the prospective Bidder. The date that the Bidding Documents are transmitted by the Issuing Office will be considered the Bidder's date of receipt of the Bidding Documents. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office.

California Prevailing Wage Rates apply to this project.

A mandatory pre-bid conference will be held at 10:00AM local time on Tuesday, February 10, 2015 at the project site, located at 1081 Alderpoint Road.

Bid security shall be furnished in accordance with the Instructions to Bidders.

Owner: **Garberville Sanitary District**

By: **Ralph Emerson**

Title: **General Manager, GSD**

Date: **January 19, 2015**

+ + END OF ADVERTISEMENT FOR BIDS + +

ARTICLE 1 – DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office* – The office from which the Bidding Documents are to be issued.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid the following information:
- A. Evidence of Bidder's authority to do business in the State of California.
- B. Evidence of Bidder's California Class "A" Contractors License.
- 3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.
- 3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.
- 3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

- 4.01 *Site and Other Areas*
- A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.
- 4.02 *Existing Site Conditions*
- A. Subsurface and Physical Conditions; Hazardous Environmental Conditions
1. The Supplementary Conditions identify:
 - a. Those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.

- b. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
 - c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
 3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
 4. Geotechnical Baseline Report: The Bidding Documents contain a Geotechnical Baseline Report (GBR). The GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.

The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.

Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.

- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 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 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall attend the required pre-bid site visit on the predetermined day and time. Additional site visits may be arranged by appointment only, and shall not disturb any ongoing operations at the Site.
- B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.
- D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- E. 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.

4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER'S REPRESENTATIONS

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

- A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;
- B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy itself as to all 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 adjacent to the Site and all drawings of physical conditions relating to existing surface or

subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;

- E. consider the information known to Bidder itself; 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; and (3) Bidder's safety precautions and programs;
- F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid 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 bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;
- G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
- H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
- J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

- 6.01 A mandatory pre-bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

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

ARTICLE 8 – BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of ten percent (10%) of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and 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 released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

- 9.01 The number of days within 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, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

- 11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or-equal" item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.
- 11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.
- 12.03 The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work: Potable Water Storage Tank, painting and tank coatings.
- If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 12.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

- 13.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
- B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.
- 13.03 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person 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.

- 13.04 A Bid by an individual shall show the Bidder's name and official address.
- 13.05 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.06 All names shall be printed in ink below the signatures.
- 13.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.08 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.09 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID

14.01 *Unit Price*

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 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.

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, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.
- 15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Garberville Sanitary District, 919 Redwood Dr. Garberville, CA. 95542.
- 15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

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

ARTICLE 17 – OPENING OF BIDS

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

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.
- 19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.
- 19.03 Evaluation of Bids
- A. 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.
 - B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
- 19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers

proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

- 19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 20 – BONDS AND INSURANCE

- 20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

ARTICLE 21 – SIGNING OF AGREEMENT

- 21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 22 – PREVAILING WAGE

- 22.01 Compliance with general prevailing wage determination made by the director of industrial relations pursuant to California Labor Code for commercial building, highway, heavy construction, and dredging projects in Humboldt County, will be required. A copy of the determination of the prevailing wage shall be posted at the project site. The contractor shall provide certified payroll records in accordance with Section 1776 of the California Labor Code with each request for payment, or as requested by the engineer. The owner may assess a fine in accordance with Section 1776 (g) of the Labor Code if the contractor fails to provide such records within the time specified in the code.

BID FORM

Alderpoint road Tank Replacement Project

Ralph Emerson, General Manager GSD

(209) 743-0125

Email: remerson@garbervillesd.org

TABLE OF CONTENTS

	Page
ARTICLE 1 – Bid Recipient	1
ARTICLE 2 – Bidder’s Acknowledgements.....	1
ARTICLE 3 – Bidder’s Representations	1
ARTICLE 4 – Bidder’s Certification.....	2
ARTICLE 5 – Basis of Bid	3
ARTICLE 6 – Time of Completion.....	5
ARTICLE 7 – Attachments to this Bid.....	5
ARTICLE 8 – Defined Terms	5
ARTICLE 9 – Bid Submittal	5

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Garberville Sanitary District

919 Redwood Drive

Garberville, California 95542

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

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

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

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

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

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; 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 any 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; and (3) Bidder's safety precautions and programs.

- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

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

NOTE: The bid schedule does not include every item required to construct the project. The contractor shall include in the bid price all labor, materials, engineering, submittal and shop drawings review, coordination and construction of a complete, fully functional system under each bid item. BIDS shall include sales tax, license, patent fees, and all other applicable taxes and fees.

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	Mobilization/Demobilization	LS	1		
2	Erosion & Sediment Control	LS	1		
3	Traffic Control	LS	1		
4	Structure Demolition	LS	1		
5	Site Clearing	LS	1		
6	Rough Grading	LS	1		
7	Aggregate Base	TON	80		
8	Unsuitable Material	CY	25		
9	Rock Slope Protection	TON	14		
10	Replacement Tree Planting	EA	36		
11	Bollards	EA	9		
12	6-Foot Security Fence & Gate	LF	320		
13	200,000 Gallon Welded Steel Tank and Concrete Ring Foundation	LS	1		
14	8-Inch Pipe and Fittings	LF	30		
15	Seismic Connections and Fittings	EA	2		
16	8-Inch Swing Check Valve	EA	1		
17	8-inch Gate Valves	EA	2		
18	8-inch One-Way Altitude Control Valve	EA	1		
19	6-Inch Storm Drain Pipe	LF	25		
21	4-Inch Gate Valve	EA	1		
21	Drop Inlet	EA	1		
22	Temporary Tank Connection & District Coordination	LS	1		
Total of All Unit Price Bid Items					\$

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) 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.

Total of Lump Sum and Unit Price Bids = Total Bid Price \$ _____

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 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are submitted with and made a condition of this Bid:
 - A. Required Bid security;
 - B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;
 - C. Contractor’s California Class A License No.: _____ or Evidence of Bidder’s ability to obtain a California Contractor’s Class A License and a covenant by Bidder to obtain said license within the time for acceptance of Bids;

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

Telephone Number:

Fax Number:

Contact Name and e-mail address:

Bidder's License No.:

(where applicable)

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

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— Include Location*):

BOND

Bond Number:

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

Bidder's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Note: 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 the 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 the 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.

NOTICE OF AWARD

Date of Issuance:

Owner:

Owner's Contract No.:

Engineer:

Engineer's Project No.:

Project:

Contract Name:

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

[describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: \$ _____ *[note if subject to unit prices, or cost-plus]*

[] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically. *[revise if multiple copies accompany the Notice of Award]*

a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [] counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

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 Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner:

Authorized Signature

By:

Title:

Copy: Engineer

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

THIS AGREEMENT is by and between Garberville Sanitary District (“Owner”) and
_____ (“Contractor”).

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: *The Project consists of demolition of an existing 30,000 gallon redwood tank, erosion and sediment control, connection of a temporary tank, tree removal and replanting, site grading, yard piping, fencing, and construction of a new 200,000 gallon welded steel, epoxy coated tank.*

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by LACO Associates.

3.02 The Owner has retained _____ (“Engineer”) 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 *Contract Times: Days*

A. The Work will be substantially completed within 90 calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 105 calendar days after the date when the Contract Times commence to run.

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 and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. 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):

1. Substantial Completion: Contractor shall pay Owner \$500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.
2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$500 for each day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

- A. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item):

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	Mobilization/Demobilization	LS	1		
2	Erosion & Sediment Control	LS	1		
3	Traffic Control	LS	1		
4	Structure Demolition	LS	1		
5	Site Clearing	LS	1		
6	Rough Grading	LS	1		
7	Aggregate Base	TON	80		
8	Unsuitable Material	CY	25		
9	Rock Slope Protection	TON	14		
10	Replacement Tree Planting	EA	36		
11	Bollards	EA	9		
12	6-Foot Security Fence & Gate	LF	320		
13	200,000 Gallon Welded Steel Tank and Concrete Ring Foundation	LS	1		
14	8-Inch Pipe and Fittings	LF	30		
15	Seismic Connections and Fittings	EA	2		
16	8-Inch Swing Check Valve	EA	1		
17	8-inch Gate Valves	EA	2		
18	8-inch One-Way Altitude Control Valve	EA	1		
19	6-Inch Storm Drain Pipe	LF	25		
21	4-Inch Gate Valve	EA	1		
21	Drop Inlet	EA	1		
22	Temporary Tank Connection & District Coordination	LS	1		
Total of All Unit Price Bid Items					\$

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

- B. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment)
\$_____.
- C. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in 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 elsewhere in the Contract.

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 Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

- a. 90 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
- b. 90 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

- 7.01 All amounts not paid when due shall bear interest at the rate of 10 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

- B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, 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 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 adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no 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.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement (pages 1 to 7, inclusive).
 - 2. Performance bond (pages 1 to 3, inclusive).
 - 3. Payment bond (pages 1 to 3, inclusive).
 - 4. General Conditions (pages 1 to 65, inclusive).
 - 5. Supplementary Conditions (pages 1 to 8, inclusive).

6. Specifications as listed in the table of contents of the Project Manual.
 7. Drawings (not attached but incorporated by reference) consisting of 15 sheets with each sheet bearing the following general title: Garberville Sanitary District Alderpoint Road Tank Replacement.
 8. Addenda (numbers ___ to ___, inclusive).
 9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages ___ to ___, inclusive).
 10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field 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 the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 Terms

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

10.02 Assignment of Contract

- A. Unless expressly agreed to elsewhere in the Contract, 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, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

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

10.04 Severability

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

and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 *Other Provisions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

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

OWNER:

CONTRACTOR:

By: _____

By: _____

Title: _____

Title: _____

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

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

License No.: _____

(where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

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

NOTICE TO PROCEED

Owner: _____ Owner's Contract No.: _____
Contractor: _____ Contractor's Project No.: _____
Engineer: _____ Engineer's Project No.: _____
Project: _____ Contract Name: _____
Effective Date of Contract: _____

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__]. *[see Paragraph 4.01 of the General Conditions]*

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, [the date of Substantial Completion is _____, and the date of readiness for final payment is _____] **or** [the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before starting any Work at the Site, Contractor must comply with the following:
[Note any access limitations, security procedures, or other restrictions]

Owner:

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer

PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: None See Paragraph 16

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

CONTRACTOR AS PRINCIPAL

SURETY

 Contractor's Name and Corporate Seal *(seal)*

 Surety's Name and Corporate Seal *(seal)*

By: _____
 Signature

By: _____
 Signature *(attach power of attorney)*

 Print Name

 Print Name

 Title

 Title

Attest: _____
 Signature

Attest: _____
 Signature

 Title

 Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

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

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence,

to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

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

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction 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 the Owner or its heirs, executors, administrators, successors, and assigns.

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

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

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims

for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: None See Paragraph 18

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

CONTRACTOR AS PRINCIPAL

SURETY

_____ *(seal)*

Contractor's Name and Corporate Seal

_____ *(seal)*

Surety's Name and Corporate Seal

By: _____

Signature

By: _____

Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____

Signature

Attest: _____

Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
 - 5.1 Claimants who do not have a direct contract with the Contractor,
 - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. **Definitions**
 - 16.1 **Claim:** A written statement by the Claimant including at a minimum:
 1. The name of the Claimant;
 2. The name of the person for whom the labor was done, or materials or equipment furnished;
 3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 4. A brief description of the labor, materials, or equipment furnished;
 5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 7. The total amount of previous payments received by the Claimant; and
 - 16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
 - 16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
 - 16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.
18. Modifications to this Bond are as follows:

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1 – Definitions and Terminology	1
1.01 Defined Terms	1
1.02 Terminology	5
Article 2 – Preliminary Matters.....	6
2.01 Delivery of Bonds and Evidence of Insurance	6
2.02 Copies of Documents	6
2.03 Before Starting Construction	6
2.04 Preconstruction Conference; Designation of Authorized Representatives	7
2.05 Initial Acceptance of Schedules	7
2.06 Electronic Transmittals.....	7
Article 3 – Documents: Intent, Requirements, Reuse	8
3.01 Intent.....	8
3.02 Reference Standards	8
3.03 Reporting and Resolving Discrepancies	8
3.04 Requirements of the Contract Documents	9
3.05 Reuse of Documents	10
Article 4 – Commencement and Progress of the Work	10
4.01 Commencement of Contract Times; Notice to Proceed	10
4.02 Starting the Work.....	10
4.03 Reference Points	10
4.04 Progress Schedule	10
4.05 Delays in Contractor’s Progress	11
Article 5 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions	12
5.01 Availability of Lands	12
5.02 Use of Site and Other Areas	12
5.03 Subsurface and Physical Conditions.....	13
5.04 Differing Subsurface or Physical Conditions	14
5.05 Underground Facilities	15

5.06	Hazardous Environmental Conditions at Site.....	17
Article 6 – Bonds and Insurance		19
6.01	Performance, Payment, and Other Bonds	19
6.02	Insurance—General Provisions	19
6.03	Contractor’s Insurance	20
6.04	Owner’s Liability Insurance	23
6.05	Property Insurance.....	23
6.06	Waiver of Rights	25
6.07	Receipt and Application of Property Insurance Proceeds	25
Article 7 – Contractor’s Responsibilities		26
7.01	Supervision and Superintendence	26
7.02	Labor; Working Hours	26
7.03	Services, Materials, and Equipment.....	26
7.04	“Or Equals”	27
7.05	Substitutes	28
7.06	Concerning Subcontractors, Suppliers, and Others	29
7.07	Patent Fees and Royalties	31
7.08	Permits	31
7.09	Taxes	32
7.10	Laws and Regulations.....	32
7.11	Record Documents.....	32
7.12	Safety and Protection.....	32
7.13	Safety Representative	33
7.14	Hazard Communication Programs	33
7.15	Emergencies	34
7.16	Shop Drawings, Samples, and Other Submittals.....	34
7.17	Contractor’s General Warranty and Guarantee.....	36
7.18	Indemnification	37
7.19	Delegation of Professional Design Services	37
Article 8 – Other Work at the Site		38
8.01	Other Work	38
8.02	Coordination	39
8.03	Legal Relationships.....	39

Article 9 – Owner’s Responsibilities.....	40
9.01 Communications to Contractor.....	40
9.02 Replacement of Engineer	40
9.03 Furnish Data	40
9.04 Pay When Due.....	40
9.05 Lands and Easements; Reports, Tests, and Drawings	40
9.06 Insurance.....	40
9.07 Change Orders.....	40
9.08 Inspections, Tests, and Approvals.....	41
9.09 Limitations on Owner’s Responsibilities	41
9.10 Undisclosed Hazardous Environmental Condition.....	41
9.11 Evidence of Financial Arrangements.....	41
9.12 Safety Programs	41
Article 10 – Engineer’s Status During Construction.....	41
10.01 Owner’s Representative.....	41
10.02 Visits to Site.....	41
10.03 Project Representative.....	42
10.04 Rejecting Defective Work.....	42
10.05 Shop Drawings, Change Orders and Payments.....	42
10.06 Determinations for Unit Price Work	42
10.07 Decisions on Requirements of Contract Documents and Acceptability of Work	42
10.08 Limitations on Engineer’s Authority and Responsibilities.....	42
10.09 Compliance with Safety Program.....	43
Article 11 – Amending the Contract Documents; Changes in the Work	43
11.01 Amending and Supplementing Contract Documents	43
11.02 Owner-Authorized Changes in the Work	44
11.03 Unauthorized Changes in the Work	44
11.04 Change of Contract Price	44
11.05 Change of Contract Times	45
11.06 Change Proposals	45
11.07 Execution of Change Orders.....	46
11.08 Notification to Surety.....	47
Article 12 – Claims.....	47

12.01	Claims	47
Article 13 –	Cost of the Work; Allowances; Unit Price Work.....	48
13.01	Cost of the Work	48
13.02	Allowances	50
13.03	Unit Price Work	51
Article 14 –	Tests and Inspections; Correction, Removal or Acceptance of Defective Work.....	52
14.01	Access to Work.....	52
14.02	Tests, Inspections, and Approvals	52
14.03	Defective Work.....	53
14.04	Acceptance of Defective Work.....	53
14.05	Uncovering Work	53
14.06	Owner May Stop the Work	54
14.07	Owner May Correct Defective Work.....	54
Article 15 –	Payments to Contractor; Set-Offs; Completion; Correction Period	55
15.01	Progress Payments	55
15.02	Contractor’s Warranty of Title	58
15.03	Substantial Completion	58
15.04	Partial Use or Occupancy	59
15.05	Final Inspection	59
15.06	Final Payment.....	59
15.07	Waiver of Claims	61
15.08	Correction Period	61
Article 16 –	Suspension of Work and Termination	62
16.01	Owner May Suspend Work	62
16.02	Owner May Terminate for Cause	62
16.03	Owner May Terminate For Convenience	63
16.04	Contractor May Stop Work or Terminate	63
Article 17 –	Final Resolution of Disputes	64
17.01	Methods and Procedures	64
Article 18 –	Miscellaneous	64
18.01	Giving Notice	64
18.02	Computation of Times.....	64
18.03	Cumulative Remedies	64

18.04	Limitation of Damages	65
18.05	No Waiver	65
18.06	Survival of Obligations	65
18.07	Controlling Law	65
18.08	Headings.....	65

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *Notice to Proceed*—A written notice 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.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *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.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *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.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *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, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *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.
40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *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 a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *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 but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in the following paragraphs 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 Article 10 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 15.03 or 15.04).
- 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. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), 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;
 2. a preliminary Schedule of Submittals; and

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, 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 and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, 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.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

- A. Standards Specifications, Codes, Laws and Regulations
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, 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, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*
 - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents:* If, 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) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) 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 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- 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.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *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 such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. 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.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. 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. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 2. abnormal weather conditions;
 3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *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.
- 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 permanent improvements are to be made 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.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, 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 any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent 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 and adjacent areas 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 of 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 structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
 - 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site 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 5.03 is materially inaccurate; or
 2. is of such a nature as to require a change in the Drawings or Specifications; or
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;
 - 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 Paragraph 13.03; and,

- c. 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.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
 1. Owner and Engineer do not warrant or guarantee 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 information and data regarding existing Underground Facilities at the Site;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
 - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
 - 1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
 - 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 Paragraph 13.03;
 - c. 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; and
 - d. Contractor gave the notice required in Paragraph 5.05.B.
 - 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 - 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings*: The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. 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, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, 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. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then 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 bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

- A. *Workers' Compensation:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
 - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
 - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
 2. claims for damages insured by reasonably available personal injury liability coverage.
 3. 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.
- C. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
1. Products and completed operations coverage:
 - a. Such insurance shall be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 3. Broad form property damage coverage.
 4. Severability of interest.
 5. Underground, explosion, and collapse coverage.
 6. Personal injury coverage.
 7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
 8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability:* Contractor shall purchase and maintain automobile liability insurance against 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. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; 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 (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
 - 1. include at least the specific coverages provided in this Article.
 - 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
 - 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
 - 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
 - 5. be appropriate for the Work being performed and provide protection from claims that 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.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
 - 1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
 - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
 - 3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
 - 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
 6. extend to cover damage or loss to insured property while in transit.
 7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
 8. allow for the waiver of the insurer's subrogation rights, as set forth below.
 9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
 10. not include a co-insurance clause.
 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
 12. include performance/hot testing and start-up.
 13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *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.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *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, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

7.04 "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 Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that 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, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, 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;
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is not objectionable to Owner.
 - 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.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
 - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
 - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
 - 3. 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:
 - a. shall certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design,
 - 2) be similar in substance to that specified, and
 - 3) be suited to the same use as that specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
 - 2) 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
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from that specified, and

- 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
 - C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
 - D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. 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.
 - E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
 - F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. 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.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. 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.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. 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 the particular Subcontractor or Supplier.

O. 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 money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

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

7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *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.

7.10 *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 or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and 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 such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
 - C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
 - D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
 - E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
 - F. Contractor's duties and responsibilities for safety and protection 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 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
 - G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *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.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated the 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 and equipment 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 of that submittal, and that Contractor approves the 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 set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Contractor shall submit the number of copies required in the Specifications.
- 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 7.16.D.

2. *Samples:*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall 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 7.16.D.
 3. 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. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- 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 or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample 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 7.16.A.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 will document any such approved variation from the requirements of the Contract Documents in a Field Order.
 5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
 6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
 7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

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.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

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

- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.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 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *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 Laws and Regulations.
- 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, 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, 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 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. 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.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, 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.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. 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.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) 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 any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 Communications to Contractor

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 Replacement of Engineer

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 Furnish Data

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 Pay When Due

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 Lands and Easements; Reports, Tests, and Drawings

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 Insurance

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 Change Orders

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- 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.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *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.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. 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.

10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. 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, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.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 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
 - 1. *Change Orders:*
 - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
 - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
 - 2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-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. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. 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, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

- C. *Contractor's Fee*: When applicable, 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 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 13.01.B.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 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - 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 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
 2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
 3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. 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;
 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
 - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
 - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work 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 13.01.C, and shall include only the following items:
 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *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, expeditors, 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here 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 Paragraph 13.01.B.

D. *Contractor's Fee:* When the Work as a whole 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, Change Proposal, Claim, set-off, or other 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 11.04.C.

E. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

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

13.03 *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. Payments to Contractor for Unit Price Work will be based on actual quantities.
- 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. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- 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, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. 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. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *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, then 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.

14.07 *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, 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, then 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 14.07, 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, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 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 during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, 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.
- C. *Review of Applications:*
1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, 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; 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 money paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
 6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due:*

- 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner:*

- 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. the Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. the Contract Price has been reduced by Change Orders;
 - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
 - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - l. there are other items entitling Owner to a set off against the amount recommended.
- 2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. 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 punch list.

15.04 *Partial Use or Occupancy*

- 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. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be 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 15.03.A through E for that part of the Work.
 - 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *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, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *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, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all disputes that Contractor believes are unsettled; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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 have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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 15.07. 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. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due:* Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such other adjacent 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 to 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. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.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 the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this Article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
 - 2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this Article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *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, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract 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.

18.03 *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. 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.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

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

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

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01. Add to the list of definitions in Paragraph 1.01.A by inserting the following as numbered items in their proper alphabetical positions:

Geotechnical Baseline Report (GBR) — The interpretive report prepared by or for Owner regarding subsurface conditions at the Site, and containing specific baseline geotechnical conditions that may be anticipated or relied upon for bidding and contract administration purposes, subject to the controlling provisions of the Contract, including the GBR’s own terms. The GBR is a Contract Document.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC/GBR-5.03 and 5.04. Delete Paragraphs 5.03 and 5.04 of the General Conditions in their entireties and replace with the following provisions:

SC/GBR-5.03 Subsurface and Physical Conditions

A. Geotechnical Baseline Report:

1. This Contract contains a Geotechnical Baseline Report (“GBR”), identified as follows: *Geotechnical Design Memorandum, dated April 30, 2014, prepared by LACO Associates, Eureka, California*].
2. The GBR is incorporated as Contract Documents. The GBR is to be used in conjunction with other Contract Documents, including the Drawings and Specifications.
3. The GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations (referred to here in the Supplementary Conditions as “Baseline Conditions”). These may include ground, geological, groundwater, and other subsurface geotechnical conditions, and baselines of anticipated Underground Facilities or subsurface structures.
4. The Baseline Conditions shall be used to assist in the administration of the Contract’s differing site conditions clause at locations where subsurface conditions have been baselined. If a condition is baselined in the GBR, then

only the pertinent Baseline Conditions shall be used to determine whether there is a differing site condition; and no other indication of that condition in the Contract Documents or Technical Data, or of a condition that describes, quantifies, or measures a similar characteristic of the subsurface, shall be used for the differing site condition determination.

5. The Baseline Conditions shall not be used to make differing site conditions determinations at locations that have not been baselined in the GBR, or at any location with respect to subsurface conditions that the Baseline Conditions do not address. If Underground Facilities or Hazardous Environmental Conditions are expressly addressed in the Baseline Conditions, then comparison to such Baseline Conditions shall be the primary means of determining (a) whether an Underground Facility was shown or indicated with reasonable accuracy, as provided in Paragraph 5.05 of the General Conditions, or (b) whether a Hazardous Environmental Condition was shown or indicated in the Contract Documents as indicated in Paragraph 5.06.H of the General Conditions.
6. The descriptions of subsurface conditions provided in the GBR are based on geotechnical investigations, laboratory tests, interpretation, interpolation, extrapolation, and analyses. Neither Owner, Engineer, nor any geotechnical or other consultant warrants or guarantees that actual subsurface conditions will be as described in the GBR, nor is the GBR intended to warrant or guarantee the use of specific means or methods of construction.
7. The behavior of the ground during construction depends substantially upon the Contractor's selected means, methods, techniques, sequences, and procedures of construction. If ground behavior conditions are baselined in the GBR, they are based on stated assumptions regarding construction means and methods.
8. The GBR shall not reduce or relieve Contractor of its responsibility for the planning, selection, and implementation of safety precautions and programs incident to Contractor's means, methods, techniques, sequences, and procedures of construction, or to the Work.

SC/GBR-5.04 Differing Subsurface or Physical Conditions

- A. Notice: If Contractor believes that any subsurface condition that is uncovered or revealed at the Site:
 1. differs materially from conditions shown or indicated in the GBR; or
 2. differs materially from conditions shown or indicated in Contract Documents other than the GBR or GDR, to the extent the GBR and GDR are inapplicable; or
 3. to the extent the GBR is inapplicable, is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
 4. to the extent the GBR is inapplicable, is of such a nature as to require a change in the Drawings or Specifications; or

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

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. **Engineer's Review:** After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph SC/GBR 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption or continuation of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

- C. **Owner's Statement to Contractor Regarding Site Condition:**

After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption or continuation of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

- D. **Possible Price and Times Adjustments:**

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph SC/GBR 5.04.A;
 - 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 Paragraph 13.03 of the General Conditions; and,
 - c. 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.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph SC/GBR 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

SC 5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.
- B. Not Used.

ARTICLE 6 – BONDS AND INSURANCE

SC 6.01 Add the following to the list of requirements in Paragraph 6.01., as a lettered item:

G. Maintenance Bond, Upon filing the notice of completion, Contractor is required to provide a maintenance bond, in the penal sum of one hundred percent (100%) of the Contract Price, using the bond forms included with the Contract Documents, to warranty all work of the project for a period of two (2) years from the date of the final completion.

SC 6.02 Add the following new paragraph immediately after Paragraph 6.02. A:

No later than ten (10) days following issuance of the notice of award, Contractor shall be required to procure and provide proof of the insurance coverage required by this section in the form of certificates and endorsements. The required insurance must cover the activities of Contractor and its Subcontractors relating to or arising from the performance of the Work, and must remain in full force and effect at all times during the period covered by the Contract until the date of recordation of the notice of completion. All required insurance must be issued by a company licensed to do business in the State of California, and each such insurer must have an A.M. Best's

financial strength rating of “A” or better and a financial size rating of “VIII” or better. If Contractor fails to provide any of the required coverage in full compliance with the requirements of the Contract Documents, Owner may, at its sole discretion, purchase such coverage at Contractor’s expense and deduct the cost from payments due to Contractor, or terminate the Contract for default.

a. Delete the last sentence of Paragraph 6.02.B

SC 6.03 Add the following to the list of requirements in Paragraph 6.03.A, as a numbered item:

5. The Policy must comply with the requirements of the California Worker’s Compensation Insurance and Safety Act. If Contractor is self-insured, Contractor shall provide its Certificate of Permission to Self-Insure, duly authorized by the Department of Industrial Relations.

SC 6.04 Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers’ Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State: Statutory

Federal, if applicable (e.g., Longshoreman’s): Statutory

Employer’s Liability:

Bodily injury, each accident \$ 1,000,000

2. Contractor’s Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate \$ 2,000,000

Products - Completed Operations Aggregate \$ 2,000,000

Personal and Advertising Injury \$ 1,000,000

Each Occurrence (Bodily Injury and Property Damage) \$ 1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Combined Single Limit of \$ 1,000,000

4. Excess or Umbrella Liability:	
Per Occurrence	\$ <u>10,000,000</u>
General Aggregate	\$ _____

5. Contractor's Pollution Liability:	
Each Occurrence	\$ <u>1,000,000</u>
General Aggregate	\$ <u>1,000,000</u>

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following:

Rural Community Assistance Corporation
 3120 Freeboard Drive, Suite 201
 West Sacramento, CA 95691

7.

SC-6.05. Add the following to the list of requirements in Paragraph 6.05.A, as a numbered item:

14. be subject to a deductible amount of no more than \$1,000 for direct physical loss in any one occurrence.

SC-6.05.A.1 Add the following new subparagraph after subparagraph 6.05.A.1:

a. In addition to Owner, Contractor, and all Subcontractors, include as insureds the following:

Rural Community Assistance Corporation
 3120 Freeboard Drive, Suite 201
 West Sacramento, CA 95691

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:

- 1. Regular working hours will be 8am-5pm, Monday through Friday**
- 2. Owner's legal holidays are New Year's Day, Martin Luther King, Jr. Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Thanksgiving, and Christmas Day.**

SC-7.02.C. Add the following new paragraph immediately after Paragraph 7.02.B:

Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation

services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-7.04 Add the following words immediately after the word “Engineer” everywhere it appears in this section:

“and/or Owner”

SC-7.05 Add the following words immediately after the word “Engineer” for all places it appears in this section:

“and/or Owner”

SC-7.16.D. Add the following words immediately after the word “Engineer” for all places it appears in this section:

“and/or Owner”

SC-7.20. Add the following new section immediately after Section 7.19:

7.20 Coordination Meetings

Contractor shall make all arrangements for weekly coordination meetings, including preparing an agenda with copies for participants, preparing and distributing minutes, and presiding over meetings. Required attendance shall include the job superintendent, major subcontractors and suppliers, engineer, and owner, as appropriate to agenda topics for each meeting. The minimum agenda shall include:

- a. Review minutes of previous meetings.
- b. Review of Work progress.
- c. Field observations, problems, and decisions.
- d. Identification of problems impeding planned progress.
- e. Review of submittal schedule and status of submittals.
- f. Review of off-site fabrication and delivery schedules.
- g. Maintenance of Progress Schedule.
- h. Corrective measures to regain projected schedules.
- i. Planned progress during succeeding work period.
- j. Coordination of projected progress.
- k. Maintenance of quality and work standards.
- l. Effect of proposed changes on Progress Schedule and coordination.
- m. Other business relating to Work.

Contractor shall record minutes and distribute copies to the participants within two days after each meeting.

ARTICLE 9 – OWNERS RESPONSIBILITIES

SC-9.01.A Immediately after the word “Owner”, replace the word “shall” with “may”

SC-9.02.A Delete the phrase “provided Contractor makes no reasonable objection to the replacement engineer” in its entirety.

ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION

SC-10.01.A Delete Paragraph 10.01.A in its entirety.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

SC-11.06.A.2 Delete Paragraph 11.06.A.2 in its entirety and insert the following in its place:

2. **Engineer and/or Owner’s Action:** Engineer and/or Owner will review each Change Proposal and, within 14-days after receipt of the Contractor’s supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to the Owner and Contractor. If the Engineer does not take action on the Change Proposal within 14-days, then either the Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the Engineer’s inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-13.03.D Add the following words immediately after the word “Engineer” for all places it appears in this section:

“and/or Owner”

SC 13.03.E Delete Paragraph 13.03.E in its entirety and insert the following in its place:

- E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:
 1. if the extended price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and
 2. if there is no corresponding adjustment with respect to any other item of Work; and
 3. if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.

ARTICLE 14 – TEST AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC-14.02.A Add the following words immediately after the word “Engineer” for all places it appears in this section:

“and/or Owner”

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC 15.03.B Add the following new subparagraph to Paragraph 15.03.B:

- 1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.**

SECTION 01 10 00 - SUMMARY

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Contract description.
 - 2. Work by Owner or other Work at the Site.
 - 3. Contractor's use of Site and premises.
 - 4. Work sequence.
 - 5. Permits.
 - 6. Specification conventions.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Summary of Work.
 - 1. Basis of Measurement: This section will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with this section shall be included in the contract price for related work.

1.3 CONTRACT DESCRIPTION

- A. Work of the Project includes construction of a 200,000 gallon welded steel water tank, the demolition of a 30,000 gallon redwood water tank, site work, and tree plantings.
- B. Perform Work of Contract under stipulated sum. Contract with Owner according to Conditions of Contract.

1.4 WORK BY OWNER OR OTHERS

- A. Coordinate Work with utilities, Owner and Humboldt County regarding tree plantings, temporary connections, driveway construction, and installation of 200,000 gallon tank.
- B. Work under this Contract includes:
 - 1. Work as indicated on Drawings.
- C. Items noted NIC (Not in Contract) and temporary tank will be furnished and installed by Owner and in place at the time of award.

1.5 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas indicated on Drawings.
- B. Time Restrictions for Performing Work: Monday – Saturday 6:00AM – 6:00PM.
- C. Utility Outages and Shutdown:
 - 1. Coordinate and schedule temporary connections and other utility outages with Owner.

- D. Construction Plan: Before start of construction, submit three copies of construction plan regarding access to Work, use of Site, and temporary connections for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.6 WORK SEQUENCE

- A. Construct Work in order to accommodate Owner's water demands during construction period. Coordinate construction schedule and operations with Owner.
- B. Sequencing of Construction Plan: Before start of construction, submit three copies of construction plan regarding phasing of demolition and new Work for acceptance by Owner. After acceptance of plan, construction sequencing shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.7 PERMITS

- A. Furnish all necessary permits for construction of Work.

1.8 SPECIFICATION CONVENTIONS

- A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 30 00 - SHOP DRAWINGS AND SUBMITTALS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included

Shop drawings and submittals

B. Related Work Described Elsewhere

1. General Conditions: Contractual requirement for submittals and substitutions
2. Pertinent Sections of these Specifications: Individual submittals required

1.02 PRODUCT HANDLING

A. Make all submittals of Shop Drawings, Samples, requests for substitutions, and other items in strict accordance with the provisions of this Section of these SPECIFICATIONS.

B. Tabulate submittals by each specification section.

PART 2 PRODUCTS

2.01 SHOP DRAWINGS AND PRODUCT SUBMITTALS

A. Scale Required

Unless otherwise specifically directed by the ENGINEER, make all Shop Drawings accurately to a scale sufficiently large enough to show all pertinent features of the item and its method of connection to the WORK.

B. Type of Prints Required

Unless otherwise specifically directed by the ENGINEER, make all Shop Drawing prints or product information in blue or black line on white background.

C. Number of Prints or Product Information Required

Unless otherwise noted, submit all shop drawings or product information in the quantity which is required (one minimum) to be returned, plus two copies which will be retained by the ENGINEER. One of the copies submitted shall be a reproducible transparency if larger than 8-1/2 by 11 inches.

2.02 SAMPLES

A. Accuracy of Sample

Unless otherwise specifically directed by the ENGINEER, all Samples shall be of the precise article proposed.

B. Number of Samples Required

Submit all Samples in the quantity which is required to be returned plus two which will be retained by the ENGINEER.

2.03 SUBSTITUTIONS

A. ENGINEER's Approval Required

1. The CONTRACT is based on the materials, equipment, and methods described in the CONTRACT DOCUMENTS.
2. The ENGINEER will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the ENGINEER to evaluate the proposed substitution.
3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this WORK by the ENGINEER.

B. "Or Equal"

1. Where the phrase "or equal" occurs in the CONTRACT DOCUMENTS, do not assume that material, equipment, or methods will be approved as equal by the ENGINEER unless the item has been specifically approved for this WORK by the ENGINEER.
2. The decision of the ENGINEER shall be final.

C. Availability of Specified Items

1. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the WORK.
2. In the event specified item or items will not be available, so notify the ENGINEER prior to receipt of bids.

3. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the CONTRACTOR, shall be the responsibility of the CONTRACTOR.

PART 3 EXECUTION

3.01 SUBMITTAL FORM

All submittals shall be transmitted with a copy of the form provided at the end of this SECTION.

3.02 COORDINATION OF SUBMITTALS

A. General

Prior to submittal for ENGINEER's review, use all means necessary to fully coordinate all material, including the following procedures:

1. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.
2. Coordinate as required with all trades and public agencies involved.
3. Secure all necessary approvals from public agencies and others; signify by stamp, or other means, that they have been secured.
4. Clearly indicate all deviations from the CONTRACT DOCUMENTS.

B. Grouping of Submittals

Unless otherwise specifically permitted by the ENGINEER, make all submittals in groups containing all associated items by specification section; the ENGINEER may reject partial submittals as not complying with the provisions of the CONTRACT DOCUMENTS.

- C. Shop drawings shall be submitted only by the CONTRACTOR, who shall indicate by a signed stamp, or other approved means, that the work shown is in conformance with the CONTRACT DOCUMENTS and has been checked for dimensions and relationship with work of all other trades involved.

3.03 TIMING OF SUBMITTALS

A. General

1. Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and re-submittal, and for placing orders and securing delivery.
2. In scheduling, allow at least ten (10) working days for the ENGINEER's review following his receipt of the submittal.

B. Delays

Costs or loss of time due to delays occasioned by tardiness of submittals are the responsibility of the CONTRACTOR and shall not be borne by the OWNER.

3.04 SUBMITTALS REQUIRED

- A. Specific submittals are required by the various Sections of these SPECIFICATIONS and are indicated therein. Following is a preliminary list of submittals, which may not be complete or comprehensive. Contractor shall prepare a final list.

Preliminary List of Submittals

Performance Bond
Payment Bond
Evidence of Insurance
Execution of Contract
List of Substitutions
Construction Schedule
Designation of Authorized Representatives
Cost breakdown for Lump Sum Items
Survey Request
Construction Sequencing Plan
Tank Drainage Plan
Tank Demolition Shop Drawings
Concrete Formwork Shop Drawings and Product Data
Concrete Reinforcing Shop Drawings
Qualifications Certificates for Welders
Concrete Reinforcing Manufacturer's Certificates
Cast-in-Place Concrete Product Data, Design Data, and Manufacturer's Instructions
Painting and Coatings Paint System Data Sheets and Material Safety Data Sheets
Painting and Coatings Samples and Color Charts
Painting and Coatings Manufacturer Certifications of Compliance
Traffic Control Plan
Tank Certificate of Compliance
Tank Shop Drawings and Design Calculations
Tank Material Certification

Tank Radiography Test Results
Tank Vacuum Test Results
Soils for Earthwork Samples and Source
Aggregates for Earthwork Samples and Source
Rough Grading Materials Samples and Source
Trench Excavation Protection Plan
Trench Backfill Samples and Source
Water Pollution Control Program
Chain Link Fence and hardware Product Data, Shop Drawings
Tree Irrigation Plan and Product Data Sheets
Tree Product Information, Planting Instructions, and Care Instructions
Precast Concrete Valve Vaults, Valve Boxes, and Drop Inlets Shop Drawings
Precast Concrete Valve Vaults, Valve Boxes, and Drop Inlets Product Data & Certificates
Thrust Restraint Product Information and Certification
Seismic Controls Product Data, Instructions, and Certification
Seismic Controls Field Test Results
Water Piping and Fittings Product Data and Certification
Valve and Hydrant Product Data and Certifications
Tank and Piping Disinfection Plan
Hydrostatic Leak Test Results
Drainage Pipe Product Data and Certification
Record Drawings

- B. After review by the ENGINEER of each submittal, the documents will be returned to the CONTRACTOR with the ENGINEER's review action defined as follows:
1. NO EXCEPTION TAKEN-Documentation is accepted subject to compatibility with possible later submittals or with additional documentation required to cover work requirements not covered in this submittal. This review action does not constitute approval of any variations in scope of WORK which shall be formalized by separate correspondence.
 2. MAKE CORRECTIONS NOTED-Meaning is the same as above for "No Exceptions Taken," except that minor inconsistencies and number of errors shall be resolved and corrected as noted. Formal re-submittal for review by the ENGINEER is not required unless so specified.
 3. REVISE AND RESUBMIT-Not favorably reviewed by the ENGINEER because of major inconsistencies, number of errors, or unauthorized departures from the TECHNICAL SPECIFICATIONS. All matters shall be resolved and corrected prior to re-submittal to the ENGINEER for review.
 4. REJECTED-Not favorably reviewed by the ENGINEER because the submittal documents show nonconformance with CONTRACT DRAWINGS and TECHNICAL SPECIFICATIONS in major respect, either technical or

administrative, or both. Detailed review will not be made due to the nonconformance. A re-submittal in conformance with the contract documents is required.

3.05 RE-SUBMITTALS

- A. Practice of submitting incomplete or unchecked shop drawings for the ENGINEER to correct or finish will not be acceptable; shop drawings which, in the opinion of the ENGINEER, clearly indicate that they have not been checked by the CONTRACTOR will be considered as not complying with the intent of the CONTRACT DOCUMENTS and will be returned to the CONTRACTOR for re-submission in the proper form.
- B. ENGINEER shall complete two detailed reviews of Shop Drawings and submittals at no cost to the CONTRACTOR. The cost of additional reviews resulting from improper submission or completion of Shop Drawings shall be deducted by the OWNER from the CONTRACT sum.

*** END OF SECTION ***

Note: SHOP DRAWING/MATERIAL REVIEW REQUEST FORM FOLLOWS

LACO ASSOCIATES, INC.

SHOP DRAWING/MATERIAL REVIEW REQUEST FORM

INSTRUCTION: Complete this form and attach a copy to each specific Submittal. Provide the same number of completed forms as specific Submittal copies.

Contract Name _____

Submission No. _____

Submittal: New _____ Re-submittal _____

Date of this submittal _____

Previous Submission No. (if any) _____

Contractor _____

Submitted by (signature and date): _____

Item	Specification Section and Paragraph	Description of Material (Name, Type, Model, Catalog No., Mfg., Etc.)

Comments: (Include all drawing titles and numbers, specific information not on drawings, information coming later, etc.)

REVIEW BY CONSTRUCTION MANAGER:

Date of receipt by Architect/Engineer _____

Review is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his/her work with that of all other trades; and the satisfactory performance of the work.

___ NO EXCEPTION TAKEN

___ MAKE CORRECTIONS NOTED

___ REVISE AND RE-SUBMIT

___ REJECTED

DATE: _____

BY: _____

SECTION 01 50 00 - TEMPORARY CONNECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Temporary facilities under Construction Management Agreement.
 - 2. Temporary utilities.
 - 3. Temporary connection.
 - 4. Communication services.
 - 5. Temporary water service.
 - 6. Water control.
 - 7. Removal of utilities, facilities, and controls.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Temporary tank connection and District coordination:
 - 1. Basis of Measurement: Lump Sum.
 - 2. Basis of Payment: Includes temporary piping, valves, utility coordination for the telecommunication to the Arthur Road pump station, excavation, backfill, connections, disconnections, coordination with the District, and submittal development, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 SUBMITTALS

- A. Contractor shall submit to the owner prior to construction a sequencing plan utilizing the on-site temporary storage to maintain supply for the water system during site cleaning activities, installation of proposed water mains and valves, demolition of the existing tank, construction of the new tank, and startup of the facility.

1.4 TEMPORARY WATER CONNECTION

- A. A minimum of 72-hours prior to any water shut-offs, the CONTRACTOR must be granted approval form OWNER prior to proceeding with the shut-off. Maximum water shut-off time shall not exceed 4-hours in a 24-hour period.
- B. Contractor shall coordinate with the owner to maintain temporary water connection during this project's construction and demolition activities through startup.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 51 00 - TEMPORARY FACILITIES & CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION

A. This SECTION covers the work necessary to move in personnel and equipment, set up offices, and related facilities necessary to prepare the WORK area for construction and the establishment and protection of survey controls. Temporary facilities and controls required for this WORK include, but are not necessarily limited to:

1. Temporary utilities such as water, electricity, and telephone
2. Sanitary facilities
3. Site Survey Control
4. Preservation of Monuments

B. Related Work Described Elsewhere

1. General Requirements: General and Supplementary Conditions
2. Section 01 10 00: Summary

1.02 PRODUCT HANDLING

Protection

- A. Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the WORK.
- B. Where survey points established by ENGINEER are damaged or moved by CONTRACTOR, CONTRACTOR shall re-establish points at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 UTILITIES

A. General

Provide and pay all costs for temporary water, electricity, and telephone required for the

performance of the WORK.

B. Water

Water used during construction and testing shall be provided by the Owner without cost, except as noted herein. Contractor shall request approval to use water at least 72 hours prior to use. Contractor shall make every effort to conserve water.

Additional water needed to re-fill the tank for bacteriological re-testing, for re-testing for VOC's, or for repairing leaks, if necessary due to a failure to meet standards, will be paid for at Contractor's expense in accordance with Section 22 12 00. In such case, water will be charged to Contractor at the Owner's Tier 2 rate of \$3.85 per 100 cubic feet.

C. Temporary Electricity

1. Make all arrangements and pay all operating costs for electrical power used during construction, testing, and up to the time of final acceptance.
2. Pay for all services associated with the temporary power.

D. Temporary Telephone Service

1. Make all arrangements and pay all operating costs for telephone service used during construction, testing, and up to the time of final acceptance.
2. Pay for all services associated with temporary telephone service.

2.02 SANITARY FACILITIES

Furnish temporary sanitary toilets for use of all workers; comply with all minimum requirements of the Health Department or other public agency having jurisdiction; maintain a sanitary condition at all times.

2.03 SURVEY CONTROL

The ENGINEER has established horizontal and vertical survey control on the project. ENGINEER shall set preliminary subgrade construction stakes one time, and finish grade stakes one time, at Owner's expense. If additional survey grade staking is required, it will be at the CONTRACTOR's expense.

After the CONTRACTOR notifies ENGINEER that finish grade has been achieved, ENGINEER will make one visit, at the Owner's expense, to check finish grades. The cost of additional survey checks, if needed, will be deducted from payment to the CONTRACTOR.

2.04 MONUMENT PRESERVATION

CONTRACTOR is responsible for preservation and/or perpetuation of all existing monuments which control subdivisions, tracts, boundaries, streets, highways, or other rights-of-way, easements, or provide survey control which will be disturbed or removed due to CONTRACTOR's work. CONTRACTOR shall provide a minimum of 10 working days notice to project ENGINEER/surveyor prior to disturbance or removal of existing monuments and file the required documentation with the County Surveyor pursuant to California Business and Professions Code section 8771.

PART 3 EXECUTION

3.01 REMOVAL

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the WORK; remove all such temporary facilities and controls as rapidly as progress of the WORK will permit or as directed by the ENGINEER.

*** END OF SECTION ***

SECTION 02 10 00 – MOBILIZATION AND DEMOBILIZATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Mobilization and Demobilization

1.2 UNIT PRICES – MEASUREMENT AND PAYMENT

- A. Mobilization and Demobilization.
 - 1. Basis of Measurement: Lump sum.
 - 2. Basis of Payment: Partial Contract payments will be made for Mobilization using the following schedule:

When the listed percentage of the original Contract amount is earned, the percentage of the amount bid for Mobilization, or the percentage of original Contract amount, whichever is less, will be paid.

Amount Earned of:	Pay Lesser of:	
Total Contract	Mobilization Bid Amount	Total Contract Amount
5%	25%	2-1/2%
10%	50%	5%
50%	100%	7-1/2%
75%	100%	10%

Upon completion of all work on the Project, payment of any amount bid for Mobilization in excess of 10 percent of the original Contract amount will be paid, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 CONTRACTOR RESPONSIBILITY

The Contractor shall be responsible for furnishing all labor, equipment, supplies, and materials necessary to perform all operations required for Project completion and for establishing, maintaining, and providing security for the Project site for the duration of the Project.

1.4 STAGING AREAS

It is the intent of this Contract to utilize the project site for staging. By making the sites available to the Contractor, the Owner, and any other person or agency connected with the property shall in no way be responsible or liable for any activity of the Contractor, Subcontractors, or any individual or organization connected with the work of the Contractor.

A. Alternative Staging Areas

The Contractor is required to use the project site for staging. If alternative sites are determined to be necessary, they must be near the project and the Contractor must make all arrangements including but not limited to clearance of non-sensitive archeological and environmental sites for their use at the Contractor's expense and must be approved by the Owner prior to use.

1.5 SPECIAL REQUIREMENTS

Contractor shall comply with all other applicable provisions of the General Provisions and Special Provisions including but not limited to restoration of landscape to original conditions. Unless specifically designated for removal, no existing trees in the staging area shall be removed. If construction of ramps, berms or other features is necessary, the Contractor shall be responsible for the importation and disposal of such material and the restoration of the site to its original condition.

A. Site Grading

If site grading is performed at the staging area, the site shall be restored to a natural vegetated condition at completion of work in accordance with one of the following:

1. Restored to original grade.
2. Restored in accordance with guidance from the Owner.

1.6 SUBMITTALS

A. The following shall be submitted:

1. Mobilization/Demobilization Work Plan

Before starting the work, the Contractor shall submit to the Owner a plan identifying his requirements for space for temporary structures, location and approximate size of mobile and stationary equipment, and storage of materials. The Contractor shall submit to the Owner a proposed plan and layout for all temporary offices, sanitary facilities, storage buildings, and storage yards.

Should the Contractor require space in addition to that available on-site, the Contractor shall make arrangements for storage of materials and equipment in locations off the construction site at the Contractors own expense.

PART 2 PRODUCTS

2.1 MATERIAL STORAGE

Provide buildings or shelters at site as required for material storage for protection against the elements, theft or other damage. The buildings shall be of sufficient size and so arranged or partitioned to provide security for their contents and provide ready access for inspection and inventory. Buildings shall be located only where pre-approved by the Owner.

A. Subcontractor's Storage

Subcontractors may provide temporary buildings or shelters for storage and protection of their materials. Buildings shall be located only where pre-approved by the Owner.

2.2 DRINKING WATER

Provide drinking water for all personnel connected with the work. Transport water in such a manner as to keep it clean and fresh. Serve from single service containers with paper cups or sanitary drinking fountains.

2.3 TEMPORARY TOILETS

Provide adequate chemical toilet facilities for all individuals connected with the work, in number as required by Federal and State Safety and Occupational Standards and at locations convenient for use. Keep in sanitary condition. Remove at completion of construction and disinfect premises. Toilets shall be regularly maintained, cleaned and drained.

2.4 SITE CLEANUP AND DISPOSAL OF RUBBISH

Maintain the construction site and building areas in a neat, orderly condition throughout the duration of this Contract. Remove from the site all rubbish, debris, and materials not to be incorporated into the work and all other accumulations that may result from work under this Contract on a weekly basis.

2.5 BARRICADES AND PROTECTION

Provide barricades, temporary fencing, handrails, shoring and other devices required by law and as necessary to protect new construction and materials and to protect all persons on the Job site.

2.6 TEMPORARY PROTECTIVE FENCING

Not later than 5 days after the date established for commencement of work and prior to the start of ground disturbing activities, the Contractor shall furnish and erect temporary protective fencing at the work site at locations identified by the Owner. The fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. The fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

2.7 SILT FENCING

Provide silt fencing in accordance with the California Department of Transportation Standard Plan T51. The silt fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work and activities that require Storm Water Pollution Prevention, shall become the property of the Contractor and shall be removed from the work site.

PART 3 EXECUTION

3.1 REQUIREMENTS

The Contractor shall furnish, install, service and maintain for the duration of the project the personnel, material and equipment as described in paragraph 1.3 of this section.

A. Codes

All facilities installed under this section shall meet the requirements of all applicable codes.

END OF SECTION

SECTION 02 41 16 - STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolishing designated structures.
2. Demolishing designated foundations.
3. Demolishing designated slabs-on-grade.
4. Demolishing, disconnecting, and capping designated utilities.
5. Demolishing designated underground tanks.
6. Protecting items designated to remain.
7. Removing demolished materials.

B. Related Sections:

1. Section 31 05 13 - Soils for Earthwork: Backfill materials.
2. Section 31 05 16 - Aggregates for Earthwork: Backfill materials.
3. Section 31 10 00 - Site Clearing: Clearing outside periphery of structures.
4. Section 31 21 13 - Rough Grading.

1.2 UNIT PRICES – MEASUREMENT AND PAYMENT

A. Structure Demolition:

1. Basis of Measurement: Lump Sum
2. Basis of Payment: Includes demolition of existing 30,000 gallon redwood tank and concrete foundation, overflow and drain piping, waterline, fencing, testing, loading, and removal from Site, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 SCHEDULING

- ##### A. Demolition of the existing 30,000 gallon redwood tank shall take place once the temporary 10,000 gallon polyethylene tank is in service and approved by the OWNER.

1.4 SUBMITTALS

A. Tank drainage plan

B. Shop Drawings Indicating:

1. Tank Demolition Plan, including location and construction of temporary work.

1.5 QUALITY ASSURANCE

- ##### A. Conform to applicable code for demolition of structures, safety of adjacent structures, dust control, runoff control and disposal.

1.6 EXISTING CONDITIONS

- A. Owner assumes no responsibility for actual condition of tank to be demolished.
- B. Notify Engineer upon discovery of hazardous materials.
- C. Do not sell demolished materials on-site.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 SEQUENCING

- A. Sequence activities to remove existing waterline and demolish existing redwood water storage tank once the new 10,000 gallon temporary storage tank is in service and OWNER has approved the demolition of the existing tank.

3.2 PREPARATION

- A. Notify affected utility companies before starting Work, and comply with utility's requirements.
- B. Do not close or obstruct roadways without permits.

3.3 DEMOLITION

- A. General:
 - 1. Use of explosives is **not** permitted.
 - 2. Conduct demolition to minimize interference with adjacent temporary water storage facility.
 - 3. Cease operations immediately when adjacent temporary water storage facility appears to be in danger. Notify Engineer. Do not resume operations until directed.
- B. Capped Utilities:
 - 1. Disconnect remove and cap designated utilities to future connections.
 - 2. Identify utilities at termination of demolition.
 - 3. Record termination or capped location on Record Documents.
- C. Remove foundation walls and footings within area of new construction.
- D. Remove concrete slabs-on-grade.
- E. Backfill areas excavated resulting from demolition according to Section 31 22 13 – Rough Grading
- F. Rough grade and compact areas affected by demolition to accommodate subsequent construction operations.

- G. Remove existing overflow piping.
- H. Remove existing waterline.
- I. Remove existing fence.
- J. Continuously clean up and remove demolished materials from Site. Do not allow materials to accumulate on-Site.
- K. Do not burn or bury materials on-Site; leave Site in clean condition.

END OF SECTION

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Formwork for cast-in place concrete.
 - 2. Shoring, bracing, and anchorage.
 - 3. Form accessories.
 - 4. Form stripping.

- B. Related Sections:
 - 1. Section 03 20 00 - Concrete Reinforcing.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Formwork:
 - 1. Basis of Measurement: Refer to Section 03 30 00. Formwork will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with formwork shall be included in the contract price for related work.

Separate payment will not be made for form materials, placement, and placing accessories. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301 - Specifications for Structural Concrete.
 - 3. ACI 318 - Building Code Requirements for Structural Concrete.
 - 4. ACI 347 - Guide to Formwork for Concrete.

- B. American Forest and Paper Association:
 - 1. AF&PA - National Design Specifications for Wood Construction.

- C. The Engineered Wood Association:
 - 1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

- D. American Society of Mechanical Engineers:
 - 1. ASME A17.1 - Safety Code for Elevators and Escalators.

- E. ASTM International:
 - 1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - 2. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
- F. West Coast Lumber Inspection Bureau:
 - 1. WCLIB - Standard Grading Rules for West Coast Lumber.

1.4 DESIGN REQUIREMENTS

- A. Design, engineer and construct formwork, shoring and bracing in accordance with ACI 318 to conform to design and applicable code requirements to achieve concrete shape, line and dimension as indicated on Drawings.

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit formwork shop drawings.
 - 2. Indicate the following:
 - a. Pertinent dimensions, openings, methods of construction, types of connections, materials, joint arrangement and details, ties and shores, location of framing, studding and bracing, and temporary supports.
 - b. Means of leakage prevention for concrete exposed to view in finished construction.
 - c. Sequence and timing of erection and stripping assumed compressive strength at time of stripping, height of lift and height of drop during placement.
 - d. Vertical, horizontal and special loads in accordance with ACI 347, Section 2.2 and camber diagrams, when applicable.
 - e. Notes to formwork erector showing size and location of conduits and piping embedded in concrete in accordance with ACI 318, Section 6.3.
 - f. Procedure and schedule for removal of shores.
- B. Product Data: Submit data on void form materials.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318
- B. For wood products furnished for work of this Section, comply with AF&PA.

1.7 COORDINATION

- A. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

- A. Form Materials: At discretion of Contractor.

2.2 FORMWORK ACCESSORIES

- A. Form Ties: Removable Snap-off type, galvanized metal, fixed or adjustable length, cone type, with waterproofing washer, free of defects capable of leaving holes larger than 1 inch in concrete surface.
 - 1. Manufacturers:
 - a. Heckmann Building Products, Inc.
 - b. Symons by Dayton Superior.
 - c. Wall-Ties & Forms, Inc.
 - d. Approved substitutions
- B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.
- C. Form Anchors and Hangers:
 - 1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.
 - 2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
 - 3. Penetration of structural steel members is not permitted.
- D. Form Release Agent: Colorless mineral oil that will not stain concrete, or absorb moisture or impair natural bonding.
 - 1. Manufacturers:
 - a. Architectural Concrete Chemicals, LLC.
 - b. Nox-Crete Products Group.
 - c. Approved substitutions
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.
- B. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Engineer.

3.2 INSTALLATION

- A. Earth Forms:
 - 1. Earth forms are not permitted.
- B. Formwork - General:

1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
 5. Complete wedging and bracing before placing concrete.
- C. Forms for Smooth Finish Concrete:
1. Use steel, plywood or lined board forms.
 2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
 3. Install form lining with close-fitting square joints between separate sheets without springing into place.
 4. Use full size sheets of form lines and plywood wherever possible.
 5. Tape joints to prevent protrusions in concrete.
 6. Use care in forming and stripping wood forms to protect corners and edges.
 7. Level and continue horizontal joints.
 8. Keep wood forms wet until stripped.
- D. Framing, Studding and Bracing:
1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.
 2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
 3. Construct beam soffits of material minimum of 2 inches thick.
 4. Distribute bracing loads over base area on which bracing is erected.
 5. When placed on ground, protect against undermining, settlement or accidental impact.
- E. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 318.
- F. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- G. Install fillet and chamfer strips on external corners of foundations and slabs.
- H. Install void forms in accordance with manufacturer's recommendations.
- I. Do not patch formwork.

3.3 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

- C. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.4 INSTALLATION - INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Install formed openings for items to be embedded in or passing through concrete work.
- B. Locate and set in place items required to be cast directly into concrete.
- C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
- D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
- G. Form Ties:
 - 1. Use sufficient strength and sufficient quantity to prevent spreading of forms.
 - 2. Place ties at least 1 inch away from finished surface of concrete.
 - 3. Leave inner rods in concrete when forms are stripped.
 - 4. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.
- H. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
- I. Construction Joints:
 - 1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
 - 2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
 - 3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
 - 4. Arrange joints in continuous line straight, true and sharp.
- J. Embedded Items:
 - 1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
 - 2. Do not embed wood or uncoated aluminum in concrete.
 - 3. Obtain installation and setting information for embedded items furnished under other Specification sections.
 - 4. Securely anchor embedded items in correct location and alignment prior to placing concrete.

5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 for size and location limitations.

K. Openings for Items Passing Through Concrete:

1. Frame openings in concrete where indicated on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
2. Coordinate work to avoid cutting and patching of concrete after placement.
3. Perform cutting and repairing of concrete required as result of failure to provide required openings.

L. Screeds:

1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
2. Slope slabs to drain where required or as shown on Drawings.
3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.

M. Screenshot Supports:

1. For concrete over waterproof membranes and vapor retarder membranes, use cradle, pad or base type screed supports which will not puncture membrane.
2. Staking through membrane is not be permitted.

N. Cleanouts and Access Panels:

1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

3.5 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.6 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Engineer.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

- C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- D. Leave forms in place for minimum number of days as specified in ACI 347.

3.7 ERECTION TOLERANCES

- A. Tolerances: Construct formwork to produce completed concrete surfaces within construction tolerances specified in ACI 117.

3.8 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
- B. Notify Engineer after placement of reinforcing steel in forms, but prior to placing concrete.
- C. Schedule concrete placement to permit formwork inspection before placing concrete.

END OF SECTION

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Reinforcing bars.
 - 2. Welded wire fabric.
 - 3. Reinforcement accessories.

- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories.
 - 2. Section 03 30 00 - Cast-In-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Bar Reinforcement:
 - 1. Basis of Measurement: Refer to Section 03 30 00. Bar reinforcement will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with bar reinforcement shall be included in the contract price for related work.

Separate payment will not be made for reinforcement, placement, and accessories. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

- B. Welded Wire Fabric Reinforcement:
 - 1. Basis of Measurement: Refer to Section 03 30 00. Welded wire fabric reinforcement will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with welded wire fabric reinforcement shall be included in the contract price for related work.

Separate payment will not be made for welded wire reinforcement, placement, and accessories. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
 - 3. ACI 530.1 - Specifications for Masonry Structures.
 - 4. ACI SP-66 - ACI Detailing Manual.

- B. ASTM International:
 - 1. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.
 - 3. A185/A185M-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 4. ASTM A496/A496M - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - 5. ASTM A497/A497M - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
 - 6. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 7. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
 - 8. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 9. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - 10. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 11. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
 - 12. ASTM A934/A934M - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
 - 13. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
- C. American Welding Society:
 - 1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
- D. Concrete Reinforcing Steel Institute:
 - 1. CRSI - Manual of Standard Practice.
 - 2. CRSI - Placing Reinforcing Bars.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel bending and cutting schedules, supporting and spacing devices.
- B. Certificates: Submit AWS qualification certificate for welders employed on the Work.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
 - 1. Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318.
- B. Prepare shop drawings in accordance with ACI SP-66.

1.6 QUALIFICATIONS

- A. Welders: AWS qualified within previous 12 months.

1.7 COORDINATION

- A. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade, deformed billet bars, uncoated finish.

2.2 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage annealed type
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions.
- C. Epoxy Coating Patching Material: Type as recommended by coating manufacturer.

2.3 FABRICATION

- A. Fabricate concrete reinforcement in accordance with ACI 318.
- B. Form standard hooks for 180 degree bends, 90 degree bend, stirrup and tie hooks, and seismic hooks as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters in accordance with ACI 318.
- D. Form ties and stirrups from the following:
 - 1. For bars No. 10 and Smaller: No. 3 deformed bars.
- E. Weld reinforcement in accordance with AWS D1.4
- F. Locate reinforcement splices not indicated on Drawings, at point of minimum stress. Review location of splices with Engineer.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position beyond specified tolerance.
 - 1. Do not weld crossing reinforcement bars for assembly except as permitted by Engineer.
- B. Do not displace or damage vapor retarder.

- C. Accommodate placement of formed openings.
- D. Space reinforcement bars with minimum clear spacing in accordance with ACI 318.
 - 1. Where bars are indicated in multiple layers, place upper bars directly above lower bars.

E. Maintain concrete cover around reinforcement in accordance with ACI 318 as follows:

Reinforcement Location		Minimum Concrete Cover
Footings and Concrete Formed Against Earth		3 inches
Concrete exposed to earth or weather	No. 6 bars and larger	2 inches
	No. 5 bars and smaller	1-1/2 inches
Supported Slabs, Walls, and Joists	No. 14 bars and larger	1-1/2 inches
	No. 11 bars and smaller	3/4 inches
Beams and Columns		1-1/2 inches
Shell and Folded Plate Members	No. 6 bars and larger	3/4 inches
	No. 5 bars and smaller	1/2 inches

- F. Splice reinforcing where indicated on Drawings in accordance with splicing device manufacturer's instructions.

3.2 ERECTION TOLERANCES

- A. Install reinforcement within the following tolerances for flexural members, walls, and compression members:

Reinforcement Depth	Depth Tolerance	Concrete Cover Tolerance
Greater than 8 inches	plus or minus 3/8 inch	minus 3/8 inch
Less than 8 inches	plus or minus 1/2 inch	minus 1/2 inch

- B. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.

3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318.
- B. Provide free access to Work and cooperate with appointed firm.
- C. Reinforcement Inspection:
 - 1. Placement Acceptance: Specified and ACI 318 material requirements and specified placement tolerances.
 - 2. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete for the following:
 - 1. Tank ring foundation.
 - 2. Thrust blocks.

- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forming and Accessories:
 - 2. Section 03 20 00 - Concrete Reinforcing.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Concrete – Tank Ring Foundation:
 - 1. Basis of Measurement: Refer to Section 22 12 00. Tank ring foundation will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with this tank ring foundation shall be included in the contract price for related work.

Separate payment will not be made for formwork, concrete, footing excavation, reinforcement, placement accessories, consolidating, and curing. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete.
 - 2. ACI 305 - Hot Weather Concreting.
 - 3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
 - 4. ACI 308.1 - Standard Specification for Curing Concrete.
 - 5. ACI 318 - Building Code Requirements for Structural Concrete.

- B. ASTM International:
 - 1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 3. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 4. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 5. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 6. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

7. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
8. ASTM C150 - Standard Specification for Portland Cement.
9. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
10. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
12. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
14. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
15. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
16. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
17. ASTM C685/C685M - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.
18. ASTM C845 - Standard Specification for Expansive Hydraulic Cement.
19. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
20. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
21. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
22. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
23. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
24. ASTM C1157 - Standard Performance Specification for Hydraulic Cement.
25. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
26. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
27. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
28. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
29. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
30. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
31. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.
32. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
33. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.
34. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

C. California Department of Health Services:

1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

1.4 SUBMITTALS

- A. Product Data: Submit data on joint devices, attachment accessories and admixtures
- B. Design Data:
 - 1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
 - a. Hot and cold weather concrete work.
 - b. Air entrained concrete work.
 - 2. Identify mix ingredients and proportions, including admixtures.
 - 3. Concrete mix designs shall be stamped and signed by a civil engineer registered in California.
- C. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 318.
- B. Conform to ACI 305 when concreting during hot weather.
- C. Conform to ACI 306.1 when concreting during cold weather.
- D. Acquire cement and aggregate from one source for Work.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Maintain concrete temperature after installation at minimum 50 degrees F for minimum 7 days.

1.7 COORDINATION

- A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type I - Normal
- B. Normal Weight Aggregates: ASTM C33
 - 1. Coarse Aggregate Maximum Size: 1 inches ,In accordance with ACI 318
- C. Water: ACI 318; potable, without deleterious amounts of chloride ions

2.2 ADMIXTURES

- A. Furnish materials according to approved mix design and concrete notes listed in the construction documents.

2.3 CONCRETE MIX

- A. Select proportions for normal weight concrete in accordance with ACI 301 Method 1
- B. Provide concrete to the following criteria: Per welded steel tank manufacture's recommendations and designed and stamped by a California Registered Civil Engineer

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.
- B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove debris and ice from formwork, reinforcement, and concrete substrates.
- D. Remove water from areas receiving concrete before concrete is placed.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 318.
- B. Notify testing laboratory and Engineer minimum 72 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, and are not disturbed during concrete placement.
- D. Deposit concrete at final position. Prevent segregation of mix.
- E. Place concrete in continuous operation for each panel or section determined by predetermined joints.
- F. Consolidate concrete.

- G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- H. Place concrete continuously between predetermined expansion, control, and construction joints.

3.4 CONCRETE FINISHING

- A. Steel trowel surfaces which are indicated to be exposed.

3.5 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
 - 1. Protect concrete footings from freezing for minimum 5 days.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by Owner's testing laboratory in accordance with ACI 318
- B. Provide free access to Work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
- D. Concrete Inspections:
 - 1. Continuous Placement Inspection: Inspect for proper installation procedures.
 - 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- E. Strength Test Samples:
 - 1. Sampling Procedures: ASTM C172.
 - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.
 - 3. Sample concrete and make one set of three cylinders for every 75 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
 - 4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
 - 5. Make one additional cylinder during cold weather concreting, and field cure.
- F. Field Testing:
 - 1. Slump Test Method: ASTM C143/C143M.
 - 2. Air Content Test Method: ASTM C173/C173M
 - 3. Temperature Test Method: ASTM C1064/C1064M.
 - 4. Measure slump and temperature for each compressive strength concrete sample.

5. Measure air content in air entrained concrete for each compressive strength concrete sample.

G. Cylinder Compressive Strength Testing:

1. Test Method: ASTM C39/C39M.
2. Test Acceptance: In accordance with ACI 318
3. Test one cylinder at 7 days.
4. Test two cylinders at 28 days.
5. Retain one cylinder for 60 days for testing when requested by Engineer.
6. Dispose remaining cylinders when testing is not required.

3.7 PATCHING

- A. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.
- C. Patch imperfections as directed by Engineer in accordance with ACI 318.

3.8 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by Architect/Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

3.9 SCHEDULE - CONCRETE TYPES AND FINISHES

- A. Tank ring foundation per manufacturer.
- B. Concrete 2,500 psi, 28 day cure.
- C. Thrust blocks 2,500 psi, 28 day cure.

END OF SECTION

SECTION 05 50 13 - MISCELLANEOUS METALWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous metalwork
 - 2. Removable Bollards

- B. Related Sections:
 - 1. Section 03 20 00 – Concrete Reinforcement
 - 2. Section 33 00 00 – Cast-in-Place Concrete
 - 3. Section 33 05 17 – Precast Concrete Valve Vaults, Valve Boxes, and Drop Inlets
 - 4. Section 33 05 19 – Thrust Restraint
 - 5. Section 33 05 48 – Vibration and Seismic Controls for Utilities Piping and Equipment
 - 6. Section 33 11 16 – Site Water Utility Distribution Piping

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Miscellaneous metalwork
 - 1. Basis of Measurement: Miscellaneous metalwork will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with miscellaneous metalwork shall be included in the contract price for related work.

Separate payment will not be made for bolts, nuts, washers, hinges, chains, expansion anchors, pipe supports, conduit and raceway supports, and equipment supports. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

- B. Removable Bollards
 - 1. Basis of Measurement: Basis of Measurement: Each
 - 2. Basis of Payment: Includes bollard, footings, casing, chain, lock, painting, accessories, and attachments, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

- A. ASTM International
 - 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
 - 3. ASTM A108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-

Finished

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 A193 – Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications
7. ASTM A194 – Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
8. ASTM A307 – Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength
9. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
10. ASTM A569 – Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial (Withdrawn 2000)
11. ASTM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

- B. American Welding Society (AWS)
1. AWS D1.1 – Structural Welding Code – Steel

C. AISC Manual of Steel Construction

1.4 SUBMITTALS

- A. Submit to the Engineer, for review, the following:
1. Shop drawings for metalwork.
 2. Product data on proprietary materials.
 3. Welder qualifications.

1.5 QUALITY ASSURANCE

- A. General. Fabricate and erect miscellaneous metalwork in accordance with the AISC, Manual of Steel Construction.
- B. Welding.
1. Welding Requirements. Comply with AWS D1.1.
 2. Stud Welding. Perform and document pre-production testing in accordance with AWS D1.1, paragraph 7.7.1 for all studs welding.
 3. Inspection. Shop welding will be inspected by the Engineer upon delivery to the site, and prior to installation. All field welds shall be visually inspected by the Engineer prior to coating. Notify the Engineer a minimum of one (1) working day prior to the required inspections.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle all items, as required, to prevent damage to the item or its coating. All materials shall be stored on dunnage prior to their installation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with the following:
1. Steel Bars, Plates, and Shapes: ASTM A36
 2. Steel Pipe: ASTM A53, Type E or S, Grade B, STD Weight Class, unless otherwise specified
 3. Structural Steel Tubing: ASTM A500, Grade B
 4. Checkered Plate: ASTM A36, lug type
 5. Galvanizing: ASTM A123 or A153
 6. Steel Bolts, Threaded Rods, Nuts, and Washers: ASTM A307, with commercial quality washers, galvanized
 7. Stainless Steel Bolts, Nuts: ASTM A193, Grade B7 or B8 bolts, with ASTM and Washers A194, Grade B7 or B8 nuts and commercial quality washers
 8. Headed Concrete Anchors: ASTM A108
 9. Welding Electrodes: E70XX, as required for basemetal
 10. Embedded Anchors: ASTM A307, galvanized
 11. Adhesive Anchors: Stainless steel 304 anchors, "HIT Adhesive Anchor System" as manufactured by the Hilti Corporation; or the "Foil Fast" Adhesive Anchoring System, as manufactured by the Rawlplug Co., or approved equal.
 12. Expansion Anchors: Stainless Steel 304 "Kwik" bolts, as manufactured by Hilti Corporation, "Rawl-Bolt" as manufactured by the Rawlplug Company, or equal
 13. Epoxy Anchors: Stainless Steel 304 anchor rods, HVA Adhesive System as manufactured by the Hilti Corporation.
- B. Metal Bar Grating. Furnish galvanized, serrated, welded steel grating with 1 1/4 inch x 1/8 inch ASTM A569 bearing bars spaced at 1 3/16-inch on center, cross bars spaced at four (4) inches on center, and galvanized steel hold-down clips. Type W/B with serrated bearing bars, as manufactured by IKG Industries, Madera, California, or approved equal. Band cut ends with 1/8 inch minimum galvanized steel bars.
- C. Aluminum Grating. Furnish aluminum grating with 1 1/4 inch x 3/16 inch serrated rectangular bars and hold-down clips. Model galvanized 125 serrated bar grating as manufactured by McNichols Co., or approved equal. Band cut ends with 3/16 inch minimum aluminum bars.
- D. Grating Plank. Furnish galvanized, serrated, 14 gauge steel plank grating with a depth of 1 1/2 inch x 11 3/4 inch width, Open-Grip Grating as manufactured by GS Metal Corps, Perfo-O Grips as manufactured by GS Metal Corps, Grip Strut as manufactured by Copper B-Line, or approved equal.
- E. All new miscellaneous metalwork shall be galvanized, unless specified otherwise.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Verify all measurements and take all necessary field measurements before fabrication. Provide materials and parts, not specifically described, but as required for a complete and proper installation. Drilling and punching shall produce clean, true lines and surfaces. Flame cutting of holes shall not be allowed.

3.2 FABRICATION

- A. Fabricate metalwork in accordance with the AISC, Manual of Steel Construction, and as shown on the approved shop drawings.

3.3 WELDING

- A. Comply with AWS D1.1. Exposed welds shall be ground smooth.

3.4 INSTALLATION

- A. Accurately set items to established lines and grades, and securely fastened in place. Install metalwork in accordance with the AISC, Manual of Steel Construction, the manufacturer's installation instructions, and approved Drawings, cuts, and details.

3.5 ANCHORAGE

- A. Provide anchorage, where necessary, for fastening miscellaneous metal items securely in place.
- B. Use only stainless steel epoxy anchors or embedded stainless steel anchor bolts for equipment, or at locations below operating decks of submerged structures.
- C. With prior approval of the Engineer, adhesive anchors, of equivalent capacity, may be installed at locations where an embedded anchor bolt is specified, provided that the Contractor can assure that bolt holes will clear all embedded reinforcing steel.

3.6 GALVANIZING

- A. Perform galvanizing by the hot-dip process after fabrication into the largest practical section. Galvanizing shall conform to ASTM A123. Any damage to galvanizing during shipping and erection shall be "touched-up" with a zinc rich, cold galvanizing paint, brush applied, conforming to ASTM A780. Prior to touch-up, the area shall be thoroughly cleaned by a wire brushing or other suitable method to remove all traces of welding flux and loose or cracked coating.

3.7 EMBEDMENTS

- A. Install metalwork to be embedded in concrete, as specified in Section 03 30 00. Items to be attached to concrete after such work is completed shall be installed in accordance with the details shown.

3.8 GRATING INSTALLATION

- A. Install in accordance manufacturer's instructions and with Engineer's instructions. Band cut bearing bars were not otherwise supported and were shown on Drawings. Band diagonal end cuts, openings, and unsupported flange ends of grating planks. Secure grating at each corner and center of each end with anchor clips. Secure each corner of individual grating planks with anchor clips.

END OF SECTION

SECTION 09 90 00 – PAINTING AND COATING

PART 1 GENERAL

1.1. SUMMARY

A. Section Includes:

1. Submerged metal (Welded steel tanks are not covered by this Specification).
2. Exposed metal (Welded steel tanks are not covered by this Specifications).
3. Buried metal
4. Concrete and masonry
5. Metal in contact with concrete
6. Fusion-bonded epoxy coated steel
7. Exterior architectural coatings and finishes
8. Interior architectural coatings and finishes

B. Related Sections:

1. Section 33 11 16 – Site Water Utility Distribution Piping
2. Section 03 30 00 – Cast-In-Place Concrete
3. Section 22 12 00 – Potable Welded Steel Water Storage Tanks

1.2. UNIT PRICE - MEASUREMENT AND PAYMENT

A. Painting and Coating:

1. Basis of Measurement: Coating will not be measured separately for payment.
2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with this interior coating shall be included in the contract price for related work.

1.3. PAINT DELIVERY AND STORAGE

All materials shall be new and shall be delivered to the project site in unopened containers that plainly show, at the time of use, the designated name, date of manufacture, color, and name of manufacturer. Paints shall be stored in a suitable protected area that is heated or cooled as required to maintain temperatures within the range recommended by the paint manufacturer. The area shall be well-ventilated, with precautionary measures taken to prevent fire hazards. Post “No Smoking” signs. Storage and mixing areas shall be clean and free of rags, waste, and scrapings.

1.4. SUBMITTALS DURING CONSTRUCTION

Submittals during construction shall be the following:

A. Data Sheets

For each paint system used herein, the Contractor shall obtain from each paint manufacturer for submittal to the Engineer, a Paint System Data Sheet (PSDS), Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system, except for products applied by equipment manufacturers. The required information shall be submitted on a system-by-system basis. The Contractor shall also provide copies of the

paint system submittals to the coating applicator. A sample PSDS form is appended at the end of this section.

B. Samples

Furnish samples as required until colors, finishes, and textures are approved. Retain approved samples to be used as the quality standard for final finishes.

1.5. QUALITY ASSURANCE

The paint manufacturer shall provide a representative to visit the jobsite at intervals during surface preparation and painting as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions and these Specifications, and as may be necessary to resolve field problems attributable to, or associated with, the manufacturer's products furnished under this contract.

The Contractor shall give the Engineer a minimum of 3 days advance notice of the start of any surface preparation work or coating application work. All such work shall be performed only in the presence of the Engineer, unless the Engineer has granted prior approval to perform such work in his/her absence.

For all coatings subject to immersion, full cure must be obtained for the completed system. Consult the coatings manufacturer's written instructions for these requirements. The coating shall not be immersed for any purpose until completion of the curing cycle.

Inspection by the Engineer, or the waiver of inspection of any particular portion of the work, shall not be construed to relieve the Contractor of his or her responsibility to perform the work in accordance with these Specifications.

1.6. WARRANTY

The Contractor shall warrant to the Owner and guarantee the work under this Section against defective workmanship and materials for a period of 1 year commencing on the date of final acceptance of the work.

PART 2 PRODUCTS

2.1. SURFACES NOT REQUIRING PAINTING

A. Unless otherwise specifically indicated in the Specifications or on the drawings, the following areas or items will not require painting:

1. Concrete Surfaces (see Section 03 30 00 for required concrete coatings, if any).
2. Nonferrous and corrosion resistant ferrous alloys such as copper, bronze, aluminum, chromium plate, weathering steel, and stainless steel, except where:
 - a. Required for electrical insulation between dissimilar metals
 - b. Aluminum and stainless steel is embedded in concrete or masonry, or aluminum is in contact with concrete or masonry
 - c. Color coding of equipment and piping is required
3. Nonmetallic materials such as glass, PVC, wood, porcelain, and plastic (FRP) except as required for architectural painting or color coding

4. Galvanic anodes
5. Items specified to be galvanized after fabrication unless specifically required elsewhere in these Specifications, or subject to immersion in nonpotable water; manufactured items and materials that are “factory” galvanized shall be prepared and coated as specified hereinafter for the exposure condition of the item and for architectural purposes unless otherwise specified herein; specifications for repair of damaged galvanized surfaced are contained hereinafter.
6. Insulated piping and/or insulated piping with jacket, except as required for architectural painting or color coding

2.2. PAINTING AND COATING SYSTEMS

The following index lists the various painting and coating systems by service and generic type:

PAINT COATINGS SYSTEM INDEX

<u>No.</u>	<u>Title</u>	<u>Generic Coating</u>
<u>Submerged Metal Coating Systems</u>		
7.	Submerged Metal, Potable or Nonpotable Water	Epoxy
<u>Exposed or Submerged Metal Coating Systems</u>		
9.	Metal Under Thermal Insulation	Phenolic epoxy
<u>Exposed Metal Coating Systems</u>		
11.	Exposed Metal, corrosive Environment	Epoxy (four-coat system)
15.	Exposed Metal, Atmospheric Weathering Environment	Alkyd
19.	Exposed/Immersed Metal	Epoxy
<u>Buried Metal Coating Systems</u>		
21.	Buried Metal	Epoxy
24.	Buried Metal	Corrosion-resisting grease
<u>PVC, CPVC, and FRP Coating Systems</u>		
41.	PVC, CPVC, and FRP, Ultraviolet Exposure	Polyurethane
<u>Coating Systems for Nonferrous Metals</u>		
51.	Aluminum and Concrete Insulation	Bituminous
52.	Exposed Metal, Galvanized and Nonferrous	Synthetic resin
<u>Coating System for Fusion Epoxy-Coated Steel Surfaces</u>		
65.	Fusion Epoxy-Coated Steel, Color Coding	Alkyd
66.	Fusion Epoxy-Coated Steel, Color Coding	Epoxy

These systems are specified in detail in the following paragraphs. For each coating, the required surface preparation, prime coat, intermediate coat (if required), topcoat, and coating thickness are described. Mil thicknesses shown are MDFT.

2.3. PAINTING AND COATING SYSTEMS DESCRIPTIONS

A. Submerged Metal Coating Systems

1. System No. 7- Submerged Metal, Potable or Nonpotable Water:

Type: Epoxy

Service Conditions: For use with structures, valves, piping, or equipment immersed in potable or nonpotable water.

Surface Preparation: SSPC SP-10.

Coating System: Apply the manufacturer's recommended number of coats to attain the specified minimum coating thickness. Products: Devoe Bar-Rust 233H, Tnemec Series N140, Carboline Super Hi-Gard 891, Ameron 395, International Interline 785 HS, Wisconsin Protective Coating Corp. Plastite 7133 or 9133, Keysite 740, Scotchkote 306, Engard 460 HS, or equal; 10 mils total. Color of topcoat: white.

2. System No. 9- Metal Under Thermal Insulation (250°F):

Type: Phenolic epoxy, epoxy amine, or MIO-filled epoxy phenolic Novalac having a minimum volume solids of 60%.

Service Conditions: For use on the exterior of steel, stainless steel, and ductile-iron piping covered with thermal insulation, in which the dry temperature does not exceed 250°F and the wet temperature does not exceed 180°F.

Surface Preparation: SSPC SP-10.

Coating System: Apply two or more coats of Plasite 7122L, Heresite CSE-6100, ICI Devoe HT-403, Sherwin-Williams Epo-Phen B62A55, or equal to a total dry-film thickness of 14 mils.

3. System No. 11- Exposed Metal, Corrosive Environment:

Type: Polyamide cured epoxy intermediate and finish coats with inorganic zinc prime coat.

Service Conditions: For use with metal structures, pipes, or reservoirs subjected to water condensation or splashing; salt spray; chemical fumes such as hydrogen sulfide and chemical contact.

Surface Preparation: SSPC SP-10.

Prime Coat: Two-component inorganic zinc pigmented coating recommended by the manufacturer to be coated with polyamide epoxy paint finish coating. Minimum zinc content shall be 12 lbs. per gallon. Apply to a thickness of 3 mils. Product: TNemec 90-96, ICI Devoe Cath-Coat 304 or 304V, International Interzinc 180HS, Ameron Dimetcote 9 or 21-9, Carboline 11 HS, Sherwin-Williams Zinc-Clad II Plus, or equal.

Intermediate Coat: Apply to a thickness of 3 mils. Products: Tnemec N69, ICI Devoe Devran 224 HS, International Interguard 760HS, Ameron 385, Carboline 888 or 893, Sherwin-Williams Macropoxy 646 B58-600, or equal.

Finish Coat: Apply two coats to a thickness of 4 mils each. Products: Tnemec Series N69, Epoxoline, ICI Devoe Devran 224HS, International Interguard 760HS, Ameron 385, Carboline 890, Sherwin-Williams Macropoxy 646 B58-600, or equal.

B. Exposed or Submerged Coating Systems

1. System No. 15- Exposed Metal, Atmospheric Weathering Environment:

Type: Gloss alkyd enamel having a minimum volume solids content of 46% with alkyd primer.

Service Conditions: For use on exterior metal and piping subject to sunlight and weathering.

Surface Preparation: SSPC SP-6.

Prime Coat: Carboline Shop Primer No. 1, ICI Devoe 4160, Tnemec 4-55, Ameron 5105, International Interlac 260HS, Engard 126 HS, or equal, applied to MDFT of 3 mils.

Finish Coat: Two coats of Carboline Carbocoat 139, 2 mils each; two coats of ICI Devoe 4348, 2 mils each; two coats of Tnemec Series 2H, 2 mils each; two coats of Ameron 5401 HS, 2 mils each; two coats of International Interlac 820, 2 mils each, one coat of Engard 222HS, 3.0 mils; or equal.

2. System No. 19- Exposed/Immersed Metal:

Type: Epoxy having a minimum solids content of 55% by volume.

Service Conditions: For use with metal (steel, iron) such as canal gates, slide gates, and dam gates alternately immersed in raw water and exposed to an atmospheric weathering environment.

Surface Preparation: SSPC SP-5.

Prime Coat: Apply Ameron 90 (gray), Engard 460 Chemical Resistant Primer (gray), International Interline 785HS (aqua), ICI Devoe 235 (gray), Tnemec N69-1211, Carboline 890 (gray), or equal to a MDFT of 5 mils.

Finish Coat: Apply Ameron 90 (white), Engard 460 Chemical Resistant Epoxy (white), International Interline 785HS (white), ICI Devoe 235 (white), Tnemec N69, Carboline 890 (white), or equal to a MDFT of 5 mils.

C. Buried Metal Coating Systems

1. System No. 21- Buried Metal:

Type: High solids epoxy or phenolic epoxy having a minimum volume solids of 80% (ASTM D 2697).

Service Conditions: Buried metal, such as valves, flanges, bolts, nuts structural steel, and fittings.

Surface Preparation: SSPC SP-10.

Coating System: Apply three or more coats of Ameron 400, Tnemec 104HS, Engard 480HS, ICI Devoe Bar-Rust 233H, Carboline 890LT, or equal; 30 mils total. Maximum thickness of an individual coating shall not exceed the manufacturer's recommendation.

2. System No. 24- Buried Metal:

Type: Corrosion-resisting grease.

Service Conditions: Buried metal, Such as bolts, bolt threads, tie rods, and nuts.

Surface Preparation: SSPC SP-3 or Sp-6.

Coating: NO-OX-ID GG-2 as manufactured by Sanchem, Inc. Apply to a minimum thickness of ¼ inch.

D. PVC Coating System

1. System No. 41-PVC Ultraviolet Exposure:

Type: Epoxy primer with a minimum volume solids of 54% and a pigmented polyurethane enamel having a minimum volume solids of 52%.

Service Conditions: PVC exposed to sunlight.

Surface Preparation: SSPC SP-1. Then lightly abrade the surface with medium-grain sandpaper.

Prime Coat: One coat of Tnemec Series N69 Epoxoline, International 7510, Ameron 385, ICI Devoe Devran 224HS, Carboline 888 or 890, or equal. Apply to a MDFT of 4 mils.

Finish Coat: One coat of Tnemec Series 1074 or 1075, International Interthane 990HS, Ameron 450HS, ICI Devoe Devran 379, Carboline134 HG, or equal. Apply to a minimum thickness of 3 mils.

E. Coating Systems for Nonferrous Metals

1. System No. 51- Aluminum and Concrete Insulation:

Type: Bituminous paint having a minimum volume solids of 68% coal-tar pitch based.

Service Conditions: Coat areas of aluminum grating, stairs and structural members of aluminum fabrications in contact with concrete with this system.

Surface Preparation: Solvent or steam cleaning per SSPC SP-1; do not use alkali cleaning. Then dust blast.

Prime Coat: Apply synthetic resin or epoxy primer to metal surface before finish coats. Products: International Intervinix VTA528/529, or equal. No primer required for Carboline or Tnemec.

Finish Coat: Two coats of Carboline Super Service Black, 12 mils each; two coats of Tnemec 46-465, 12 mils each; two coats of International Intertuf 100, 12 mils each; or equal.

2. System No. 52- Exposed Metal, Galvanized and Nonferrous:

Type: Synthetic resin or epoxy primer.

Service Conditions: Coat galvanized and nonferrous metal surfaces with this system before applying topcoat.

Surface Preparation: Galvanized surfaces shall be flat with no protrusions. Remove high spots and tears in the galvanizing with hand and power grinders. Comply with ASTM D 6386, paragraph 5.2.1. Do not remove the galvanized coating below the specified thickness. Solvent clean galvanized surfaces per ASTM D 6386, paragraph 5.3.2. Then sweep blast per ASTM D 6386, paragraph 5.4.1. Use one of the abrasive materials that is described in ASTM D 6386, paragraph 5.4.1. Surface preparation for weathered and partially weathered galvanized steel shall be in accordance with ASTM D 6386, paragraphs 6 and 7. Apply prime coating within one hour of the surface preparation.

Solvent clean or steam clean other nonferrous surfaces per SSPC SP-1; do not use alkali cleaning. Then dust blast.

Prime Coat: Tnemec N69-1211 (4 mils), Ameron 385 (4 mils), ICI Devoe Devran 224HS (4 mils), Carboline Rustbond Penetrating Sealer SG, or equal.

Intermediate and Finish Coats: Epoxy as described in System No. 11.

F. Coating Systems for Fusion Epoxy-Coated Steel Surfaces

1. System No. 65- Fusion Epoxy-Coated Steel, Color Coding:

Type: Gloss alkyd enamel having a minimum volume solids content of 50%.

Application: Color coding of pipe or steel surfaces already coated with fusion bonded epoxy.

Surface Preparation: SSPC SP-1. Then roughen the epoxy surface with power tool cleaning per SP-3 or a light sandblast per SP-7.

Prime Coat: None.

Finish Coat: Two coats of Carboline Rustarmor 139, 1.5 mils each; two coats of Tnemec Series 2H, 1.5 mils each; two coats of International Interlac 820, 1.5 mils each; two coats of Ameron 5401 HS, 1.5 mils each; two coats of ICI Devoe 4348, 1.5 mils each; or equal.

2. System No. 66- Fusion Epoxy-Coated Steel, Color Coding:

Type: Epoxy having a minimum volume solids content of 60%.

Application: Color coding of pipe or steel surfaces already coated with fusion bonded epoxy.

Surface Preparation: SSPC SP-1. Then roughen the epoxy surface with power tool cleaning per SP-3 or a light sandblast per SP-7.

Prime Coat: None.

Finish Coat: One coat of Carboline 890, 5.0 mils; Tnemec 104, 5.0 mils; International Interguard 760HS, 5.0 mils; Ameron 385, 5.0 mils; ICI Devoe Devran 224HS, 5.0 mils; or equal.

G. Abrasives for Surface Preparation

1. Abrasives used for preparation of ferrous (excluding stainless steel) surfaces shall be one of the following:
 - a. 16 to 30 or 16 to 40 mesh silica sand or mineral grit
 - b. 20 to 40 mesh garnet
 - c. Crushed iron slag, 100% retained on No. 80 mesh
 - d. SAE Grade G-40 or G-50 iron or steel grit
2. Abrasives used for preparation of copper and aluminum surfaces shall be one of the following:
 - a. Crushed slag, 80 to 100 mesh
 - b. Very fine silica sand, 80 to 100 mesh
3. In the above gradations, 100% of the material shall pass through the first stated sieve size and 100% shall be retained on the second stated sieve size.

2.4. COLORS

The Engineer will select colors for any items not covered by the drawings or Specifications.

Colors shall be formulated with colorants free of lead, lead compounds, or other materials which might be affected by the presence of hydrogen sulfide or other gas likely to be present at the project.

Proprietary identification of colors is for identification only. Any authorized manufacturer may supply matches.

A. Equipment Colors

Equipment shall be meant to include the machinery or vessel itself plus the structural supports and fasteners and attached electrical conduits. All non-submerged portions of equipment shall be painted the same color as the process piping it serves, except as itemized below.

EQUIPMENT	COLOR
Dangerous parts of equipment and machinery	OSHA Orange
Fire protection equipment and apparatus	OSHA Red
Physical hazards in normal operating area	OSHA Yellow

Fiberglass reinforced plastic (FRP) equipment with an integral colored gel coat does not require painting, provided the color is as specified.

B. Pipe Identification Painting

All non-submerged metal piping except electrical conduit shall be color coded. Fittings, valves, and pipe supports shall be painted with the same background color as the pipe.

Piping color coding and banding shall be in compliance with the requirements of ANSI A13.1 and Z53.1.

For stainless steel piping, background color shall be applied only from the centerline of the color code banding to 1-foot on either side of the outermost extremities of such banding.

Steel pipe supports (not stainless steel) for stainless steel piping shall be painted to match the wall or equipment color to which they are attached.

Fiberglass reinforced plastic (FRP) pipe and polyvinyl chloride (PVC) pipe located outside of buildings and enclosed structures will not require painting, except as noted.

C. Welded Steel Tank

Exterior finish color shall be selected from the manufacturer's standard color sheets by the Engineer in consultation with the Owner.

PART 3 EXECUTION

3.1. GENERAL

All materials of a paint system, including primer and finish coats, shall be produced by the same paint manufacturer. Thinners, cleaners, driers, and other additives shall be as recommended by the paint manufacturer of the particular coating.

3.2. INTENT

It is the intent of these Specifications that Contractors and their subcontractors employed on the jobsite will leave the surfaces of their work in such a condition that only minor cleaning, sanding, and filling is required prior to surface preparation and painting. It is the responsibility of the Contractor to inspect and provide substrate surfaces that are prepared in accordance with these Specifications and the printed directions and recommendations of the paint manufacturer whose product is to be applied.

3.3. PROTECTION OF MATERIALS NOT TO BE PAINTED

Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Openings in motors shall be masked to prevent paint and other materials from entering the motors.

3.4. ENVIRONMENTAL CONDITIONS

- Do not paint in the rain, wind, snow, mist, fog or when steel or metal surface temperatures are less than 5° F above the dew point.
- Do not apply paint when the relative humidity is above 85%.
- Do not paint when the temperature of metal to be painted is above 120° F.
- Do not apply alkyd, inorganic zinc, silicone aluminum, or silicone acrylic paints if air or surface temperature is below 40° F or expected to be below 40° F within 24 hours.
- Do not apply epoxy, acrylic latex, and polyurethane paints on an exterior or interior surface if air or surface temperature is below 60° F or expected to drop below 60° F in 24 hours.

3.5. SAFETY

Painting shall be performed in strict accordance with the safety recommendations of the paint manufacturer; with the safety recommendations of the National Association of Corrosion Engineers contained in the publication, Manual for Painter Safety; and with federal, state, and local agencies having jurisdiction.

3.6. PAINT MIXING

Multiple-component coatings shall be prepared using all of the contents of the container for each component as packaged by the paint manufacturer. No partial batches will be permitted. Multiple-component coatings that have been mixed shall not be used beyond their pot life. The

Contractor shall provide small quantity kits for touch-up painting and for painting other small areas. Only the components specified and furnished by the paint manufacturer shall be mixed. No intermixing of additional components for reasons of color or otherwise, even within the same generic type of coating, will be permitted. Paint materials shall be kept sealed when not in use.

Where more than one coat of a material is applied within a given system, color will be alternated to provide a visual reference that the required number of coats has been applied.

3.7. LOCATION WHERE PAINTING IS PERFORMED

Surface preparation and painting shall be done at the project site and/or a shop blast cleaning facility.

3.8. SHOP BLAST CLEANING

Items such as structural steel, metal doors and frames, metal louvers, and similar items as reviewed by the Engineer may be shop prepared and primed at the option of the Contractor. Centrifugal wheel blast cleaning is an acceptable alternate to shop blast cleaning. All work shall be blast cleaned and primed in accordance with these Specifications.

3.9. SURFACE PREPARATION

A. Metal Surface Preparation

1. General

All workmanship for metal surface preparation as specified shall be in strict conformance with the current Steel Structures Painting Council (SSPC) Specifications as follows:

Solvent Cleaning	SP 1
Hand Tool Cleaning	SP 2
Power Tool Cleaning	SP 3
White Metal Blast Cleaning	SP 5
Commercial Blast Cleaning	SP 6
Brush-Off Blast Cleaning	SP 7
Pickling	SP 8
Near-White Blast Cleaning	SP 10
Power Tool Cleaning to Bare Metal	SP 11
Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra- High-Pressure Water Jetting Prior to Recoating	SP 12

Wherever the words “solvent cleaning,” “hand tool cleaning,” “wire brushing,” or “blast cleaning,” or similar words of equal intent are used in these Specifications or in

paint manufacturer's specifications, they shall be understood to refer to the applicable SSPC Specifications listed above.

Hand tool clean areas that cannot be cleaned by power tool cleaning.

2. Pre-Blast Cleaning Requirements:

- a. All oil, grease, welding fluxes, and other surface contaminants shall be removed prior to blast cleaning. Pre-blast cleaning methods shall use steam, open flame, hot water, or cold water with appropriate detergent additives followed with clean water rinsing.
- b. Small isolated areas shall be cleaned as above or solvent cleaned with suitable solvents and clean cloths.
- c. All sharp edges shall be rounded or chamfered and all burrs, jagged edges, and surface defects shall be ground smooth.
- d. Welds and adjacent areas shall be prepared such that there is: (1) no undercutting or reverse ridges on the weld bead, (2) no weld spatter on or adjacent to the weld or any other area to be painted, and (3) no sharp peaks or ridges along the weld bead. All embedded pieces of electrode or wire shall be ground flush with the adjacent surface of the weld bead.

3. Blast Cleaning Requirements:

- a. The type of equipment and speed of travel shall be such that the specified degree of cleanliness is obtained. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendations for the particular primer to be used. Only dry blast cleaning methods will be permitted. The abrasive shall not be reused.
- b. Dust blasting is defined as cleaning the surface through the use of very fine abrasives, such as siliceous or mineral abrasives, 80 to 100 mesh. Apply a fine etch to the metal surface to clean the surface of any contamination or oxide and to provide a surface profile for the coating.
- c. Do not abrasive blast PVC, CPVC, or FRP piping or equipment. Do not abrasive blast epoxy or enamel-coated pipe that has already been factory coated, except to repair scratched or damaged coatings.
- d. During sandblast cleaning, prevent damage to adjacent coatings. Schedule blast cleaning and coating such that dust, dirt, blast particles, old coatings, rust, mill scale, etc., will not damage or fall upon wet or newly coated surfaces.
- e. The Contractor shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

4. Post-Blast Cleaning and Other Cleaning Requirements:

- a. All surfaces shall be cleaned of all dust and residual particles of the cleaning operations by dry (no oil or water vapor) air blast cleaning or other method prior to painting. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth. Surfaces shall be painted the same date they are sandblasted. Surfaces that have started to rust before they are painted shall be reblasted.
- b. For carbon steel surfaces, after abrasive blast cleaning, the height of the surface profile shall be 2 to 3 mils. If this cannot be achieved with the surface

preparation named in the painting system, SSPC SP-5 may be required. Verify the surface profile by measuring with an impresser tape acceptable to the Engineer. Perform a minimum of one test per 100 square feet of surface area. Testing shall be witnessed by the Engineer. The impresser tape used in the test shall be permanently marked with the date, time, and locations where the test was made. Test results shall be promptly presented to the Engineer. Do not touch the surface between the time of abrasive blasting and the time the coating is applied. Apply coatings within two hours of blasting or before any rust bloom forms.

- c. Do not apply any part of a coating system before the Engineer has reviewed the surface preparation. If coating has been applied without this review, if directed by the Engineer, remove the applied coating by abrasive blasting and reapply the coat in accordance with this specification.

B. Plastic Surface Preparation

All plastic surfaces to be coated shall be hand sanded with a medium grit sandpaper to provide tooth for the coating system. Large areas may be power sanded or brush-off blasted, provided sufficient controls are employed so the surface is roughened without removing excess material.

C. Preparation of Existing Coated Surfaces

Existing coated surfaces to be repainted shall be detergent washed and fresh water rinsed. Loose, abraded, or damaged coatings shall be cleaned to substrate by Hand or Power Tool, SP-2 or SP-3. Surrounding intact coating shall be feathered. One spot coat of the specified primer shall be applied to bare areas overlapping the prepared existing coating. One full finish coat of the specified material shall be applied overall.

The exact nature of the existing coatings is not known in all cases; and, while it is assumed that they have oxidized sufficiently to prevent lifting or peeling when over-coated with the paints specified, the compatibility shall be checked by application to a small area prior to starting the painting. If lifting or other problems occur, request deposition from the Engineer.

D. Brush-Off Blast Cleaning

The equipment, procedure, and degree of cleaning shall conform to the Steel Structures Painting Council Surface Preparation 7, Brush-Off Blast Cleaning. The abrasive may be either wet or dry blasting sand, grit, or nut shell. The various surface preparation parameters such as size and hardness of the abrasive, nozzle size, air pressure, and nozzle distance from the surface shall be selected such that the surface is cleaned without pitting, chipping, or otherwise damaging the surface. The Contractor shall verify his or her parameter selection by blast cleaning a trial area that will not be exposed to view. The trial blast cleaned area shall be subject to the approval of the Engineer and shall be used as a representative sample of the surface preparation. Surfaces that are damaged by blast cleaning shall be repaired or replaced by the Contractor to the satisfaction of the Engineer.

E. Acid Etching

After precleaning, the following solution is spread by brush or plastic sprinkling can: 1 part commercial muriatic acid reduced by 2 parts water by volume. Adding acid to water in these proportions gives an approximate 10% solution of HCL. Workers shall be equipped with necessary protective clothing. The application rate shall be approximately 2 gallons per 100 square feet. Work the acid solution into the surface by hard-bristled brushes or brooms until complete wetting and coverage is obtained. The acid will react vigorously for a few minutes, during which time brushing is continued. After the bubbling has subsided (10 minutes), hose down the remaining slurry with high pressure clean water. Rinsing must be done immediately to avoid formation of salts on the surface which are difficult to remove. Thorough rinsing is necessary to remove any residual acid surface condition which can impair adhesion. The surface shall be completely dry before coating is applied. After etching, the surface shall be “grainy” to the touch. If not, repeat the treatment.

F. Solvent Cleaning

Solvent cleaning shall consist of removal of foreign matter such as oil, grease, soil, drawing and cutting compounds, and any other surface contaminants by the use of solvents, emulsions, cleaning compounds, steam cleaning, or similar materials and methods which involve a solvent or cleaning action. This method conforms to Steel Structures Painting Council SP-1.

G. Items Having Shop-Applied Prime Coats

1. After application of primer to surfaces, allow coating to cure for a minimum of two hours before handling to minimize damage.
2. When loading for shipment to the project site, use spacers and other protective devices to separate items to prevent damaging the shop-primed surfaces during transit and unloading. If wood spacers are used, remove wood splinters and particles from the shop-primed surfaces after separation. Use padded chains or ribbon binders to secure the loaded items and minimize damage to the shop-primed surfaces.
3. Cover shop-primed items 100% with protective covering or tarpaulins to prevent deposition of road salts, fuel residue, and other contaminants in transit.
4. Handle shop-primed items with care during unloading, installation, and erection operations to minimize damage. Do not place or store shop-primed items on the ground or on top of other work unless ground or work is covered with a protective covering or tarpaulin. Place shop-primed items above the ground upon platforms, skids, or other supports.

H. Field Touch-Up of Shop-Applied Prime Coats

1. Remove oil and grease surface contaminants on metal surfaces in accordance with SSPC SP-1. Use clean rags wetted with a degreasing solution, rinse with clean water, and wipe dry.
2. Remove dust, dirt, salts, moisture, chalking primers, or other surface contaminants that will affect the adhesion or durability of the coating system. Use a high-pressure water blaster or scrub surfaces with a broom or brush wetted with a solution of trisodium phosphate, detergent, and water. Rinse scrubbed surfaces with clean water.
3. Remove loose or peeling primer and other surface contaminants not easily removed by the previous cleaning methods in accordance with SSPC SP-7. Take care that

- remaining primers are not damaged by the blast cleaning operation. Remaining primers shall be firmly bonded to the steel surfaces with blast cleaned edges feathered.
4. Remove rust, scaling, or primer damaged by welding or during shipment, storage and erection in accordance with SSPC SP-10. Take care that remaining primers are not damaged by the blast cleaning operation. Areas smaller than 1 square inch may be prepared per SSPC SP-11. Remaining primers shall be firmly bonded to the steel surfaces with cleaned edges feathered.
 5. Use repair procedures on damaged primer that protects adjacent primer. Blast cleaning may require the use of lower air pressure, smaller nozzles, and abrasive particle sizes, short blast nozzle distance from surface, shielding, and/or masking.
 6. After abrasive blast cleaning of damaged and defective areas remove dust, blast particles, and other debris by dusting, sweeping, and vacuuming; then apply the specified touch-up coating.
 7. Surfaces that are shop primed shall receive a field touch-up of the same primer used in the original prime coat.

3.10. APPLICATION OF PAINT

A. General

All materials of a specified painting system, including primer, intermediate, and finish coats shall be produced by the same manufacturer. Thinners, cleaners, driers, and other additives shall be recommended by the paint manufacturer for the particular coating system.

Manufacturer's written instructions for applying each type of paint or protective coating shall be furnished to the Engineer prior to application. Cleaned surfaces and all coats shall be inspected prior to the succeeding coat. Schedule such inspection with the Engineer in advance. Apply all coatings in strict accordance with the paint manufacturer's recommendations, as reviewed by the Engineer. Sufficient time shall be allowed between coats to assure thorough drying of previously applied paint.

For fusion bonded coatings, method of application may be electrostatic, fluidized bed, or flocking.

Units to be bolted together and to structures shall be painted prior to assembly or installation.

Deliver paints to the jobsite in the original, unopened containers.

B. Procedures for the Application of Coatings

1. Conform to the requirements of SSPC PA-1. Follow the recommendations of the coating manufacturer including the selection of spray equipment, brushes, rollers, cleaners, thinners, mixing, drying time, temperature and humidity of application, and safety precautions.
2. Stir, strain, and keep coating materials at a uniform consistency during application. Power mix components. For multiple component materials, premix each component before combining. Apply each coating evenly, free of brush marks, sags, runs, and other evidence of poor workmanship. Use a different shade of tint on succeeding coating applications to indicate coverage where possible. Finished surfaces shall be free from defects or blemishes.

3. Do not use thinners unless recommended by the coating manufacturer. If thinning is allowed, do not exceed the maximum allowable amount of thinner per gallon of coating material. Stir coating materials at all times when adding thinner. Do not flood the coating material surface with thinner prior to mixing. Do not reduce coating materials more than is absolutely necessary to obtain the proper application characteristics and to obtain the specified dry-film thicknesses.
4. Remove dust, blast particles, and other debris from blast cleaned surfaces by dusting, sweeping, and vacuuming. Allow ventilator fans to clean airborne dust to provide good visibility of working area prior to coating applications. Remove dust from coated surfaces by dusting, sweeping, and vacuuming prior to applying succeeding coats.
5. Apply coating systems to the specified minimum dry-film thicknesses as measured from above the peaks of the surface profile.
6. Apply primer immediately after blast cleaning and before any surface rusting occurs, or any dust, dirt, or any foreign matter has accumulated. Reclean surfaces by blast cleaning that have surface colored or become moist prior to coating application.
7. Apply a brush coat of primer on welds, sharp edges, nuts, bolts, and irregular surfaces prior to the application of the primer and finish coat. Apply the brush coat prior to an in conjunction with the spray coat application. Apply the spray coat over the brush coat.
8. Before applying subsequent coats, allow the primer and intermediate coats to dry for the minimum curing time recommended by the manufacturer. In no case shall the time between coats exceed the manufacturer's recommendation.
9. Each coat shall cover the surface of the preceding coat completely, and there shall be a visually perceptible difference in applied shade or tint of colors.
10. Applied coating systems shall be cured at 75° F or higher for 48 hours. If temperature is lower than 75° F, curing time shall be in accordance with printed recommendations of the manufacturer, unless otherwise allowed by the Engineer.
11. Assembled parts shall be disassembled sufficiently before painting or coating to ensure complete coverage by the required coating.

C. Film Thickness

Coverage is listed as either total minimum dry film thickness in mils (MDFT) or the spreading rate in square feet per gallon (SFPG). Per coat determinations are listed as MDFTPC or SFPGPC. The number of coats is the minimum required irrespective of the coating thickness. Additional coats may be required to obtain the minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions. Maximum film build per coat shall not exceed the coating manufacturer's recommendations.

Film thickness measurements and electrical inspection of the coated surfaces shall be performed with properly calibrated instruments. Recoat and repair as necessary for compliance with the Specifications. All coats will be subject to inspection by the Engineer and the coating manufacturer's representative.

Particular attention shall be given edges, angles, flanges, etc. Where insufficient film thicknesses are likely to be present, ensure proper millage in these areas.

After repaired and recoated areas have dried sufficiently, final tests will be conducted by the Engineer. Coating thickness specified in mils will be measured with a magnetic type dry film thickness gauge such as Mikrotest, supplied by Nordson Corporation, Anaheim, CA;

by Elcometer; or equal. The finish coat (except zinc primer and galvanizing) will be tested for holidays and discontinuities with an electrical holiday detector, low voltage, wet sponge type such as Model M-1, by Tinker and Razor, San Gabriel, CA.; "Bird Dog" by K-D's; or equal.

Each coat shall be checked for the correct millage. No measurement will be made under a minimum of 8 hours after application of the coating.

D. Porous Surfaces

Porous surfaces such as concrete, masonry, etc., may have the prime coat thinned to provide maximum penetration and adhesion. Type and amount of thinning shall be determined by the paint manufacturer and is dependent upon the surface density and type of coating. Porous surfaces specified to receive a water base coating shall be damp, but free of running water, just prior to application of the coating.

E. Damaged Coatings

Damaged coatings, pinholes, and holidays shall have the edges feathered and repaired in accordance with the recommendations of the paint manufacturer, as reviewed by the Engineer. Repair of fusion bonded coatings shall be as recommended by the original applicator. Liquid repair kits are to be provided for this purpose by the applicator, as recommended by the coating manufacturer.

All finish coats; including touch-up and damage-repair coats shall be applied in a manner which will present a uniform texture and color-matched appearance.

F. Unsatisfactory Application

If the item has an improper finish color, or insufficient film thickness, the surface shall be cleaned and top-coated with the specified paint material to obtain the specified color and coverage. Specific surface preparation information is to be secured from the coating manufacturer and the Engineer.

All visible areas of chipped, peeled, or abraded paint shall be hand or power sanded, feathering the edges. The areas shall then be primed and finish coated in accordance with the Specifications. Depending on the extent of repair and its appearance, a finish sanding and topcoat may be required by the Engineer.

Work shall be free of runs, bridges, shiners, laps, or other imperfections. Evidence of these conditions shall be cause for rejection. Any defects in the coating system shall be repaired by the Contractor per written recommendations of the coating manufacturer. Leave all staging up until the Engineer has inspected the surface or coating. Staging removed prior to approval by Engineer shall be replaced.

3.11. SHIPPING

In all cases where precoated items are to be shipped to the jobsite, all efforts will be made to protect the coating from damage. Coated items shall be battened to prevent abrasion. Contractor shall use nonmetallic or padded slings and straps in handling. Items will be rejected for excessive damage, in the opinion of the Engineer.

3.12. CLEANUP

All cloths and waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site or destroyed in a legal manner. Paint spots, oil, or stains upon adjacent surfaces and floors shall be completely removed, and the entire job left clean and acceptable to the Engineer.

3.13. PAINT APPLICATION SCHEDULE

Unless otherwise indicated in the Specifications or on the drawings, the work shall be painted or coated in accordance with the following application schedule. In the event of discrepancies or omissions in the following, request clarification from the Engineer before starting the work in question.

PROTECTIVE COATING SYSTEMS

Unless otherwise indicated in the Technical Specifications or on the Drawings, the work shall be painted or coated in accordance with the following application schedule. In the event of discrepancies or omissions, request clarification from the Engineer before starting the work in question.

SYSTEM NO.	SURFACE PREP.	PAINT MATERIAL	MIN. COATS, COVER
7- Submerged Metal-Potable Water	Near-White Blast (SP 10)	Epoxy Polyamide Primer	1 coat 5 MDFT
		Epoxy Polyamide Top Coat	1 coat, 5 MDFT
11- Exposed Metal, Corrosive Environment	Near-White Blast (SP 10)	Inorganic Zinc Primer	1 coat, 3 MDFT
		Epoxy Polyamide Intermediate Coat	1 coat, 3 MDFT
		Epoxy Polyamide Top Coat	2 coats, 4 MDFT each
15- Exposed Metal-Atmospheric Environment	Commercial Blast (SP 6)	Alkyd Enamel Primer Shop Prime	1 coat, 3 MDFT
		Alkyd Enamel Top Coat	2 coats, 2 MDFT each
21- Buried Metal	Near-White Blast (SP 10)	Epoxy	3 coats, 30 MDFT total

*** END OF SECTION ***

NOTE: PAINT SYSTEM DATA SHEET FOLLOWS

PAIN T SYSTEM DATA SHEET

Attached products' Technical Data Sheet (if applicable) to this sheet for each paint system submittal.

Paint System Number (from spec.) _____

Paint System Title (from spec.) _____

Coatings Supplier _____

Representative _____

Surface Preparation _____

Paint Material (Generic)	Product Name/Number (Proprietary)	Min. Coats Coverage
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SECTION 09 90 05 - PROTECTIVE COATINGS FOR WELDED STEEL RESERVOIRS

PART 1 GENERAL

1.1. SUMMARY

A. Section Includes:

1. Interior coating of the welded steel storage tank
2. Exterior painting of the welded steel storage tank

B. Related Sections:

1. Section 09 90 00 – Painting and Coatings
2. Section 22 12 00 – Potable Welded Steel Water Storage Tanks

1.2. UNIT PRICE – MEASUREMENT AND PAYMENT

A. Interior coating

1. Basis of Measurement: Refer to Section 22 12 00. Interior coating will not be measured separately for payment.
2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with this interior coating shall be included in the contract price for related work.

Separate payment will not be made for coating roof framing, roof plates, columns, floor, piping, manways, and ladders. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

B. Exterior painting

1. Basis of Measurement: Refer to Section 22 12 00. Exterior painting will not be measured separately for payment.
2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with this interior coating shall be included in the contract price for related work.

Separate payment will not be made for painting of entire exterior surface of tank, ladders, and other exterior fixtures. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3. REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

B. American Water Work Association (AWWA):

1. AWWA D102-11 – Coated Steel Water Storage Tanks

C. The Society for Protective Coatings (SSPC):

1. SSPC-VIS 1 – Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning
2. SSPC-SP 1 – Solvent Cleaning

3. SSPC-SP 2 – Hand Tool Cleaning
4. SSPC-SP 3 – Power Tool Cleaning
5. SSPC-SP 5 – White Metal Blast Cleaning
6. SSPC-SP 6 – Commercial Blast Cleaning
7. SSPC-SP 7 – Brush-Off Blast Cleaning
8. SSPC-SP 10 – Near White Blast Cleaning
9. SSPC-SP 11T – Power Tool Cleaning to Bare Metal
10. SSPC-PA-1 – Shop, Field, and Maintenance Printing of Steel

1.4. SUBMITTALS

For each paint system used herein, the Contractor shall obtain from each paint manufacturer for submittal to the Engineer, a Paint System Data Sheet (PSDS), Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system, except for products applied by equipment manufacturers. The required information shall be submitted on a system-by-system basis. The Contractor shall also provide copies of the paint system submittals to the coating applicator. A sample PSDS form is appended at the end of this section.

The Contractor is to supply the Material Safety Data Sheets (MSDS) for the coating used at the site, and to have a set of MSDS available on site for reference.

The Contractor shall obtain from the paint manufacturer a statement that the paints used on the interior of the tank wall are an National Sanitation Foundation (NSF) approved chemical, and suitable for use in a potable water tank.

Furnish samples as required until colors, finishes, and textures are approved. Retain approved samples to be used as the quality standard for final finishes.

1.5. QUALITY ASSURANCE

- A. Surface preparation will be based upon comparison with "Visual Standard for Abrasive Blast Cleaned Steel," SSPC-Vis 1 89.
- B. No coating or paint shall be applied to wet or damp surfaces, in rain, snow, fog, or mist, when the steel temperature or surrounding air temperature is less than 5 degrees above the dew point, nor in conditions not recommended by the manufacturer. If such conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable. The day's coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.
- C. The Contractor shall apply protective coatings to the interior and exterior of the welded steel tank in accordance with AWWA D102-11 standards and the Steel Structures Painting Manual, Volume 2 - Systems and Specifications, latest revision, published by Steel Structures Painting Council; and the manufacturer's recommendations.
- D. The Contractor shall guarantee the tank coating against any defects of workmanship for a period of one year from the date of completion. If any material or workmanship proves to be defective within one year, they shall be replaced or repaired by the contractor at no additional costs to the Owner.

- E. Warranty Inspection - The Owner shall conduct the warranty inspection during the eleventh month following completion or placement into service of all coating and painting work required by this section. All defective work shall be repaired in accordance with the manufacturer's recommendation and the satisfaction of the Owner in order to bring the defective areas up to the quality level of the original work required by this specification.

PART 2 PRODUCTS

2.1. GENERAL

All materials shall be delivered to the jobsite in their original, unopened containers bearing the manufacturer's name, brand and batch number. Requests for material substitutions must be made and approved in writing.

All coatings and paints shall be stored in enclosed structures when necessary to protect them from weather and excessive heat or cold. Flammable coatings or paints must be stored to conform with City, County, State, and Federal safety codes for flammable coating or paint materials. All coatings shall be protected from freezing.

All materials used for surface preparation, priming, and coating shall meet the requirements of all applicable Local, State, and Federal air regulatory requirements.

2.2. COATING MATERIALS

Material shall conform to the following requirements:

- A. Coating materials shall be suitable for the intended use. Materials shall be recommended by their manufacturer for the intended service. Interior immersion coatings must be on the current USEPA or NSF Standard 61 list for potable water coatings and meet all requirements of the State Health Department.
- B. Only high-grade products of manufacturers having an established good reputation in the manufacture of quality protective coatings shall be used.
- C. Materials shall be used within the manufacturer's recommended shelf life unless otherwise approved in writing by the manufacturer.
- D. Where practicable, each succeeding coat of paint shall be of a different color, shade, or gloss. Where a particular finish color is specified herein, it is for bidding purpose only. Exterior finish color shall be selected from the manufacturer's standard color sheets by the Engineer in consultation with the Owner.
- E. Where alternate products are specified, selection from among the alternates is at the Contractor's option.
- F. The Contractor may submit for consideration paint materials of manufacturer's other than those specified herein. The Contractor shall provide satisfactory documentation from the firm manufacturing the proposed material that the material meets the specified requirements and is equivalent to or better than the listed materials in the following properties.

1. Quality

2. Durability
3. Resistance to abrasion and physical damage
4. Life expectancy
5. Ability to recoat in future
6. Solids content by volume
7. Dry film thickness per coat
8. Compatibility with other coatings
9. Suitability for the intended service
10. Resistance to chemical attack
11. Temperature limitations in service and during application
12. Type and quality of recommended undercoats and topcoats
13. Ease of application
14. Ease of repairing damaged areas
15. Stability of colors

G. Materials and processes for hot-dip galvanized products shall conform to ASTM A123.

2.3. THICKNESS AND HOLIDAY TESTING

- A. Thickness of coatings and paint shall be checked with a non-destructive, magnetic type thickness gauge. Coating integrity of all interior coated surfaces shall be tested with an approved holiday detection device. Non-destructive holiday detectors shall not exceed 100 volts nor shall destructive holiday detectors exceed the voltage recommended by the manufacturer of the coating system. For thicknesses between 10 and 20 mils (0.25mm and 0.50mm) a non-sudsing type wetting agent such as Kodak Photo-Flo, shall be added to the water prior to wetting the detector sponge. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations and re-tested. Contractor shall submit certified test results after re-testing. No pinholes or other irregularities will be permitted in the final coating. Holiday detection devices shall be operated in the presence of a representative of the Owner, if any.

In cases of dispute concerning film thickness, measurements made with instruments shown to be in calibration with the National Bureau of Standards calibration plates shall predominate.

2.4. SAFETY AND HEALTH REQUIREMENTS

- A. In accordance with the requirements set forth by regulatory agencies applicable to the construction industry and in accordance with the manufacturer's printed instructions and appropriate technical bulletins and manuals, the Contractor shall provide and require use of personal lifesaving equipment for persons working on or about the site.

As a minimum, personal lifesaving equipment shall properly address protection of those persons in the following categories:

1. Head and Face Protection
2. Respiratory Devices
3. Ventilation
4. Sound Levels
5. Illumination
6. Temporary Ladders and Scaffolding

PART 3 EXECUTION

3.1. GENERAL

All materials of a paint system, including primer and finish coats, shall be produced by the same paint manufacturer. Thinners, cleaners, driers, and other additives shall be used as recommended by the paint manufacturer of the particular coating.

3.2. STANDARDS

- A. All coating and painting shall conform to applicable standards of the Steel Structures Painting Council Manual.
- B. Work shall be performed by skilled craftsmen qualified to perform the specified work in a manner comparable with the best standards of practice. Continuity of personnel shall be maintained and transfers of key personnel shall be coordinated with Owner's representative.
- C. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the finish must be removed.
- D. Coating and painting systems include surface preparation, prime coating and finish coatings. All prime coatings may be shop applied or field applied. As indicated elsewhere in this section, some prime coatings must be applied prior to erection. The Contractor shall provide a prime coat compatible with the finish coat as specified.
- E. Any prime coatings which are damaged or contaminated during fabrication, transportation, or erection shall be thoroughly cleaned and touched up in the field as specified. The Contractor shall use repair procedures which insure the complete protection of all adjacent primer. The specified repair method and equipment may include wire brushing, hand or power tool cleaning or dry air blast cleaning as permitted by the coating manufacturer. In order to prevent injury to surrounding painted areas blast cleaning may require use of lower air pressure, smaller nozzle, smaller abrasive particle sizes, short blast nozzle distance from surface, shielding and masking. If damage is too extensive or uneconomical to repair, the item shall be re-cleaned and coated or painted as necessary to provide a quality coating.
- F. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air.
- G. Application of the first coat shall follow surface preparation and cleaning. Any cleaned areas showing surface contamination prior to application of the first coat shall be re-cleaned prior to application of first coat.
- H. The Contractor shall employ forced air ventilation during the application of interior coatings. After completion of the interior coatings, proper curing procedures shall be followed. Adequate cure time shall be allowed prior to performing disinfection and prior to filling the tank for the leak test.

3.3. SURFACE PREPARATION

A. General - The latest revision of the following surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification by reference:

1. SSPC-SP 1: Solvent Cleaning
2. SSPC-SP 2: Hand Tool Cleaning
3. SSPC-SP 3: Power Tool Cleaning
4. SSPC-SP 5: White Metal Blast Cleaning
5. SSPC-SP 6: Commercial Blast Cleaning
6. SSPC-SP 7: Brush-Off Blast Cleaning
7. SSPC-SP 10: Near White Blast Cleaning
8. SSPC-SP 11T: Power Tool Cleaning to Bare Metal

In case of questions about the quality of blast cleaning provided, the SSPC blasting standards for visual comparison and the corresponding definitions shall be consulted.

- B. Slag and weld metal accumulation not removed by the tank fabricator, erector, or installer shall be removed by chipping or grinding. All sharp edges shall be peened, ground or otherwise blunted as recommended by the coating manufacturer.
- C. Field blast cleaning for all surfaces shall be with dry abrasive unless otherwise approved.
- D. Maximum particle size of abrasives used in blast cleaning shall be that which will produce a profile in accordance with recommendations of the manufacturer of the specified coating system.
- E. Abrasive used in field blast cleaning operations shall be new and free of contaminants that would interfere with adhesion or performance of the coating system. For unconfined blasting operations, abrasives shall meet air quality board regulatory requirements. Abrasives shall not be reused unless they are free of contamination which would be detrimental to the adhesion or performance of the coating system.
- F. During blast cleaning operations, caution shall be exercised to insure that existing coatings or paint are not exposed to abrasion from blast cleaning. Any existing coatings thus damaged shall be restored to their previous state.
- G. The Contractor shall keep the area of his work in a clean condition and shall not permit blasting materials to accumulate and constitute a nuisance or hazard to the prosecution of the work or operation of the existing facilities.
- H. If necessary, blast-cleaned surfaces shall be dry cleaned prior to application of specified coating or paint. No coating or paint shall be applied over damp surfaces.

3.4. APPLICATION

A. Coating and paint application shall conform to the requirements of Steel Structures Painting Council Painting Application Specification SSPC-PA-1, latest revision for "Shop, Field and Maintenance Painting".

- B. Thinning shall be permitted as recommended by the manufacturer for the conditions of application.
- C. Each application of coating or paint shall be applied evenly, free of sags and runs, with no evidence of poor workmanship. Care shall be exercised to avoid lapping on glass or hardware. Coating and paint shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.
- D. If required to prevent damage, protective coverings or drop cloths shall be used to protect floors, fixtures and equipment. Care shall be exercised to prevent coating or paint from being spattered onto surfaces which are not to be coated or painted. Surfaces from which materials cannot be removed satisfactorily shall be recoated or repainted to produce a finish satisfactory to the Owner.
- E. When two coats of coating or paint are specified, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color, shade or gloss.
- F. All material shall be applied in accordance with the manufacturer's recommendations and these specifications.
- G. At least one spray-brush coat shall be applied to irregular interior surfaces such as unusually rough welds or corners.
- H. Where the number of coats or dry film thickness is specified, they shall be considered a minimum. The Contractor shall apply additional coats as necessary to achieve the specified dry film thickness.

3.5. INTERIOR AND EXTERIOR COATINGS

A. Scope

This section covers shop applied primers and field applied coatings for interior and exterior surfaces of welded steel reservoirs for storage of potable water.

B. Coating Procedures

Coating procedures and recoat cycles are critical. It is imperative that the manufacturer's recommendations be strictly followed. Any deviation from printed literature must be approved in writing by the manufacturer prior to starting alternate procedures.

C. Surfaces Which Must Be Blasted and Primed Prior To Erection

The following surfaces shall be completely blasted and primed prior to erection: both sides of roof plates, all surfaces of rafters and girders, column caps, mating surfaces of bolted connections of the roof structure, other areas of the roof made inaccessible after erection. These surfaces shall be prepared and primed prior to erection as specified in Coating Systems.

D. Surfaces Which May Be Blasted And Primed Prior To Erection

At the Contractor's option, the following surfaces may be either blasted and primed prior to erection, or blasted and primed after erection: interior and exterior of shell plates, interior and exterior of knuckles on knuckle roof tanks, the bottom plates of the reservoir, roof supporting columns. Areas other than those specifically mentioned may be cleaned and primed prior to erection upon approval from the engineer. These surfaces shall be prepared and primed as specified in Coating Systems.

E. Surfaces Not To Be Painted

Though it is the intent of this specification to properly protect all tank surfaces, it is not a requirement to perform any surface preparation, priming, or coating on the underside of the reservoir bottom plates or on the interior surfaces of the tank overflow.

3.6. COATING SYSTEMS

A. General

Following are descriptions of the various coatings to be applied, locations of application, number and thickness of coats to be applied, quality of surface preparation required, and the total system thicknesses. These requirements are considered to be the minimum acceptable. The Contractor shall apply additional coats as necessary to achieve the specified minimum dry film thickness.

B. Coating Systems for Interior Reservoir Surfaces

Underside of roof plates, all surfaces of rafters and girders, column caps, and interior areas which will be made inaccessible after erection.

SURFACE PREPARATION: All surfaces shall be prepared prior to erection, in the shop or in the field, in accordance with SSPC-SP10 near white blast cleaning.

PRIMING: After proper surface preparation, all surfaces shall receive a coat of epoxy to a dry film thickness of three (3) mils. If desired for construction purposes, edges of parts to be welded in the field may have the coating held back from the edge or tapered to a thinner film thickness near the edge. The color for this coat shall be red or other suitable color. Specified accessories shall be hot-dip galvanized.

TREATMENT: All surfaces which were hot-dip galvanized shall be treated as required by the coating manufacturer prior to the application of touchup and finish coatings.

FIRST FIELD COAT: After erection, all exposed surfaces damaged or contaminated during fabrication, transportation, or erection or prior to painting shall be prepared in accordance with the manufacturer's instructions. All surfaces shall then receive a coat of epoxy to a dry film thickness of approximately five (5+) mils. The color of this coat shall be beige or other suitable color.

FINISH: After observing proper recoat cycle and surface condition, apply one coat of epoxy to a dry film thickness of approximately five (5+) mils. The color of this coat shall be white.

TOTAL SYSTEM: The total coating system for the exposed surfaces of these areas shall achieve a minimum dry film thickness of twelve (12) mils.

C. Interior Pre-Primed Surfaces not Included in B above

SURFACE PREPARATION: All surfaces shall be prepared, either in the shop or in the field, in accordance with SSPC-SP10 near white blast cleaning.

PRIMING: After proper surface preparation, all surfaces shall receive a coat of epoxy to a dry film thickness of three (3) mils. If desired for construction purposes, edges of parts to be welded in the field may have the coating held back from the edge or tapered to a thinner film thickness near the edge. The color for this coat shall be red or other suitable color.

FIRST FIELD COAT: After erection, all exposed surfaces damaged or contaminated during fabrication, transportation, or erection or prior to painting shall be prepared in accordance with the manufacturer's instructions. All surfaces shall then receive a coat of epoxy to a dry film thickness of approximately five (5+) mils. The color of this coat shall be beige or other suitable color.

FINISH: After observing proper recoat cycle and surface condition, apply one coat of epoxy to a dry film thickness of approximately five (5+) mils. The color of this coat shall be white.

TOTAL SYSTEM: The total coating system for the exposed surfaces of these areas shall achieve a minimum dry film thickness of twelve (12) mils.

D. Interior Surfaces not Pre-Primed

SURFACE PREPARATION: All exposed surfaces shall be prepared in accordance with SSPC-SP10 near white blast cleaning.

PRIMING: After proper surface preparation, all surfaces shall receive a coat of epoxy to a dry film thickness of approximately six (6+) mils. The color of this coat shall be beige or other suitable color.

FINISH: After observing proper recoat cycle and surface condition, apply one coat of epoxy to a dry film thickness of approximately six (6+) mils. The color of this coat shall be white.

TOTAL SYSTEM: The total coating system for the exposed surfaces of these areas shall achieve a minimum dry film thickness of ten (10) mils.

E. Coating Systems for Exterior Reservoir Surfaces

EXTERIOR GALVANIZED ACCESSORIES AND EXTERIOR SURFACES OF THE SHELL AND ROOF

SURFACE PREPARATION: All surfaces shall be prepared, either in the shop or in the field, in accordance with SSPC-SP10 near white blast cleaning.

PRIMING: Prior to erection and after proper surface preparation, top side of roof plates shall receive a coat of epoxy to a minimum dry film thickness of two (2) mil. Either prior to or after erection and after proper surface preparation, exterior surfaces of the shell shall receive a coat of epoxy to a minimum dry film thickness of two (2) mil. If desired for construction purposes, edges of ports to be welded in the field may have the coating held back from the edge or tapered to a thinner film thickness near the edge. The color of this coat shall be red or other suitable color. Specified accessories shall be hot-dip galvanized.

TREATMENT: All surfaces which were hot-dip galvanized shall be treated as required by the coating manufacturer prior to the application of touchup and finish coatings.

FIRST FIELD COAT: After erection, all exposed surfaces damaged or contaminated during fabrication, transportation, or erection or prior to painting shall be prepared in accordance with the manufacturer's instructions. All surfaces shall then receive a coat of epoxy to a dry film thickness of approximately two (2+) mils. This coat shall be tinted so that the exterior finish coat will cover in one coat.

FINISH: After observing proper recoat cycle and surface condition, apply one coat of polyurethane to a minimum dry film thickness of two (2) mils. This coat shall be in the exterior finish color selected by the owner.

TOTAL SYSTEM: The total coating system for these surfaces shall achieve a minimum dry film thickness of six (6) mils.

F. Exterior Surfaces and Accessories Not Included in E Above

SURFACE PREPARATION: All surfaces shall be prepared in accordance with SSPC-SP10 near white blast cleaning.

PRIMING: After proper surface preparation, all surfaces shall receive one or more coats of epoxy to a dry film thickness of approximately four (4+) mils. This coat shall be tinted so that the exterior finish coat will cover in one coat.

FINISH: After observing proper recoat cycle and surface condition, all surfaces shall receive a coat of polyurethane to a minimum dry film thickness of two (2) mils. This coat shall be in the exterior finish color selected by the Owner.

TOTAL SYSTEM: The total coating system for these surfaces shall achieve a minimum dry film thickness of six (6) mils.

G. Clean Up

Upon completion of the work, all staging, scaffolding, containers, rubbish, and waste coating material shall be removed from the site or destroyed in a manner approved by the Owner. Coating or paint spots and oil or stains upon adjacent surfaces shall be removed and the job site cleaned. All damage to surfaces resulting from the work of this section shall be cleaned, repaired or refinished to meet the requirement of this specification at no cost to the Owner.

H. Omission

Care has been taken to delineate herein those surfaces to be painted and those surfaces not to be painted. However, if painting requirements have been inadvertently omitted from this section or other sections of these specifications, it is intended that all exposed ferrous metal surfaces, unless specifically exempted herein, shall receive first class protective coating equal to that given the same type of surface pursuant to these specifications.

I. Disinfection

See Section 33 11 16 in these specifications for details

J. Bacteriological and VOC Testing

See Section 33 11 16 in these specifications for details

END OF SECTION

TYPICAL PAINT SYSTEM SUMMARY *

<u>LOCATION</u>	<u>PRIOR TO ERECTION</u>	<u>FIELD APPLICATION</u>
Interior Floor, Shell, Roof	Blast: SSPC-SP10 Touchup Blast: SSPC-SP10	Touchup and Intermediate Coat: Epoxy
Knuckles, Structure,	Prime: Epoxy Coating	
Columns and Accessories mils±	1 coat to 2 mils	Intermediate coat areas to 5 mils ± Touchup/Intermediate area to 7 Finish: Epoxy coating 1 coat to 5 mils ±
TOTAL SYSTEM: 12 MILS MDFT		
Exterior Roof, Shell	Blast: SSPC-SP10	Touchup Blast : SSPC SP10
Knuckles, and Accessories Intermediate Coat: mils± mils	Prime:	Epoxy Coating Touchup and 1 coat to 2 mils Epoxy Intermediate coat areas to 2 mils ± Touchup intermediate area to 4 Finish: Polyurethane 1 coat to 2
TOTAL SYSTEM : 6 MILS MDFT		

- * Notes:
- 1) This summary is provided for convenience only. The specifications shall govern the actual performance of the work.
 - 2) MDFT represents Minimum Dry Film Thickness.
 - 3) The number of coats represented here is the minimum required. Additional coats shall be applied as necessary to achieve the minimum dry film thicknesses specified.

MATERIAL SPECIFICATIONS

INTERIOR EPOXY*

TNEMEC: 20 Series

DEVOE: 233H

EXTERIOR EPOXY

TNEMEC: 20 Series

DEVOE: 233H

POLYURETHANE

TNEMEC: 75

DEVOE: 378

* NOTES:- All coatings must meet applicable air regulatory board requirements.

Interior epoxies must be on the current USEPA or NSF Standard 61 list for potable water coatings and meet all requirements of the State Health Department

SECTION 15 10 00 – TRAFFIC CONTROL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Traffic control

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Traffic Control
 - 1. Basis of Measurement: Lump Sum
 - 2. Basis of Payment: Includes flagging, placement of cones, delineators, and signs for traffic control, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

- A. CalTrans Standard Specifications 2010
- B. California MUTCD

1.4 SUBMITTALS

- A. Self-certification for crashworthiness of Category 1 temporary traffic control devices at least 5 business days before starting any work using the devices or within 2 business days after the notification if the devices are already in use. Either you or the manufacturer must perform the self-certification. Include the following information:
 - 1. Date
 - 2. Federal Aid number if applicable
 - 3. Contract number, district, county, route and post mile of project limits
 - 4. Company name of certifying vendor, street address, city, state and zip code
 - 5. Printed name, signature and title of certifying person
 - 6. Types of Category 1 temporary traffic control devices
- B. List of proposed Category 2 temporary traffic control devices at least 5 business days before starting any work using the devices or within 2 business days after the notification if the devices are already in use.
- C. Submit a sample of the type of portable delineator that you will be using on the project before placing portable delineators on the job site.
- D. Submit an approved traffic control plan. Approval shall be made by Humboldt County Department of Public Works.

1.5 DEFINITIONS

- A. **Category 1** temporary traffic control devices: Small, lightweight devices weighing less than 100 pounds certified as crashworthy by crash testing or crash testing of similar devices. Category 1 temporary traffic control devices include traffic cones, plastic traffic drums, portable delineators, and channelizers.
- B. **Category 2** temporary traffic control devices: Small, lightweight devices weighing less than 100 pounds that are not expected to produce significant changes in vehicular velocity, but could cause harm to impacting vehicles. Category 2 temporary traffic control devices include barricades and portable sign supports.
- C. **Category 3** temporary traffic control devices: Temporary traffic-handling equipment and devices weighing 100 pounds or more that are expected to produce significant changes in the vehicular velocity of impacting vehicles. Category 3 temporary traffic-handling equipment and devices include crash cushions, impact attenuator vehicles, temporary railing, temporary barrier, and end treatments for temporary railings and barriers.
- D. **Useable shoulder area:** Any longitudinal paved or unpaved contiguous surface adjacent to the traveled way with:
 - 1. Enough weight-bearing capacity to support traffic control vehicles and equipment, such as flashing arrow signs, portable changeable message signs, and impact attenuator vehicles
 - 2. Slope not greater than 6:1 (horizontal:vertical)
- E. **Hours of darkness:** As defined under Veh Code § 280.

1.6 QUALITY ASSURANCE

- A. Category 2 temporary traffic control devices must be labeled with the FHWA acceptance letter number and the name of the manufacturer. The label must be legible and permanently affixed to the traffic control device by the manufacturer.
- B. Retroreflectivity for the following materials must comply with Table 2A-3, "Minimum Retroreflectivity Requirements," of the California MUTCD and be on the Authorized Material List for signing and delineation materials:
 - 1. Retroreflective sheeting for barricades
 - 2. Retroreflective bands for portable delineators
 - 3. Retroreflective sheeting for construction area signs
 - 4. Retroreflective sheeting for channelizers
 - 5. Reflectors for Type K temporary railing
 - 6. Retroreflective cone sleeves
 - 7. White and orange-colored retroreflective stripes for plastic traffic drums.
- C. The following traffic-handling devices must be visible from 1,000 feet during the hours of darkness under illumination of legal high-beam headlights by persons with 20/20 vision or vision corrected to 20/20:
 - 1. Retroreflective bands on portable delineators

2. Retroreflective sheeting on channelizers
3. Retroreflective cone sleeves on traffic cones

PART 2 PRODUCTS

2.1 PORTABLE DELINEATORS

- A. Portable delineators, including the base, must be composed of a material that has enough rigidity to remain upright when unattended and must be flexible or collapsible upon impact by a vehicle. The base must be shaped to prevent rolling after impact. The base must be anchored or weigh enough to keep the delineator in an upright position. Comply with the manufacturer's instructions for ballast for portable delineators.
- B. The vertical portion of portable delineators must be fluorescent orange or predominantly orange. The posts must be not less than 3 inches in width or diameter. The minimum height must be 36 inches above the traveled way.
- C. A minimum of 2 white retroreflective bands, each not less than 3 inches wide, must be mounted a minimum of 1-1/2 inches apart. The lower retroreflective band must be from 2.5 to 3 feet above the roadway surface.

2.2 CONSTRUCTION AREA SIGNS

- A. Quality Control and Assurance
 1. Construction area signs must be the product of a commercial sign manufacturer.
 2. Construction area signs must be visible from 500 feet and legible from 300 feet at noon on a cloudless day and during the hours of darkness under illumination of legal low-beam headlights by persons with 20/20 vision or vision corrected to 20/20. Fabric sign panels on portable signs are not subject to the visibility and legibility requirements for headlight illumination during the hours of darkness.
 3. Construction area signs may be new or used. Used signs must have the specified sheeting material and qualify with Section 1.6. A significant difference between day and nighttime retroreflective color is cause for rejecting signs.
- B. Portable Signs
 1. Each portable sign must consist of a base, standard or framework, and a sign panel. Units delivered to the job site must be capable of being placed into immediate operation.
 2. Sign panels for portable signs must be one of the following:
 - a. Sign panels specified for stationary signs
 - b. Nonretroreflective cotton drill fabric
 - c. Nonretroreflective flexible industrial nylon fabric
 - d. Another type of fabric, if authorized

3. Do not use nonretroreflective portable signs during the hours of darkness.
4. The height above the edge of traveled way to the bottom of the portable sign panel must be at least 1 foot.

2.3 TRAFFIC CONES

- A. Traffic cones must be flexible, fluorescent orange, and be manufactured from commercial-quality material designed for the intended purpose.
- B. The outer section of the portion above the base of the traffic cone must be translucent and be of a highly pigmented, fluorescent orange, polyvinyl compound. The overall height of a traffic cone must be at least 28 inches and the bottom inside diameter must be at least 10.5 inches. The base must be anchored or have enough size and mass to keep the traffic cone in an upright position.
- C. During the hours of darkness, traffic cones must have retroreflective cone sleeves. Retroreflective cone sleeves must be one of the following types:
 1. Removable flexible retroreflective cone sleeves fabricated from retroreflective sheeting at least 13 inches in height, placed a maximum of 3 inches from the top of the cone. Do not use the sleeves during daylight hours.
 2. Permanently affixed, semitransparent, retroreflective cone sleeves fabricated from semitransparent, retroreflective sheeting at least 13 inches in height, placed a maximum of 3 inches from the top of the cone. You may use traffic cones with semitransparent retroreflective cone sleeves during daylight hours.
 3. Permanently affixed double-band retroreflective cone sleeves consisting of 2 white retroreflective bands. The top band must be 6 inches in height, placed a maximum of 4 inches from the top of the cone. The lower band must be 4 inches in height, placed 2 inches below the bottom of the top band. You may use traffic cones with double-band retroreflective cone sleeves during daylight hours.
- D. Use the same type of retroreflective cone sleeve for all cones used on the project.

2.4 FLAGGERS

- A. Flagging apparel, traffic control devices, and equipment for flaggers must comply with part 6, "Temporary Traffic Control," of the California MUTCD. Assign flaggers to control traffic and to warn the public of any dangerous conditions resulting from work activities. Maintain flagging apparel, traffic control devices, and equipment for flaggers in good repair at all times.

PART 3 EXECUTION

3.1 CONSTRUCTION AREA SIGNS

Place all construction area signs outside of the traveled way. Do not block bicycle and pedestrian pathways with construction area signs.

Place, install, maintain, and remove temporary object markers shown as construction area signs in

the same way specified for construction area signs.

Maintain accurate information on construction area signs. Immediately replace or correct signs that convey inaccurate information.

During the progress of work, immediately cover or remove unneeded signs. Check covered signs daily for damage and immediately replace covers if needed.

Covers for construction area signs must be of sufficient size and density to completely block out the message so that it is not visible. Securely fasten covers to prevent movement from wind.

Clean all construction area sign panels at the time of installation and at least once every 4 months thereafter.

Be prepared to furnish additional construction area sign panels, posts and mounting hardware, or portable sign mounts on short notice due to changing traffic conditions or damage caused by traffic or other conditions. Maintain an inventory of commonly required items at the job site or make arrangements with a supplier who is able, on a daily basis, to furnish the items on short notice.

Replace any damaged construction area sign or repair the sign if authorized.

Remove sign panels that exhibit irregular luminance, shadowing, or dark blotches at nighttime under vehicular headlight illumination at your expense.

END OF SECTION

SECTION 22 12 00 - POTABLE WELDED STEEL WATER STORAGE TANKS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Design, manufacture, erection, and testing of 200,000 gallon welded steel tank.
- B. Related Sections:
 - 1. Section 33 11 16: Site Water Utility Distribution Piping
 - 2. Section 03 30 00: Cast-in-Place Concrete
 - 3. Section 09 90 00: Painting and Coatings

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. 200,000 gallon welded steel tank and concrete ring foundation:
 - 1. Basis of Measurement: Lump Sum
 - 2. Basis of Payment: Includes tank ring foundation, 200,000 gallon welded steel tank, tank and foundation design, tank coatings, weld field inspection and testing, leak testing, (2) man-ways, 6" overflow, 8" inlet, 8" outlet, open exterior ladder with anti-climb door and safety climb, 12" center roof vent, roof hand railing, 36" square roof access hatch, sight level indicator, sample tap, VOC testing, disinfection, de-chlorination and disposal of testing water, and eleven-month inspection and corrections. Price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

The latest editions of the following standards are incorporated by reference. They form a part of this standard to the extent specified herein. In any case of conflict, the requirements of this Section shall prevail.

Abbreviations:

ACI	American Concrete Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
ACI 31	Building Code Requirements for Reinforced Concrete
ANSI B16.5	Steel Pipe Flanges and Flanged Fittings
API Spec 5L	Specification for Line Pipe
ASTM A6	Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use
ASTM A27	Specification for Carbon-Steel Castings for General Application
ASTM A36	Specification for Structural Steel

ASTM A53	Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A108	Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality
ASTM A131	Specification for Structural Steel for Ships
ASTM A139	Specification for Electric-Fusion (ARC)- Welded Steel Pipe (Sizes 4 in. and Over)
ASTM A181	Specification for Forgings, Carbon Steel for General Purpose Piping
ASTM A283	Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars
ASTM A307	Specification for Carbon Steel Externally Threaded Standard Fasteners
ASTM A325	Specification for High-Strength Bolts for Structural Steel Joints
ASTM A435	Specification for Straight-Beam Ultrasonic Examination of Steel Plates for Pressure Vessels
ASTM A500	Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A501	Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A568	Specification for General Requirements for Steel, Carbon and High-Strength Low-Alloy Hot-Rolled Sheet, Hot-Rolled Strip, and Cold-Rolled Sheet
ASTM A570	Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality
ASTM A573	Specification for Structural Carbon Steel Plates of Improved Toughness
ASTM A668	Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use
AWWA C652-11	Disinfection of Water-Storage Facilities
AWWA D100-11	Welded Carbon Steel Tanks for Water Storage
AWWA D102-11	Coating Steel Water-Storage Tanks
CCR Title 22 Article 6	Distribution Reservoirs

1.4 DESIGN REQUIREMENTS

- A. The finished tank shall be a complete and functional water storage reservoir as defined by the American Water Works Association (AWWA) and in compliance with all AWWA requirements.
- B. The Contractor shall design and build the water storage tank in accordance with these Plans, Specifications, AWWA D100-11, and state and local building codes.

1.5 SUBMITTALS

- A. Certification of Compliance

The Contractor shall submit to the Engineer three (3) copies of certification of compliance

with the Plans, Specifications, and all applicable codes and standards.

B. Shop Drawings and Design Calculations

The Contractor shall submit structural design loading and seismic conditions, description of structural design methods and codes including allowable stresses and safety factors with design calculations sealed by a professional engineer in the State of California for the tank and ring foundation. After award of the contract, the Contractor shall prepare design calculations, foundation plans, and detail tank drawings that are to be submitted to the Engineer for review and subsequent approval prior to proceeding with any fabrication. Standard welding symbols as recommended by the American Welding Society shall be used on welded steel tank drawings.

C. Material Certification

Certification of all materials including tank valves, ladders, foundations, and appurtenances, properly executed by the manufacturer, shall be submitted to show compliance with the Specification of materials being furnished.

D. Radiography

The tank contractor shall be responsible to radiograph the tank in accordance with AWWA D100-11. A complete radiography package including x-ray film and Radiographic Report shall be submitted to the owner's representative. All tests shall comply with AWWA D100-11.

E. Vacuum Test

After the tank is completed and before it is painted, the welded seams in the tank bottom shall be tested in accordance with AWWA D100-11.

F. Protective Coatings

The Contractor shall submit a description of the coating system, including a list of products to be used, to the Engineer for approval prior to beginning application of the system. See Section 09 90 05 "Protective Coating for Welded Steel Reservoirs"

1.6 QUALITY ASSURANCE

A. This Specification does not cover all details of design and construction. Where details for specific elements are not given, it is intended that the Contractor, subject to the approval of the Engineer, shall provide details that are as adequate and safe as those that would otherwise be provided under this Specification, and in compliance with all appropriate standards and codes.

B. The Contractor shall guarantee the structure against any defective materials or workmanship, including paint and painting, for a period of one year from the date of completion. If any materials or workmanship prove to be defective within one year, they shall be replaced or

repaired by the Contractor at no additional cost to the Owner.

- C. Warranty Inspection - The Owner shall conduct the warranty inspection during the eleventh month following completion or placement into service of all coating and painting work required by this section. All defective work shall be repaired in accordance with the manufacturer's recommendation and the satisfaction of the Owner in order to bring the defective areas up to the quality level of the original work required by this specification.

1.7 MANUFACTURER’S SERVICES

A manufacturer’s representative for the tank system being furnished shall be present at the job site throughout construction to instruct the installation crafter’s in the proper assembly of the product.

PART 2 PRODUCTS

2.1 GENERAL

All materials to be incorporated into any structure to meet this Specification shall be new, previously unused, in first-class condition, and shall comply with all of the requirements of these Specifications.

2.2 BASIC DESIGN REQUIREMENTS

- A. The following Tank Schedule lists the size of each tank and allowable dead load bearing pressure.

TANK SCHEDULE

Schedule	Tank Name	Usable Tank Volume ¹	Nominal Tank Diameter ² (ft.)	Nominal Sidewall Height ² (ft.)	Allowable Dead Load Bearing Pressure ³
1	Water Storage Tank	200,000	42	24	2,000 psf

1. Usable Tank Volume is the minimum storage volume between the bottom of the tank overflow and the bottom of the tank inlet/outlet piping, in U.S. gallons.
2. Nominal Tank Diameter and Nominal Shell Height are provided for general information only. Minor variations from these dimensions are allowed, subject to approval of the Engineer. Due to site constraints the tank cannot have a diameter greater than that listed.
3. See Geotechnical Design Memorandum for site preparation and design criteria.

- B. The tank and foundation shall be designed by the manufacturer in accordance with AWWA D100-11 for welded carbon steel tanks, the California Building Code, and the Geotechnical memorandum prepared by LACO Associates, dated April 30, 2014. All seismic design factors shall be in accordance with the Geotechnical Memorandum. The tank shall not be designed in accordance with Section 14 of AWWA D100-11.
- C. The tank foundation shall be Type 1 – Ringwall Footing per AWWA D100-11 Section 12.6.1. Foundation shall be prepared in accordance with AWWA D100-11 Section 12.6.
- D. The tank roof shall be supported by the perimeter walls and a single center column, unless additional columns are called for by the supplier, and shall be designed in accordance with

AWWA D100-11 Section 3.6. The tank column(s) shall not coincide with seam in the floor plate.

- E. There is no snow load requirement for this tank.
- F. Tank is to be designed for a seismic Zone 4, Seismic Use Group 3. See geotechnical memorandum.
- G. The minimum freeboard shall be determined in accordance with AWWA D100-11 Section 13.5.4.4. Maximum Operating Level (MOL) shall be the bottom elevation of the tank overflow pipe.

2.3 MATERIAL SPECIFICATIONS

- A. Bolts, Anchor Bolts and Rods: Bolts and anchor bolts, washers, and nuts shall be 18-8 stainless steel. Two washers per bolt/nut system shall be placed, one for the bolt head and one for the nut.
- B. Reinforcing steel: Reinforcing steel, if used, shall comply with the requirements of ACI 318.
- C. Plates: Plate materials shall be open-hearth, electric-furnace, or basic-oxygen-process steel conforming to any of the following ASTM specifications - A36; A131, grades A and B; A283, grades A, B, C, and D; or A573, grade 58.

The plates shall be manufactured in accordance with AWWA D100-11.

- D. Sheets: Sheet materials shall conform to ASTM A570, grade 30, 33, or 36, and ASTM A568.
- E. Structural Shapes: All structural shapes for use under this section shall be produced by the open-hearth, basic-oxygen, or electric-furnace process.

The structural shapes shall be designed and manufactured in accordance with AWWA D100-11.

- F. Pins: Pins shall comply with ASTM A307, grade B; ASTM A108, grade 1018 or grade 1025; or ASTM A36. Size and diameter tolerances on turned pins shall be equal to that of cold-finished shafting. Surface finish shall depend on application, but in no case be rougher than 0.000125 inches.
- G. Castings: Castings shall conform to ASTM A27, grade 60-30 (full annealed).
- H. Forgings
 - 1. Forgings shall conform to any of the following ASTM specifications - A668, class D; A181, grade II; or A105.

2. Forged and rolled pipe flanges shall conform to the material requirements for forged carbon steel flanges as specified in ANSI B16.5.

- I. Electrodes and Fluxes: The filler metals and materials shall be of the same classification as those that have been qualified for each welding procedure in accordance with AWWA D100-11, Section 8.2.

2.4 SHELL MANHOLES

Manholes shall be provided in the first ring of each tank shell at the locations shown on the Plans. Manholes shall be circular, 36 inches in diameter.

2.5 OUTSIDE LADDER

The Contractor shall furnish and install a tank ladder on the outside of the shell beginning 8 feet above the level of the ground, at the location shown on the Plans or recommended by the manufacturer. The side rails shall be not less than 2 inches by 3/8-inch, with spacing between side rails not less than 16 inches. The rungs shall be not less than 3/4 inch round or square bars, spaced 12 inches apart on centers. The ladder shall be per California Administrative Code, Title 8, Subchapter 7, Section 3277. Rails, rungs, and hardware shall be stainless steel.

The ladder shall be equipped with the "Saf-T-Climb" Fall Prevention System, or approved equal, and the Contractor shall supply one harness for the system installed.

The Contractor shall furnish access to roof hatches and vents. Such access shall be reached from the outside tank ladder as specified in AWWA D100-11, Section 7.4.2.3.

An interior ladder is not required.

2.6 SAFETY DEVICES

The Contractor shall furnish and install all safety devices, including, but not limited to, roof-ladder handrails, rest platforms, safety cable attachments, etc., as required by federal and state laws and regulations.

2.7 OVERFLOW

The tank shall be equipped with an overflow to ground as shown on the Plans. The overflow shall be placed down the outside of the tank shell and supported at proper intervals with suitable brackets. The overflow will have a bare interior and be coated in the same manner and color as the tank coating.

2.8 ROOF OPENING

The roof access shall be placed near the outside tank ladder and shall be provided with a hinged cover and a stainless steel hasp for locking.

2.9 VENTS

Vent shall be welded to the cover plate of the center manhole on the roof. Vent shall be screened and shall conform to AWWA Section 5.7.2 D100.

Suitable vents shall be furnished above the maximum water level, which shall have a capacity to pass air so that at the maximum possible rate of water flow, either entering or leaving the tank, excessive pressure or vacuum will not be developed. The overflow pipe shall not be considered a tank vent.

2.10 SIGHT LEVEL INDICATOR GAUGE

A sight level indicator gauge shall be installed at the location shown on the Plans. The level shall consist of a float on the tank interior connected to a counter weight hanging down the tank exterior against an inverse depth scale with markings in tenths of feet.

2.11 ADDITIONAL ACCESSORIES AND EXCEPTIONS

Any additional accessories required to be furnished shall be specified by the Owner. Exceptions and provisions of this section may be specified by the purchaser to suit special situations.

2.12 INSTRUMENTATION

Instrumentation is shown on the plans.

PART 3 EXECUTION

3.1 ERECTION

The Contractor shall furnish all labor, liability and compensation insurance, tools, false work, scaffolding, cranes, and other equipment necessary, and shall erect the tank so that it is complete, functional and ready for use. Erection procedures, tools, and techniques shall be as specified in AWWA D100-11.

3.2 SHOP INSPECTION

The Owner may require shop inspection by a commercial inspection agency, the cost of which shall be paid by the Owner. Copies of typical test reports shall be furnished to the Owner, if requested. Shop inspection shall consist of a visual inspection of the fabricating practices and operations to determine compliance with the Specifications.

Welds made in the shop that carry stress from the weight or pressure of the tank contents across the welded joint shall be inspected by the Contractor in accordance with the radiographic or sectional segment methods of AWWA D100-11 at no additional cost to the Owner.

3.3 WELD FIELD INSPECTION

The quality of field welding shall be the responsibility of the Contractor, and shall be determined by qualified radiographs or sectional segments, or both, of the number and location specified in AWWA D100-11 Section 11.5. The contractor is to provide the Engineer with the X-ray inspection company

contact information to verify qualifications. Engineer will approve the testing company before radiographic testing begins. At the conclusion of the Work, the Contractor shall submit a written report in accordance with AWWA D100-11 Section 11.2 prepared by the Contractor's qualified personnel, certifying that the Work was inspected as set forth therein.

Defective welds shall be removed by chipping with a round-nosed tool or by arc or oxygen gouging, from one or both sides of the joint, and then re-welded in compliance with approved procedures. Removal of defective welds is required only to the extent necessary to remove the defects present. Repairs shall be re-inspected by the original test procedure.

3.4 PAINTING

The tank metal surface shall be shop-primed before delivery to the site. After a satisfactory leak test has been completed, the tank shall be painted in accordance with Section 09 90 05 of these Specifications. The Contractor shall provide a minimum drying time corresponding to the paint system used for each coating, however, under no circumstances shall the minimum drying time under any paint system be less than five days after the final inside coat is applied. If necessary, an automatic heating and humidity control system shall be utilized to provide complete and timely drying of the tank interior

3.5 TESTING

- A. Leak-Testing: After the tank is completed and before it is painted, it shall be field tested in accordance with AWWA D100-11 Section 11.10.
- B. VOC Testing: After the tank has been coated, cured and disinfected, it shall be tested for residual organic solvents as follows:
 - 1. Following a five-day soaking period, the water in the tank shall be sampled to determine the presence of any leached organic chemicals. Samples of the water shall be analyzed by a laboratory certified by the State Department of Health Services for the presence of any volatile organics.
 - 2. If any VOC exceeds the State action level, the tank should remain out of service until corrective action is taken and re-samples indicate that VOC levels are below action levels.
 - 3. A written report shall be submitted to the Owner of all test results and the date the tank was placed in service.
- C. Supply and Disposal of Test Water: The Owner will provide test water for one five-day soaking period. Additional water for testing, if necessary due to a failure to meet the standards above, will be paid for by Contractor. Contractor shall collect all test water that does not comply with standards and shall be responsible for obtaining any necessary permits, complying with all regulations and assuring that draining the reservoir does not cause any environmental damage or nuisance. The Contractor will be responsible for draining the reservoir, and verifying the discharge water is properly de-chlorinated and disposed of in accordance with the regulating agency.

- D. The Contractor shall be responsible for all testing required herein.
- E. Eleven months after construction has been completed, while the tank is under warranty, the tank shall be drained by the District, and the interior inspected for holidays and paint blistering. The Contractor or representative shall be present with the appropriate coating patch kit that meets AWWA D102-11 standards. Contractor will then patch all visible holidays using method described on the patch kit, as well as repair any portions of coating that have blistered per AWWA standards. Once the holidays are patched, and any blistered coating repaired, the Contractor shall disinfect the tank per AWWA C652-11. The Owner will then fill the tank and perform a coliform test. If the sample tests positive for coliform bacteria, then a second sample will be taken. If the second sample proves positive for coliform bacteria then the Owner shall drain the tank, and the Contractor shall re-disinfect the tank, re-fill it at Contractor's expense, and retest it until a negative coliform test is achieved.

At the same time the interior coating is being inspected, the exterior coating of the tank will be visually inspected by the Engineer and Owner, and any observed defect corrected by the Contractor per AWWA D102-11 standards.

3.6 DISINFECTION

- A. The Contractor shall disinfect the tank and sample for bacteriological quality in accordance with AWWA C652-11 and Section 33 11 16 Site Water Utility Distribution Piping of these Specifications. After disinfection, the tank shall be tested for VOC's, and leakage in accordance with these specifications. Prior to placing the tank in service, an acceptable chlorine residual, as required by the District, shall be provided by the Contractor.
- B. Bacteriological Testing
 - 1. After the Contractor has performed disinfection procedures on the steel reservoir, the Owner shall take water samples for coliform organism testing. If the samples pass coliform standards, then the water will be allowed to stand in the reservoir for volatile organics testing. If the samples do not pass, the water in the reservoir shall be re-sampled. If the second test does not pass, the reservoir must be drained and re-disinfected in accordance with AWWA C652-03.
 - 2. The Contractor shall be responsible for obtaining any necessary permits, complying with all regulations and assuring that draining the reservoir does not cause any environmental damage or nuisance. The Contractor will be responsible for draining the reservoir, and verifying the discharge water is properly de-chlorinated. Water to refill the reservoir due to a failed bacteriological test shall be paid for by the Contractor. This process will be repeated as necessary until the reservoir passes bacteriological tests.
 - 3. The Contractor has the right to obtain his own samples for independent coliform testing at any laboratory certified by the California State Department of Health Services (DHS) for such testing. After one positive coliform test, water in the

reservoir will be considered to pass coliform standards when nine (9) more tests show no coliform contamination (90 percent negative). All samples tested must be reported. The Owner reserves the right to take additional samples for coliform testing if the Contractor's testing results differ from those of the Owner.

4. After the Contractor has performed disinfection procedures on the water mains, bacteriological testing shall be performed in accordance with AWWA C651-99 – Section 7.

END OF SECTION

SECTION 31 05 13 - SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Subsoil materials.
2. Topsoil materials.

B. Related Sections:

1. Section 31 05 16 - Aggregates for Earthwork.
2. Section 31 22 13 - Rough Grading.
3. Section 31 23 17 - Trenching.
4. Geotechnical Design Memorandum, Prepared by LACO Associates, dated April 30, 2014; bore hole locations and findings of subsurface materials.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Excavation:

1. Basis of Measurement: Refer to Section 31 22 13. Excavation will not be measured separately for payment.
2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with this excavation shall be included in the contract price for related work.

Separate payment will not be made for excavating existing topsoil and subsoil, supplying soil material, stockpiling, and removal of excess soil material. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.4 SUBMITTALS

- A. Samples: Submit, in air-tight containers, full 5-gallon bucket sample of each type of Type of fill to testing laboratory.
- B. Materials Source: Submit name of imported materials source.

1.5 QUALITY ASSURANCE

- A. Furnish each subsoil material from single source throughout the Work.
- B. Perform Work in accordance with Humboldt County Department of Public Works Standards.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

- A. Fill materials used in building/tank areas should be composed of soil material having a low expansion potential, and be free of organic content, debris, and/or other deleterious matter. It should be placed on an approved excavation bottom as described above. The fill material should not generally contain rocks larger than 3 inches in greatest dimension, or more than 15 percent larger than 2 inches and conform to the following specifications:

Plasticity Index:	less than 15%
Liquid Limit:	less than 40%
Percent passing No. 200 sieve:	50 maximum, 5 minimum

Fill materials placed within structure areas having perimeter foundations and slabs should be moisture conditioned to near optimum and compacted by mechanical means to a minimum of 90 percent of the maximum dry density as determined by the ASTM D1557 test procedure (upon approval by the engineer and County of Humboldt California Test 216 may be used). Structural fill materials should generally be placed in lifts not to exceed 8 inches in loose thickness.

2.2 TOPSOIL MATERIALS

- A. Stockpile unsuitable fill material "topsoil" onsite to be used for post construction re-vegetation purposes. Contractor shall remove any unused topsoil material. Refer to the Project Geotechnical Design Memorandum prepared by LACO dated April 30, 2014 for subsurface conditions.

2.3 SOURCE QUALITY CONTROL

- A. Testing and Analysis of Subsoil Material: Perform in accordance with California Test 231.
- B. When tests indicate materials do not meet specified requirements, change material and retest.
- C. Furnish materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.
- C. Remove excess excavated materials subsoil and topsoil not intended for reuse, from site.
- D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

3.2 STOCKPILING

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Prevent intermixing of soil types or contamination.
- E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 05 16 - AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aggregate base course
2. Rock slope protection

B. Related Sections:

1. Section 31 05 13 - Soils for Earthwork: Fill and grading materials.
2. Section 31 22 13 - Rough Grading.
3. Section 31 23 17 - Trenching.
4. Section 33 11 16 - Site Water Utility Distribution Piping.
5. Geotechnical Design Memorandum, Prepared by LACO, dated April 30, 2014; bore hole locations and findings of subsurface materials.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Aggregate Base:

1. Basis of Measurement: Per Ton as determined by certified weight tickets
2. Basis of Payment: Includes supplying aggregate materials, stockpiling, installing to lines and elevations shown in the construction documents, and compacting, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

B. Rock slope protection:

1. Basis of Measurement: Per Ton, as determined by certified weight tickets.
2. Basis of Payment: Includes supplying imported rock materials, stockpiling, fabric liner, installing to lines and elevations shown in the construction documents, which price will payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO M147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).

4. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
5. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

C. Caltrans Standard Specifications 2010

1.4 SUBMITTALS

- A. Samples: Submit, in air-tight containers, full 5-gallon bucket sample of each type of Type of fill to testing laboratory.
- B. Materials Source: Submit name of imported materials suppliers.

1.5 QUALITY ASSURANCE

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform Work in accordance with Humboldt County Department of Public Works Standards.

PART 2 PRODUCTS

2.1 AGGREGATE BASE COURSE

- A. Coarse Aggregate Class 2 aggregate base: Conforming to California Standard Specifications Section 26
- B. Within the following limits, based on ASTM D448:

Sieve Size	Percent Passing
2 inches	--
1-1/2 inches	--
1 inch	100
3/4 inch	90-100
No. 4	35-60
No. 30	10-30
No. 200	2-9

2.2 ROCK SLOPE PROTECTION

- A. Imported Rock. Rock materials and gradation shall conform to Section 72-2.02, *Materials* of the Caltrans Standard Specification 2010. Rock size classes, as designated below, shall be as shown on the Drawings, or as directed by the Engineer
 1. Type 1 Riprap. Comply with Section 72 of the Caltrans Standard Specifications for Light Class.

2.3 AGGREGATE QUALITY

A. Aggregates must comply with the quality requirements shown in the following table:

Property	California Test	Operating range	Contract Compliance
Resistance (R-Value) (min)	301	--	78
Sand Equivalent (min)	217	25	22
Durability index (min)	229	--	35

2.4 SOURCE QUALITY CONTROL

- A. Upon notification from the contractor, compaction testing will be performed at the expense of the Owner. Retests due to initial failing compaction tests will be at the expense of the Contractor.
- B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with California Test 216 and 231
- C. When tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 STOCKPILING

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.2 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

3.3 ROCK SLOPE PROTECTION

- A. Install rock slope protection in accordance with Section 72 of the Caltrans Standard Specifications 2010 and to the lines and the minimum dimensions shown on the Drawings. Use equipment to place rock on slopes, or below the water. Place rock so as to minimize the number of voids.

END OF SECTION

SECTION 31 10 00 - SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Removing surface debris.
 - 2. Removing designated trees, shrubs, and other plant life.
 - 3. Removing abandoned utilities.
 - 4. Excavating topsoil.

- B. Related Sections:
 - 1. Section 02 41 16 - Structure Demolition: Removing designated structures and utilities.
 - 2. Section 31 22 13 - Rough Grading.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Site Clearing:
 - 1. Basis of Measurement:
Site Clearing: lump sum
 - 2. Basis of Payment: Includes clearing site, abandoned utilities, tree removal including removal of roots to a depth of three feet, loading and removing waste materials from site, topsoil salvage, storage, and replacement, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to compute the work as specified.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing plant life designated to be removed is tagged or identified.

3.2 PREPARATION

- A. Call Local Utility Line Information service not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

- A. Locate, identify, and protect utilities indicated to remain, from damage.

- B. Protect trees, plant growth, and features designated to remain.

- C. Protect bench marks, and survey control points, from damage or displacement.

3.4 CLEARING

- A. Clear areas required for access to site and execution of Work to minimum depth of 12 inches.
- B. Remove trees and shrubs indicated. Remove stumps and main root ball.
- C. Clear undergrowth and deadwood, without disturbing subsoil.
- D. Apply herbicide to remaining stumps to inhibit growth.

3.5 REMOVAL

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- C. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- D. Do not burn or bury materials on site. Leave site in clean condition.

3.6 TOPSOIL EXCAVATION

- A. Excavate topsoil from entire site where indicated without mixing with foreign materials for use in finish grading.
- B. Remove excess topsoil from site.

END OF SECTION

SECTION 31 22 13 - ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating topsoil.
2. Excavating subsoil.
3. Cutting, grading, filling, rough contouring, and compacting, for site improvements
4. Unsuitable Material

B. Related Sections:

1. Section 02 41 16 - Structure Demolition.
2. Section 31 05 13 - Soils for Earthwork: Soils for fill.
3. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill.
4. Section 31 10 00 - Site Clearing: Excavating topsoil.
5. Section 31 23 17 - Trenching: Trenching and backfilling for utilities.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Rough Grading:

1. Basis of Measurement: By Lump Sum.
2. Basis of Payment: Includes excavating existing subsoil, supplying structural fill materials, stockpiling, scarifying substrate surface, placing where required, and compacting, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

B. Unsuitable Material:

1. Measurement of this item shall be on a cubic yard in place basis as calculated from field-measured dimensions.
2. Payment shall include full compensation for all materials, labor and equipment necessary for removing unsuitable materials. Work shall include, but is not limited to, excavation, hauling, and disposal of unsuitable material as directed by the ENGINEER, compaction of subgrade, placement and compaction to 95% Relative Compaction with Class 2 aggregate base fill, dust control, and control of water.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
3. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
6. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
7. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
8. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
9. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 SUBMITTALS

- A. Samples: Submit, in air-tight containers, full 5-gallon bucket sample of each type of fill to testing laboratory.
- B. Materials Source: Submit name of imported materials suppliers.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with Humboldt County Department of Public Works Standards.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Engineered Fill: As specified in the Geotechnical Memorandum prepared by LACO dated April 30, 2014.
- B. Granular Fill: Caltrans $\frac{3}{4}$ " Class 2 aggregate base, minimum 70% crushed and three fractured faces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

- A. Call Local Utility Line Information service at Verizon not less than three working days before performing Work.

1. Request underground utilities to be located and marked within and surrounding construction areas.
 - B. Identify required lines, levels, contours, and datum.
 - C. Notify Verizon to remove and relocate phone utilities.
 - D. Protect utilities indicated to remain from damage.
 - E. Protect plant life, lawns, and other features remaining as portion of final landscaping.
 - F. Protect bench marks, Survey control point, existing structures, fences, paving, and curbs from excavating equipment and vehicular traffic.
- 3.3 TOPSOIL EXCAVATION
- A. Excavate topsoil from entire site without mixing with foreign materials for use in finish grading.
 - B. Remove excess topsoil not intended for reuse, from site.
- 3.4 SUBSOIL EXCAVATION
- A. Excavate subsoil from areas to be further excavated,
 - B. When excavating through roots, perform Work by hand and cut roots with sharp axe.
 - C. Remove excess subsoil not intended for reuse, from site.
 - D. Benching Slopes: In accordance with the Geotechnical Memorandum prepared by LACO and dated April 30, 2014
 - E. Stability: Replace damaged or displaced subsoil as specified for fill.
- 3.5 FILLING
- A. Fill areas to contours and elevations with unfrozen materials.
 - B. Maintain optimum moisture content of fill materials to attain required compaction density.
 - C. Make grade changes gradual. Blend slope into level areas.
 - D. Repair or replace items indicated to remain damaged by excavation or filling.
 - E. Install Work in accordance with Humboldt County Department of Public Works standards.
- 3.6 TOLERANCES
- A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.7 FIELD QUALITY CONTROL

- A. Upon notification from the contractor, compaction testing will be performed at the expense of the Owner. Retests due to initial failing compaction tests will be at the expense of the Contractor.
- B. Perform laboratory material tests in accordance with California Test 216
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: California Test 231
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- E. Frequency of Tests: Minimum 3-tests per lift of fill material

3.8 SCHEDULES

- A. Engineered Fill:
 - 1. Fill Type To subgrade elevation in maximum 8-inch loose lifts
 - 2. Compact uniformly to minimum 95 percent of maximum density or as specified by plans.

END OF SECTION

SECTION 31 23 17 - TRENCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

B. Related Sections:

1. Section 03 30 00 - Cast-In-Place Concrete: Concrete materials.
2. Section 31 05 13 - Soils for Earthwork: Soils for fill.
3. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill.
4. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
5. Geotechnical Design Memorandum, Prepared by LACO, dated April 30, 2014, bore hole locations and findings of subsurface materials.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Trenching:

1. Basis of Measurement: Refer to Section 33 11 16. Trenching will not be measured separately for payment.
2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with this trenching shall be included in the contract price for related work.

Separate payment will not be made for excavating to required elevations, protecting excavation, and stockpiling excavated materials, and removing excavated materials from site. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

1.5 SUBMITTALS

- A. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- B. Samples: Submit, in air-tight containers, full 5-gallon bucket sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported fill materials suppliers.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with Humboldt County Department of Public Works Standards

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.8 COORDINATION

- A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Trench Backfill - Class 2 aggregate base per Section 31 05 16

PART 3 EXECUTION

3.1 LINES AND GRADES

- A. Lay pipes to lines and grades indicated on Drawings.
 1. Engineer or Owner reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

- A. Call Local Utility Line Information service at Verizon not less than three working days before performing Work.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns, and other features remaining as portion of final landscaping.
- D. Protect bench marks, existing structures, fences, and paving, from excavating equipment and vehicular traffic.
- E. Maintain and protect above and below grade utilities indicated to remain.
- F. Establish temporary traffic control when trenching is performed in public right-of-way.

3.3 TRENCHING

- A. Cut trenches to width indicated on Drawings. Remove water or materials that interfere with Work.
- B. Excavate bottom of trenches maximum 2 feet wider than outside diameter of pipe.
- C. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. When subsurface materials at bottom of trench are loose or soft, notify Engineer, and request instructions.
- F. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Class 2 aggregate base and compact to density equal to or greater than requirements for subsequent backfill material.
- G. Trim excavation. Remove loose matter.
- H. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.
- I. Remove excess subsoil not intended for reuse, from site.

3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

- B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

3.5 BACKFILLING

- A. Backfill trenches to contours and elevations with unfrozen fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place material in continuous layers as follows:
 - 1. Granular Fill: Maximum 8 inches loose depth.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Do not leave trenches open at end of working day.
- F. Protect open trench to prevent danger to the Public

3.6 FIELD QUALITY CONTROL

- A. Upon notification from the contractor, compaction testing will be performed at the expense of the Owner. Retests due to initial failing compaction tests will be at the expense of the Contractor.
- B. Perform laboratory material tests in accordance with California Test 216
- C. Perform in place compaction tests in accordance with the following:
 - 1. Density Tests: California Test 231
 - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.
- E. Frequency of Tests: minimum 3 tests per lift.

3.7 PROTECTION OF FINISHED WORK

- A. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION

SECTION 31 25 00 - EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Contactor shall employ a Qualified SWPPP developer to develop a Water Pollution Control Program (WPCP) for the project.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Erosion and Sediment Control:
 - 1. Basis of Measurement: Lump Sum
 - 2. Basis of Payment: Development of a WPCP, installing and maintaining, and removing Best Management Practices in accordance with the WPCP, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO T88 - Standard Specification for Particle Size Analysis of Soils.
 - 2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

1.4 SUBMITTALS

- A. Submit one WPCP to the engineer for approval 2-weeks prior to commencing of work.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance Humboldt County Department of Public Works standard.
- B. Maintain one copy of WPCP document on site.

1.6 PRE-INSTALLATION MEETINGS

- A. Convene minimum one week prior to commencing work of this section.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 32 31 13 - FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fence framework, fabric, and accessories.
2. Excavation for post bases.
3. Concrete foundation for posts and center drop for gates.
4. Manual gates and related hardware.
5. Privacy slats

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Fencing:

1. Basis of Measurement: By linear foot.
2. Basis of Payment: Includes posts, post footings, rails, tension wire, fabric, gates, accessories, and attachments, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

A. ASTM International:

1. ASTM A36 – Standard Specification for Carbon Structural Steel
2. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
6. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
7. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
8. ASTM A513 – Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
9. ASTM A817 - Standard Specification for Metallic-Coated Steel Wire for Chain-Link Fence Fabric and Marcellled Tension Wire.
10. A1011/A1011M-07 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
11. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
12. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
13. ASTM F552 - Standard Terminology relating to Chain Link Fencing.
14. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.

15. ASTM F626 - Standard Specification for Fence Fittings.
16. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric.
17. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
18. ASTM F934 - Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
19. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
20. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
21. ASTM F1183 - Standard Specification for Aluminum Alloy Chain Link Fence Fabric.
22. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.
23. ASTM F1345 - Standard Specification for Zinc - 5% Aluminum -Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric.

- B. Chain Link Fence Manufacturers Institute:
1. CLFMI - Product Manual.

1.4 SUBMITTALS

- A. Submit to the Engineer, for review, the following:
1. Product data on new fence and gate materials.
 2. Shop drawings shall be submitted showing details of proposed gate modifications for the gates to be salvaged and reused.
 3. Identity of and the location where existing fence materials are to be reused.
 4. Shop drawings showing typical details of new fence and new gate installations.
 5. Manufacturer's product literature on the gate system, hardware, and coating system. Include materials, sizes, and thickness of components, fasteners, bracing, finish hardware, and accessory items.

1.5 QUALITY ASSURANCE

- A. Supply material in accordance with CLFMI – Product Manual.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials: Manufactured materials shall be delivered in containers or packages approved by the manufacturer. Gate products shall have tags bearing the names of the manufacturer and item.
- B. Storage: Products shall be carefully stored above ground in a manner acceptable to the manufacturer, in an area that is protected from all deleterious elements. Storage conditions shall prevent damage to the product or marring of finishes.

PART 2 PRODUCTS

2.1 GENERAL

A. Structural requirements for gates:

1. The gates shall be structurally stable vertically under its own weight and laterally under the following horizontal loads acting from any direction:
 - a. Wind: Wind load shall be over entire projected area perpendicular to gate, as defined in the California Building Code, 110 miles per hour.
 - b. Seismic: Zone 4 seismic force applied at center of gravity to gate.
2. The gates shall be rigid enough that any distortion or deflection horizontally or vertically or both will not interfere with normal operation. The gates shall not sag under their own weight or deflect any more than the lock assembly will accommodate when the gates are closing. The gates shall be engineered for a maximum deflection of 1/160 of the full span with a 200 pound live load at free end and at middle of span. Live loads are not applied at the same time.
3. The structural features of the gates shall be designed under the responsibility of a structural engineer licensed in the State of California. The design concept shall submit to rational analysis and shall be in accordance with applicable codes.

B. The loads shall be applied to gates when it is in each of the following positions:

1. Closed and engaged with lock assembly.
2. Closed but slightly ajar from lock assembly.
3. Partially closed/open.
4. Completely open.

2.2 MATERIALS

- A. Fence Post and Rails: Fence post and rails shall be manufactured from tubing meeting requirements of ASTM A 500-Steel Structural Tubing in Rounds and Shapes, Grade B.
- B. Bars, Plates, and Shapes: Solid steel bars, flat plates, and shapes shall be manufactured from steel conforming to requirements of ASTM A36 – Structural Steel, Bars, Flats, and Shapes.
- C. Gate Frames: Gate frames shall be manufactured from steel pipes, welded, conforming to the requirements of ASTM A500, Grade B. Miscellaneous shapes, angles, and reinforcing necessary to strengthen the gates or support the hardware shall conform to ASTM A36.
- D. Pickets: Pickets shall be hollow metal tubing conforming to the requirements of ASTM A513 – Electric-Resistance Welded Caps on Alloy Steel Mechanical Tubing.
- E. Welding: Welding products shall conform to the requirements of AWS D1.1 – Structural Welding Code and AWS – Standard Qualification Procedures as applicable.
- F. Galvanizing: Galvanizing shall conform to the requirements of ASTM A123 – Zinc (Hot dipped

Galvanized) Coating on Iron and Steel Products.

- G. Protective Coating: Coating shall be the manufacturer's shop applied rust inhibitive metal primer and a final gloss black enamel top-coat system. Minimum painting specification shall meet or exceed that in Section 09 90 00.
- H. Finish Hardware: Provide all finish hardware necessary for the functioning of the gates and their latching and locking. Finish of exposed to view hardware shall be galvanized metal or corrosive resistant metal.
- I. Post Caps: Post caps shall be welded enclosure plate, formed steel cap, cast or malleable iron and shall form a weather tight closure cap. Each post shall be provided with a cap.
- J. Fasteners: Continuous inverted V-track with fasteners as per the plans.
- K. Concrete: Concrete shall conform to Section 03 30 00.
- L. Barbed Wire: ASTM A121 Coating Type Z, galvanized steel; 12 gage thick wire, 3 strands, 4 points at 3 inch oc.
- M. Tension Wire: 6 gage (5 mm) thick steel, single strand, marcelled, spiraled or crimped, aluminum-coated tension wire conforming to ASTM A824.
- N. Bollards: Bollards shall be as detailed on the Drawings. Bollards shall be manufactured from steel conforming to requirements of ASTM A36 - structural steel bars, flats, and shapes.

PART 3 EXECUTION

3.1 PREPARATION

- A. Obstructions which interfere with the proper alignment of gates shall be removed. The Contractor shall verify any grade change and surface irregularities and make adjustments as needed.
- B. Discrepancies between the shop drawings and field conditions shall be brought to the attention of the Engineer immediately upon discovery.

3.2 INSTALLATION

- A. The installation shall conform to applicable codes and manufacturer's published or written installation instructions.
- B. Gates shall be plumb and level.
- C. The Contractor shall provide any gate stops that may be required. Any padlock provisions of strikes shall be field attached to assure alignment.
- D. All field welds and any abrasions to factory coating shall be thoroughly cleaned, reprimed, and

touched up with the approved coating system.

- E. The Contractor shall lubricate the rollers and other gate hardware after installation and coating.
- F. Install bottom tension wire stretched taut between terminal posts.

END OF SECTION

SECTION 32 93 05 – TREE PLANTING AND IRRIGATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Tree planting

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Tree planting:
1. Basis of Measurement: Each.
2. Basis of Payment: Includes excavation, planting, soil amendments, and trees of each type required, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 SUBMITTALS

- A. The Contractor shall submit an irrigation plan showing connection to main line, lateral lines, drip lines, valves, fixtures, and controller.
B. Contractor shall submit all catalog data sheets on all irrigation system materials and equipment to be installed under this Contract for approval by the Engineer before ordering materials.
C. Contractor shall submit tree product information, planting instructions, and manufacturer's care instructions.

1.4 QUALITY ASSURANCE

- A. The Landscape Contractor shall provide the protection against and assume full responsibility for damage done to any paving, structures, etc. during the course of the work.
B. Proper Installation. The Contractor shall be responsible for proper installation of the trees to ensure healthy and vigorous growth and development according to the Plans, these Specifications and the Engineer's direction.
C. Substitutions. No materials substitutions will be allowed without approval from the Engineer.
D. Responsibility. If plants are damaged before or during installation, the Contractor shall be responsible for purchasing, securing, and paying all associated costs for replacement plants of the same species and size, unless otherwise approved by the Engineer.
E. Reference. All work required under this Section and on the Drawings shall be conducted in conformance to the State Standard Specifications, latest edition.

- F. Landscape Contractor shall guarantee all plants for one year from date of final acceptance.
- G. All accepted plants shall be free of dead branches and dead branch tips and shall have foliage of normal density, size and color in order to be considered vigorous and thriving.
- H. Replacements with plants of comparable quality and size shall be made by Contractor for plants which fail, except where failure is from cause which is beyond the control of the Contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Materials: All materials and equipment delivered to the job site shall be clearly marked to identify the item or the materials. All materials shall be new and installed in accordance with the Drawings and the Specifications.
- B. Storage: Plants shall be maintained in optimal health and be protected at all times from animal damage; vandalism; inclement weather conditions, including drought, wind, and frost; toxic water; sunlight; moisture; or contact with vehicles, equipment, and tools and any other conditions that would damage or reduce the viability of the plants. Plants may be stored on the site in the Contractor's staging area provided a temporary fence is erected for plant protection. Shade, frost, and wind protection may be used if necessary to protect the health of the plants. Plants shall be maintained moist at all times before planting and shall be completely watered 1-hour or less before installation and shall be moist when installed.
- C. Handling: The Contractor shall ensure that the plants, planting supplies, and irrigation supplies are not damaged at any time. After acceptance by the Engineer, handling and storage of the plants and bulk materials delivered to the site shall become the responsibility of the Contractor. All irrigation supplies, including plastic pipe, shall be stored in a manner to prevent damage from sunlight, moisture, or contact with vehicles, equipment, or tools.

PART 2 PRODUCTS

2.1 INSPECTION OF TREES

- A. Trees shall be subject to inspection and approval at nursery or upon delivery for conformity to specification requirements as to quality, size, and variety.

2.2 PLANTING MATERIALS

- A. Top Soil.
 - 1. Top Soil shall be friable loam free from subsoil, roots, grass, excessive amount of weeds, stones and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4% and a maximum of 25% organic matter.
- B. Fertilizer
 - 1. Fertilizer shall be Biosol™ Mix, or equivalent organic fertilizer made from the fermentation of soybean meal, cottonseed meal, and sulfate of potash magnesia. Said mix shall be sterilized and free of weed seeds and shall be composed of 96% fungal and bacterial biomass and 4% water with an NPK value of 7:2:3.

C. Soil Amendment

1. Soil Amendment shall be nitrogen stabilized wood residual, organic compost, sawdust/manure mixture or accepted equal.

D. Trees

1. Trees shall be nursery stock of a 5 gallon container size. Trees shall be replaced in accordance with the approved CEQA document at a 2:1 ratio of the same species being removed. All plants supplied shall be healthy, shapely, well rooted, and of a size “standard for industry.” All plants are subject to approval by Engineer.

PART 3 EXECUTION

3.1 GENERAL

- A. Due to the scale of drawings, it is not possible to indicate exact location of plant materials. The Contractor shall carefully investigate the finished conditions affecting all of his work and plan his work accordingly to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems and architectural or engineering features. Contractor shall coordinate with the District for final placement of the trees.

3.2 SITE CONDITIONS

- A. Site Conditions. The contractor shall verify site conditions and be familiar with existing grade conditions, locations of existing features to be preserved, and all existing vegetation to remain. Field adjustments may be necessary to avoid disturbances to existing vegetation to remain. Before ordering materials or proceeding with work, the Contractor shall verify all dimensions and quantities between the Drawings, these Specifications and field conditions; any and all discrepancies shall be reported immediately to the Engineer.
- B. Field Adjustments. Field Adjustments necessary to accommodate or to minimize disturbances to existing site conditions shall be done at the Contractor’s expense. Work shall be postponed in any area of discrepancy with the Drawings or these Specifications until the Engineer has provided a written resolution to the conflict. The Contractor shall assume full responsibility for proceeding with work without written approval.
- C. Coordination. The Contractor shall coordinate the planting installation with the Owner to avoid conflicts with roads, utilities, other construction, and any existing features.
- D. Vandalism. Throughout the Contract period, the Contractor shall be responsible for the replacement or repair of any part of the plant installation that is damaged as a result of vandalism; the Contractor shall be responsible for securing the Project site to minimize negative effects from vandalism.

3.3 PREPARATION

- A. Protection of Existing Trees & Shrubs: Before beginning any work, Contractor shall guarantee

- protection of any existing plants to remain on or adjacent to the site.
- B. Grading and Drainage.
 - 1. Landscape Contractor shall be responsible for correct finished planting grades.
 - 2. Landscaping Contractor shall provide and spread adequate topsoil in all planting areas, where indicated.
 - 3. Loosen planting beds to a 6-inch minimum depth before adding topsoil and soil amendments.
 - 4. Final grading is to be approved by Engineer prior to planting.
 - C. Sequence of Operations. The planting operations shall be conducted according to the following sequence of operations:
 - 1. Flag tree locations, for the approval by the Owner,
 - 2. Excavate planting holes and apply soil amendment,
 - 3. Install trees in the prepared planting hole,
 - 4. Provide sufficient irrigation to each installed tree.

3.4 TREE INSTALLATION

- A. Set out all plants in the approximate locations. The Owner will make any adjustments in the final locations of the plants. Only after approval has been given shall the Contractor proceed with the planting.
- B. Any planting near water supply fixtures, transformers, etc., shall be located so as not to affect their operation.
- C. Do not permit heavy equipment to pass over underground utilities, heating and electrical conduits, and the like.
- D. Planting Pits. Planting pits shall be excavated as shown on the submitted Drawings and according to these Specifications. For 5 gallon container plantings, excavate a planting hole approximately 3 times the width and 1.5 times the depth of container. For all container sizes, plantings shall conform to the details included on the submitted Drawings. The planting pit sides shall be scarified before plant placement. Before plant installation, the planting pit shall be backfilled to approximately half the depth of the pit. The backfill shall then be tamped and watered to remove air pockets and reduce settling.
- E. Subsoil removal. Separate subgrade soils from the upper topsoil portions and remove from planting area during planting operations. Loosen subgrade in pits to a depth of 3 inches. Thoroughly scarify sides of all planting pits.
- F. Weed Removal. Before plant installation, weeds shall be removed within a 4-foot radius, minimum, of individual planting sites by mechanical or manual methods. At no time shall herbicides be used for weed control. At all times, native volunteer plants shall be preserved as directed by the Engineer.

- G. Trees shall be planted approximately in the center of their holes, root crown level with the surrounding grade. Roots shall be spread to rest in a natural growing position. All backfilled soil shall be pushed into the holes around roots and firmed sufficiently to force out all air pockets. Trees planted in planting areas shall have earth watering basins constructed at the base of the trees. During storage and planting, roots shall be protected from drying out at all times.
- H. Fertilizer. For each 5 gallon plant place 1 pound of planting fertilizer. At all times, planting fertilizer shall be applied according to manufacturer's specifications. Planting fertilizer shall be placed in the bottom of the hole and mixed with native soil used to back fill the bottom of the hole. At no time shall the plant roots come in direct contact with the planting fertilizer.
- I. Plants. At all times, plants shall be installed into soil that does not exceed field soil moisture capacity. The plant shall be placed in the planting pit and the backfill shall be completed, tamped, and watered. To place a container plant, remove the plant from the container with the rootball completely intact. Do not hold the plant by its stem or branch or in any way that may damage the plant. Scarify or roughen the sides and loosen the bottom of the root ball if roots are partially root bound. Insert the rootball in the planting hole without bending or damaging the roots. Set the plant plumb (i.e., upright) and brace in position until the backfill has been tamped solidly around the rootball. Add water to planting hole to allow for settling of the soil. Position the plant so that the root crown is set 1/2 inch above finish grade at the time of planting. Place the plant in the hole and back fill with excavated soil. Remove all plant containers offsite and recycle according to State and local regulations.
- J. Finish Grade. The planting hole shall be filled with moist, pulverized backfill. Backfill material shall make good contact with the rootball, leaving no air pockets. Planting pit filling shall be completed so that the root crown is covered with a maximum of 1/4 inch layer of backfill above finish grade. The Contractor shall be responsible for filling the planting pit to avoid settlement before plant placement. The Contractor shall add backfill, firmly packed in place to avoid air pockets, and adjust plants due to settlement as required.
- K. Watering Installed Plants. The Contractor shall be responsible for ensuring that the plants are watered before, during, and after the installation. Plants shall be thoroughly watered immediately after installation at individual plant locations. At no time shall water applied cause erosion or damage to the watering basin at each plant. At no time shall hoses be dragged in a manner that damages plants, irrigation bubbler systems, or watering basins.
- L. Mulching. Cover all unplanted areas in planting beds as indicated on Plans and Specifications. Bring mulch to within a few inches of each plant, allowing some uncovered area around the base of the plants.

3.5 CLEAN UP

- A. Daily Cleanup. Site cleanup shall occur on a daily basis. All garbage, construction debris, excess plants and dirt, other discarded materials, and extraneous equipment caused by or due to the Contractor shall be removed offsite at the Contractor's expense and in accordance with State and local regulations.
- B. Salvage. All materials designated to be salvaged shall be handled and removed with care. The

Contractor shall be responsible for salvaging, removing offsite, and recycling all plant containers and racks; at no time will the Owner or the Engineer be responsible for recycling plant containers and racks.

END OF SECTION

SECTION 33 05 17 - PRECAST CONCRETE VALVE VAULTS, VALVE BOXES, AND DROP INLETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Precast concrete valve vaults.
 - 2. Precast concrete valve boxes.
 - 3. Drop inlets
 - 4. Energy Dissipater

- B. Related Sections:
 - 1. Section 31 05 16 - Aggregates for Earthwork.
 - 2. Section 33 11 16 - Site Water Utility Distribution Piping.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Precast Concrete Valve Vaults:
 - 1. Basis of Measurement: Each.
 - 2. Basis of Payment: Includes excavation, valve vault, accessories, tests, and backfill, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

- B. Precast Concrete Valve Boxes:
 - 1. Basis of Measurement: Refer to Section 33 11 16. Precast Concrete Valve Boxes will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with precast concrete valve boxes shall be included in the contract price for related work.

Separate payment will not be made for excavation, valve box, accessories, test and backfill. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

- C. Drop Inlets:
 - 1. Basis of Measurement: Each.
 - 2. Basis of Payment: Include excavation, precast concrete box, accessories, tests, and backfill, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals and doing all work necessary to complete the work as specified.

- D. Energy Dissipater
 - 1. Basis of Measurement: Refer to Section 31 05 16. Energy Dissipater will not be measured separately for payment
 - 2. Basis of Payment: Includes supplying imported rock materials, stockpiling, fabric liner, installing to lines and elevations shown in the construction documents, which price will payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

A. ASTM International:

1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
2. ASTM A185/A185M - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A536 - Standard Specification for Ductile Iron Castings.
4. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
5. ASTM C33 - Standard Specification for Concrete Aggregates.
6. ASTM C150 - Standard Specification for Portland Cement.
7. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
8. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
9. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
10. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
11. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
12. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
13. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.
14. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
15. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
16. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
17. ASTM D4104 - Standard Test Method (Analytical Procedure) for Determining Transmissivity of Nonleaky Confined Aquifers by Overdamped Well Response to Instantaneous Change in Head (Slug Test)

1.4 DESIGN REQUIREMENTS

A. Design Criteria:

1. Watertight precast reinforced air-entrained concrete structures designed to ASTM C890 live loading and installation conditions, and manufactured to conform to ASTM C913.
2. Minimum 28-day Compressive Strength: 5,000 psi.
3. Honeycombed or retempered concrete is not permitted.

1.5 SUBMITTALS

- A. Shop Drawing: Indicate plan, location and inverts of connecting piping.
- B. Product Data: Submit data on valve vaults, valve boxes, and drop inlets.

- C. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from materials suppliers attesting that precast concrete valve vaults, valve boxes, and drop inlets provided meet or exceed ASTM Standards and specification requirements.
- D. Manufacturer's Installation Instructions: Submit special procedures for precast concrete valve vaults, valve boxes, and drop inlet installation.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with Humboldt County Department of Public Works Standards

1.7 DELIVERY, STORAGE AND HANDLING

- A. Transport and handle precast concrete units with equipment designed to protect units from damage.
- B. Do not place concrete units in position to cause overstress, warp or twist.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE VALVE VAULTS, VALVE BOXES AND DROP INLETS

- A. Manufacturers:
 - 1. Oldcastle Enclosure Solutions
 - 2. Jensen Precast
 - 3. Approve equal Substitutions
- B. Materials:
 - 1. Portland Cement: ASTM C150, Type II.
 - 2. Coarse Aggregates: ASTM C33; Graded 1 inch to No. 4 Sieve.
 - 3. Sand: ASTM C33; 2.35 fineness modulus.
 - 4. Water: Potable; clean and free of injurious amounts of acids, alkalis, salts, organic materials, and substances incompatible with concrete or steel.
 - 5. Air-Entraining Admixtures: ASTM C260.
 - 6. Reinforcing Steel:
 - a. Deformed Bars: Per Section 03 20 00 Concrete Reinforcement.
 - b. Welded Wire Fabric: ASTM A185/A185M.
 - 7. Joint Sealant:
 - a. ASTM C990.
- C. Mixes:
 - 1. Design concrete mix to produce required concrete strength, air-entrainment, watertight properties, and loading requirements.

- D. Valve Vault, Valve Box, and Drop Inlet Frames and Covers:
 - 1. Cast Iron Castings: ASTM A48/A48M, Class 30 or better; free of bubbles, sand and air holes, and other imperfections.
 - 2. Valve vaults shall be H-20 traffic load rated.

- E. Access Steps:
 - 1. Steel reinforced copolymer polypropylene meeting the following specifications:
 - a. ASTM C478.
 - b. ASTM C497, Method of test.
 - c. ASTM D4104, PP0344B33534Z02 copolymer polypropylene.
 - d. ASTM A615/A615M, Grade 60, 1/2" reinforced rod.
 - 2. Aluminum: ASTM B221, Alloy 6061-T6.

2.2 BEDDING MATERIALS

- A. Aggregate Bedding Material: Class 2 Aggregate Base in accordance with California Standard Specifications Section 26, latest version.

2.3 FABRICATION AND MANUFACTURE

- A. Fabricate precast reinforced concrete structures in accordance with ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify piping connection, size, location and inverts are as indicated on Drawings.

3.2 PREPARATION

- A. Ream pipe ends and remove burrs.
- B. Remove scale and dirt from components before assembly.
- C. Establish invert elevations for each component in system.
- D. Hand trim excavation to suit valve vaults, valve boxes, and drop inlets. Remove stones, roots or other obstructions.

3.3 FIELD QUALITY CONTROL

- A. Request inspection by Engineer prior to placing aggregate cover over piping.
- B. Compaction Testing: In accordance with **ASTM D1557** When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- C. Frequency of Tests: minimum 3 per lift of fill material.

END OF SECTION

SECTION 33 05 19 THRUST RESTRAINT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thrust restraints
- B. Related Requirements:
 - 1. Section 33 11 16 – Site Water Utility Distribution Piping
 - 2. Section 03 30 00 – Cast-in-Place Concrete: Concrete for thrust restraints

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Thrust Restraints
 - 1. Basis of Measurement: See Section 33 11 16. Thrust restraint will not be measured separately for payment.
 - 2. Basis of Payment: No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with thrust restraints shall be included in the contract price for related work.

Separate payment will not be made for concrete, formwork, and excavation. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM A36 – Standard Specification for Carbon Structural Steel
 - 2. ASTM A242 – Standard Specification for High-Strength Low-Alloy Structural Steel
 - 3. ASTM A536 – Standard Specification for Ductile Iron Castings
 - 4. ASTM A588 – Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance
- B. American Water Works Association (AWWA):
 - 1. AWWA C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - 2. AWWA C151 – Ductile-Iron Pipe, Centrifugally Cast
 - 3. AWWA C153 – Ductile-Iron Compact Fittings

1.4 SUBMITTALS

- A. When specified in the special specifications or required by the Engineer, shop drawings and manufacturer's literature shall be submitted to the Engineer for all materials and components.

1.5 QUALITY ASSURANCE

- A. Perform work according to AWWA standards.

PART 2 PRODUCTS

2.1 THRUST RESTRAINTS FOR WATER PIPING

- A. Ductile Iron Pipe: AWWA C151

Mechanically restrained joints shall be manufactured integrally with the pipe or provided as accessory mechanisms as described in this section.

Field welding of ductile iron pipe for joint restraint shall not be permitted. Cadwelds for corrosion protection are acceptable.

Mechanical joint retainer gland restraints for ductile iron pipe shall be designed to fit standard mechanical joint bells with standard "tee" head bolts conforming to ANSI/AWWA C111/A21.11 and AWWA C153. Glands shall be manufactured of ductile iron conforming to ASTM A36 grade 60-42-10. Set screws shall not be permitted. Mechanical joint restraint devices shall have a working pressure of at least 250 PSI with a minimum safety factor of 2:1.

Glands shall be provided with a restraining mechanism consisting of a sufficient number of individually set gripping surfaces which impart a wedging action against the pipe, increasing in resistance with increasing pressure. The gripping surfaces shall incorporate twist-off nuts to insure proper setting. Restraint mechanisms shall be installed in accordance with the manufacturer's recommendations.

- B. Polyvinyl Chloride Pipe (PVC)

Restraint harnesses shall consist of: a split ring that fits behind the bell; either a split or full restraint ring that installs on the spigot end; and tie bars or tee bolts which connect the two rings. The harness restraint may be split to enable installation after the pipe spigot has been installed into the bell. All components which comprise the restraint harness shall be manufactured of ductile iron conforming to the requirements of ASTM A536. Each ring shall have serrations on its full inside diameter (360°) or a sufficient number of individually adjusted gripping surfaces.

All clamping bolts, tie bars, tee bolts, nuts, and washers shall be manufactured of either 1) "Corten" high strength low-alloy structural weathering steel (or approved equal) in accordance with ASTM A242 or A588, or 2) 316 stainless steel with Xylan coated stainless steel nuts.

Provide restraint against thrust loads. Typically, external joint restraints employ individual external clamps that fit behind the bell and around the pipe, and tie rods between the clamps.

Thrust restraint utilizing Portland cement concrete thrust blocking shall be only for

modifications to existing pipe lines or as may be approved by the Engineer. Cement concrete thrust blocks shall comply with the requirements of Subsection 03 30 00.

C. High Density Polyethylene Pipe (HDPE)

Mechanical joints to polyethylene pipe are fully restrained against thrust load only if pressure and tensile tests cause the pipe to yield before the pipe and fitting disjoin. Mechanical joints that provide full thrust restraint are designed to mechanically compress the pipe OD against a rigid tube or stiffener in the pipe bore.

Insert fittings are pushed into the mating pipe bores, and use individual compression sleeves on the pipe OD's. Compression couplings fit over the pipe ends, and use individual insert stiffeners in the pipe bores.

- D. When joining plain end pipe to bell and spigot or mechanical-joint type fittings or pipe, an external joint restraint must be used to provide restraint against thrust loads. Typically, external joint restraints employ individual external clamps that fit behind the bell and around the pipe, and tie rods between the clamps.

PART 3 EXECUTION

3.1 GENERAL

The contractor shall provide and install thrust restraint at all points of directional change (i.e., fittings, valves, bends, tees, and plugs). All thrust restraint methods shall be installed prior to pressure testing. Wooden blocks, wedges, or other non-permanent techniques will not be permitted.

The length of pipe to be restrained shall be as indicated on the plans, shop drawings and as called for by manufacturer's requirements.

3.2 WORKMANSHIP

All personnel of the contractor shall be skilled and knowledgeable with regard to the installation procedures for the thrust restraint being installed.

3.3 PORTLAND CEMENT CONCRETE THRUST BLOCKS

The use of Portland cement concrete thrust blocks is not permissible except as shown on the plans or with the approval of the Engineer.

Portland cement concrete thrust blocks when approved, shall be placed against undisturbed earth. Where it is not practicable to place the concrete thrust block against undisturbed earth, the fill material placed between the pipe's bearing surface and the undisturbed soil shall be compacted to a minimum of 95% of the maximum density as determined in accordance with the requirements of Caltrans Standard Specifications.

END OF SECTION

SECTION 33 05 48 - VIBRATION AND SEISMIC CONTROLS FOR UTILITIES PIPING AND
EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seismic connections.

B. Related Requirements:

1. Section 03 30 00 - Cast-in-Place Concrete: Execution and product requirements for concrete for placement by this Section.
2. Section 33 11 16 - Site Water Utility Distribution Piping: Materials and methods for piping, valves, and appurtenances.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Flexible Expansion Joint and fittings:

1. Basis of Measurement: Each.
2. Basis of Payment: Includes coupling, fittings, and accessories, and pipe supports, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 SUBMITTALS

- A. Product Data: Submit schedule of vibration isolator type with location and load on each. Submit catalog information indicating materials and dimensional data.
- B. Manufacturer's Installation Instructions: Submit special procedures and setting dimensions.
- C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- D. Manufacturer Reports: Indicate sound isolation installation is complete and according to instructions.
- E. Qualifications Statement:
 1. Submit qualifications for manufacturer.

1.4 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 FLEXIBLE EXPANSION JOINTS

- A. Manufacturer List:
 - 1. EBAA Iron, Inc. Flex Tend Series 4408F20B
 - 2. Approved Equal Substitutions

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that equipment and piping is installed before Work of this Section is started.

3.2 INSTALLATION

- A. Adjust equipment level.
- B. Piping Connections:
 - 1. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height.
 - 2. When full load is applied, adjust isolators to load in order to allow shim removal.
- C. Horizontal Pipe Isolation:
 - 1. Provide restrained, closed-spring isolators for mounting of floor-supported piping.

3.3 FIELD QUALITY CONTROL

- A. Inspect isolated equipment after installation and submit report, including static deflections.

3.4 CLEANING

- A. Remove foreign objects that might bridge vibration isolators.

END OF SECTION

SECTION 33 11 16 - SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe and fittings for Site water line, including domestic water line and fire water line
2. Gate valves, altitude valves, ball valves, swing check valves, and butterfly valves.
3. Hydrants and yard hydrants.
4. Underground pipe markers.
5. Precast concrete vaults.
6. Valve boxes.
7. Bedding and cover materials.
8. Disinfection and Hydrostatic Testing

B. Related Sections:

1. Section 03 30 00 - Cast-in-Place Concrete: Concrete for thrust restraints.
2. Section 31 05 13 - Soils for Earthwork: Soils for backfill in trenches.
3. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill in trenches.
4. Section 31 23 17 - Trenching: Execution requirements for trenching.
5. Section 33 05 17 – Precast Concrete Valve Vaults, Valve Boxes, and Drop Inlets.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Pipe and Fittings:

1. Basis of Measurement: Linear foot, as measured on the surface from the center of fittings.
2. Basis of Payment: Includes hand-trimming, excavation, trenching, compaction, pipe and fittings and flexible couplings, elbows, bedding, cover, joint restraints, concrete thrust restraints, tracer wire, connection to tank piping, and connection to municipal utility water source, testing, and disinfection, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

B. Valves:

1. Basis of Measurement: Each
2. Basis of Payment: Includes gate valves, altitude valves, ball valves, swing check valves, and butterfly valves, riser pipe, valve box and covers, tracer wire, thrust restraint and all related fittings and accessories, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings.
2. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
3. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
4. ASME B16.47 – Large Diameter Steel Flanges: NPS 26 through NPS 60 Metric/Inch Standard

C. American Society of Sanitary Engineering:

1. ASSE 1012 - Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent.
2. ASSE 1013 - Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers.

D. ANSI

1. ANSI 16.5 – Pipe Flanges and Flanged Fittings

E. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.
2. ASTM A182 – Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
3. ASTM A350 – Standard Specification for Carbon and Low-Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components
4. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
5. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
6. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
7. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
8. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
9. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure Rated Pipe (SDR Series).
10. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
11. ASTM D2855 - Standard Practice for Making Solvent Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
12. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
13. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
14. ASTM D6938 - Standard Test Method for In Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth).

F. American Welding Society:

1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

G. American Water Works Association:

1. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast.
5. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
6. AWWA C502 - Dry-Barrel Fire Hydrants.
7. AWWA C504 - Rubber-Seated Butterfly Valves.
8. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.
9. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
10. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.
11. AWWA C606 - Grooved and Shouldered Joints.
12. AWWA C651-99 Standard for Disinfection of Water Mains
13. AWWA C652-02 Standard for Disinfection of Water Storage Facilities
14. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.
15. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.
16. AWWA C702 - Cold-Water Meters - Compound Type.
17. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
18. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.
19. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In.(13 mm) Through 3 In.(76 mm), for Water Service.
20. AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 63 In. (1,600 mm), for Water Distribution and Transmission.
21. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.
22. AWWA C653-97 Standard for Disinfection of Water Treatment Plants

H. Manufacturer's Standardization Society of the Valve and Fittings Industry:

1. MSS SP-60 - Connecting Flange Joint Between Tapping Sleeves and Tapping Valves.

I. Underwriters Laboratories Inc.:

1. UL 246 - Standard for Safety Hydrants for Fire-Protection Service.

1.4 SUBMITTALS

- A. Product Data: Submit data on pipe materials, pipe fittings, valves, and accessories.
- B. Contractor shall submit a plan for disinfection of the storage tank and piping..

1.5 QUALITY ASSURANCE

- A. Perform Work according to AWWA standards.

PART 2 PRODUCTS

2.1 WATER PIPING

A. Ductile Iron Pipe: AWWA C151

1. Fittings: Ductile iron, standard thickness.
2. Joints: AWWA C111, rubber gasket with rods.
3. Jackets: AWWA C105 polyethylene jacket and Double-layer, half-lapped, 10-mil polyethylene tape.

B. PVC Pipe:

1. AWWA C900 Class 165.
2. Fittings: AWWA C111, cast iron.
3. Joints: ASTM D3139 compression gasket ring.

2.2 FITTINGS AND FLEXIBLE COUPLINGS

A. Fittings.

1. Cast Iron and Ductile Iron Fittings.
Cast iron and ductile iron fittings shall meet the requirements of AWWA C110 and AWWA C153 for compact fittings. Working pressure for fitting 24 inches in diameter and larger shall be as indicated on the plans or in the special specifications.

The interior surface of cast iron and ductile iron fittings shall be cement-mortar lined and sealed by the manufacturer in accordance with AWWA C104.

All plugs and caps used for stubouts shall be tapped for a 2 inch national pipe thread.

Connection bolts and nuts for mechanical joint fittings shall be manufactured of carbon steel or approved equal in accordance with ASTM A242. For flanged fittings, connection bolts and washers shall be manufactured of 316 stainless steel and nuts shall be manufactured of 316 stainless steel with a Xylan coating or approved equal. No anti-seize compound shall be applied on flange bolts.

2. Polyvinyl Chloride (PVC) Pressure Fittings.
PVC pressure fittings shall conform to the requirements of with AWWA C907.

Restraining methods for PVC fittings shall be in accordance with Section 33 05 19. Restraining methods for HDPE shall be in accordance with Section 33 05 19.

Field welding of ductile iron fittings shall not be allowed.

B. Blind Flange

1. Rated for minimum 150 psi.
2. Should conform to ASTM A182 and A350, ASME B16.47 and B16.48, and ASME/ANSI B16.5 and B16.2.
3. Manufacturer List:
 - a. Coastal Precision Engineered Flanges
 - b. Texas Flange

c. Approved Equal Substitutions

C. Flexible Couplings.

Couplings shall meet the requirements of AWWA C219. Joint harnesses, if shown on the plans or specified in the special specifications, shall be in accordance with AWWA M11.

Center sleeves may be manufactured from carbon steel, stainless steel, or ductile iron unless otherwise specified on the plans, special specifications, or as directed by the Engineer.

Bolts and washers for couplings shall be manufactured of 316 stainless steel and nuts shall be manufactured of 316 stainless steel with a Xylan coating or approved equal. No anti-seize compound shall be applied on flanged bolts.

Nuts and bolts for couplings 2 inch in diameter and smaller shall be stainless steel or cadmium plated. Nuts and bolts for couplings larger than 2 inches in diameter shall be stainless steel 18-8 type 303.

The minimum working pressure of the coupling shall be the same as the working pressure of the pipeline to which the coupling is to be installed.

Interior and exterior coatings shall be applied by the manufacturer in accordance with AWWA C550 unless otherwise specified on the plans or in the special specifications. The minimum dry coating thickness shall be 12 mils unless the lining thickness is limited by the working tolerance of the coupling components.

2.3 GATE VALVES

A. Manufacturer List:

1. Clow Valve Co.
2. Muller Co.
3. Approved Equal Substitutions.

B. 3 in and Larger: AWWA C509, iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, flanged ends, control rod, and valve box.

C. Mark manufacturer's name and pressure rating on valve body.

D. Pressure Class.

Design pressure for resilient-seated gate valves shall be 200 psi for diameters up to 12 inches and 150 psi for valves 16 inches and larger. Valves for operating pressures other than the above shall be as specified on the plans or in the special specifications.

E. Component Parts.

Unless otherwise provided herein, component parts for resilient- seated gate valves shall be in accordance with AWWA C509 and C515. All components of resilient- seated valves shall be tested and certified by an approved testing laboratory located in the United States. All parts shall be readily available.

1. The valve manufacturer's name and valve model number, size, and year of manufacture shall be cast on the body.
2. The resilient seat shall be fastened to the gate by use of either mechanical, stainless steel fasteners, or vulcanizing methods in accordance with the requirements of ASTM D429 and the manufacturer's recommended procedures.
3. Resilient-seated gate valves shall be provided with a two inch square operating nut. When specified on the plans, a hand wheel shall be used. The direction to open the valve shall be to the left (e.g. counter clockwise). A direction indication for opening the valve shall be cast on the operating nut. Position indicators shall not be required unless specified on the plans or in the special specifications. Valves must have a minimum of 2 turns per inch of diameter.
4. All interior ferrous surfaces exposed to fluid flow, including the gate, shall be factory coated with a thermo-setting or fusion epoxy coating. The coating shall be safe for potable water systems in accordance with AWWA C550. The minimum coating thickness shall be 10 mils.
5. The wedge shall be manufactured of ductile iron and fully encapsulated in a molded EPDM resilient material resistant to heat, corrosion, hydrolysis, tuberculation, abrasion and bacteria and comply with ASTM D2000.
6. All exterior ferrous surfaces, including nuts and bolts, shall be field coated with a fast curing sealant from the approved materials list in Appendix A for this use. The application of the sealant shall be accordance with the manufacturer's recommendations. Nuts and bolts may be manufactured of ASTM type 304 or 316 stainless steel in lieu of being coated.
7. All internal parts shall be accessible for repair or replacement without removing the valve body from the pressure line. The stem shall be sealed by use of a minimum of two O- rings. The O-ring(s) shall be located above the stem collar. O-rings shall be replaceable under pressure with the valve in the open position.
8. The diameter of the internal passageway shall have a nominal inside dimension equal to the valve size or larger. The valve shall provide an unobstructed waterway in the full open position making the valve applicable for tapping applications.
9. Valve stem shall be a high strength, low zinc bronze, 40,000 psi yield strength, 70,000 psi tensile strength, with not less than ten percent elongation. Stem bronze shall conform to the requirements of Section 2 of AWWA C509.
10. Valve ends shall be mechanical joint, conforming to AWWA C110, unless otherwise specified in the Contract Documents. Connection bolts and nuts shall be manufactured of cor-ten steel or approved equal in accordance with ASTM A242.
11. Where specified in the Contract Document, valve ends shall be flanged in accordance with AWWA C110 for 125/150 lb flanges and ASME/ANSI B16.1 FOR 250/300 lb flanges. Connection bolts and washers shall be manufactured of 316 stainless steel and nuts shall be manufactured of 316 stainless steel with a Xylan coating or approved equal. No anti- seize compound shall be applied on flanged bolts.

2.4 ALTITUDE CONTROL VALVES

A. Manufacturer List:

1. Cla-Val
2. Substitutions: Not permitted.

B. 8-inch altitude control valve manufactured by Cla-Val, Model 210-01

C. Mark manufacturer's name and pressure rating on valve body.

2.5 SWING CHECK VALVES

A. Manufacturer List:

1. Milwaukee Valve Company.
2. Val-Matic Valve & Manufacturing Corp.
3. Approved equal substitutions

B. Mark manufacturer's name and pressure rating on valve body.

2.6 UNDERGROUND PIPE MARKERS

A. Manufacturer List:

1. Kolbi Pipe Marker Co.
2. Marking Services, Inc.
3. Seton Identification Products.
4. Approved Equal Substitutions

B. Plastic Ribbon Tape:

1. Bright colored, continuously printed.
2. Minimum 3 in wide by 4 mil thick.
3. Manufactured for direct burial service.

C. Trace Wire:

1. Electronic detection materials for non-conductive piping products.
2. Unshielded, 10 gage THWN-insulated copper wire.
3. Conductive tape.

2.7 DISINFECTANT

A. Disinfectant shall comply with the AWWA standard for the equipment being disinfected. Liquid chlorine shall not be used. Calcium hypochlorite tablets shall be non-sequestered. Calcium hypochlorite tablets/granules shall not be left in contact with metal pipes or valves.

2.8 MATERIALS

A. Bedding and Cover:

1. Bedding: Class 2 aggregate base in accordance with California Standard Specifications Section 26.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

3.2 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.
- D. Protect and support existing distribution piping and appurtenances as Work progresses.

3.3 BEDDING

- A. Form and place concrete for pipe thrust restraints at change of pipe direction. Place concrete to permit full access to pipe and pipe accessories.
- B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 8 in loose depth; compact to 90 percent.
- C. Backfill around sides and to top of pipe with cover fill, tamp in place, and compact to 90 percent.
- D. Maintain optimum moisture content of fill material to attain required compaction density.

3.4 INSTALLATION - PIPE

- A. Group piping with other Site piping work whenever practical.
- B. Install pipe to indicated elevation and to within tolerance of 0.10'.
- C. Install ductile iron piping and fittings according to AWWA C600.
- D. Install grooved and shouldered pipe joints according to AWWA C606.
- E. Route pipe in straight line.
- F. Install access fittings to permit disinfection of water system
- G. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- H. Establish elevations of buried piping with not less than 3 ft of cover.
- I. Install plastic ribbon tape continuous over top of pipe
- J. Install trace wire continuous over top of pipe

3.5 INSTALLATION – FITTINGS AND FLEXIBLE COUPLINGS

A. General.

Fittings, flexible couplings, and repair clamps shall be installed in accordance with the manufacturer's recommendations and AWWA C600, except as modified herein.

All fittings, valves, flexible couplings, and repair clamps which are to be buried shall be encased with 10 mil polyethylene in accordance with AWWA C105, Method C.

B. Workmanship.

The contractor shall provide personnel skilled and knowledgeable with regard to the installation procedures for the fittings, flexible couplings, and repair clamps as well as all incidental appurtenances being installed.

3.6 INSTALLATION – GATE VALVE

A. General.

Valves shall be installed in accordance with this section and the valve manufacturer's recommendations. All fittings, valves, flexible couplings and repair clamps shall be encased with a 10 mil polyethylene in accordance with AWWA C105 Method C.

B. Workmanship.

All personnel of the contractor or subcontractor shall be skilled and knowledgeable with regard to the installation procedures for the valves and appurtenances being installed.

C. Valves.

Prior to installation in the trench, valves 16" or larger shall be fully opened and closed by the contractor to check the operation to ensure that the valve fully seats. A record shall be made of the number of turns required to fully open or close the valve. This record shall be included on the as-built plans. The inside of the valve shall be thoroughly cleaned prior to valve installation.

3.7 INSTALLATION - VALVES

A. Set valves on solid bearing or compacted soil

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

3.8 DISINFECTION

A. Disinfection Of Water Mains

1. After all other work has been completed, hydrostatic pressure and leakage tests have been passed, and prior to placing in service, all water lines shall be completely disinfected in accordance with AWWA Standard C651.

2. The water main shall be flushed as thoroughly as possible using corporation cocks, drain valves or other suitable valves, acceptable to the Engineer prior to chlorination. However, if calcium hypochlorite tablets are attached to the pipe at the time of installation for purposes of sterilization, it will not be possible to flush the main prior to disinfection. It shall therefore be necessary to exercise extreme care to keep the pipe clean during installation. The number of calcium hypochlorite tablets used shall be in accordance with the following table, which is based on 6 to 8 tablets per ounce.

TABLETS REQUIRED PER PIPE LENGTH:

Length of Pipe	Section Pipe Diameter				
	4"	6"	8"	10"	12"
12' to 13'	2	2	3	4	6
16' to 20'	2	2	4	6	8

Prior to acceptance of the system by the Owner, all pressurized mains shall be thoroughly flushed and successfully tested for bacteriologic quality.

3. **Retention Period**
 Chlorinated water shall be retained in the tank and pipeline long enough to destroy all non-spore-forming bacteria. This period shall be at least 24 hours. After the sodium hypochlorite treated water has been retained for the required time, the chlorine residual at the pipe extremities and at the other representative points shall be at least 50 ppm.
4. **Chlorinating Valves**
 During the process of chlorinating the piping and pipelines, all valves and other appurtenances shall be operated while the pipeline is filled with the heavily chlorinated water.
5. **Final Flushing**
 Following chlorination, all treated water shall be thoroughly flushed from the pipes and pipelines until the replacement water shall, upon testing, both chemically and bacteriologically, be proven equal to the water quality at the point of supply. Chlorination shall be repeated, if necessary, by the Contractor at no additional cost to the Owner, if the replacement water does not prove equal to the water quality at the point of supply. The Contractor shall properly dispose of flush water in a manner that will not cause damage and nuisance to the environment. Contractor shall dechlorinate the flush water completely and discharge it to the nearest storm drain or drainage channel in a manner which shall not cause erosion or other environmental problems.

B. Disinfection Of Storage Tank
 Refer to Section 22 12 00.

C. Bacteriological Tests

After final flushing and before the water main is placed in service, tanks and water mains shall be sampled by the Owner and tested for coliform organisms and iron bacteria in accordance with “Standard Methods for the Examination of Water and Wastewater.”

1. Samples shall be collected by the Owner from the downhill end of the water main and from the sample tap of the storage tank. No hose or fire hydrant shall be used in collection of samples.
2. Test results shall show the absence of coliform organisms.
3. The Owner will conduct the laboratory tests at no cost to the Contractor. If the initial disinfection fails to produce satisfactory bacteriological samples, the Engineer shall evaluate the situation prior to directing the contractor to take any corrective actions.
4. The Contractor shall be responsible for any time delay and pay all costs incurred for retesting and any corrective actions taken.

3.9 FIELD QUALITY CONTROL

A. Pressure Test Storage Tank: Refer to Section 22 12 00.

B. Pressure test system according to AWWA C600 and the following:

1. Test Pressure: Not less than 200 psig or 50 psi in excess of maximum static pressure, whichever is greater.
2. Conduct hydrostatic test for at least two hours.
3. Fill section to be tested with water slowly; expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled. Raise pressure to specified test pressure.
4. Observe joints, fittings, and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.
5. Correct visible deficiencies and continue testing at same test pressure for additional two hours to determine leakage rate. Maintain pressure within plus or minus 5 psi of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.
6. Compute maximum allowable leakage by the following formula:

$L = SD \times \sqrt{P}/C$
L = testing allowance, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during hydrostatic test, in psig
C = 148,000
When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

7. When test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections, and retest until leakage is within allowable limits. Correct visible leaks regardless of quantity of leakage.

C. Compaction Testing for Bedding: According to ASTM D6938

- D. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.
- E. Frequency of Compaction Tests: minimum 3 per lift of fill material.

END OF SECTION

SECTION 33 41 00 - STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Storm drainage piping.
2. Bedding and cover materials.

B. Related Sections:

1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 31 05 13 - Soils for Earthwork: Soils for backfill in trenches.
3. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill in trenches.
4. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.
5. Section 33 05 17 - Precast Concrete Valve Vaults, Valve Boxes, and Drop Inlets

1.2 UNIT PRICE - BASIS OF MEASUREMENT

A. Storm Drain Pipe:

1. Basis of Measurement: By the linear foot
2. Basis of Payment: Includes excavating, bedding, pipe and fittings, granular cover, flared end section and connecting to existing drain piping, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the work as specified.

Separate payment will not be made for excavating, bedding, foundation pad, unit installation with accessories, and connecting to existing piping. Full compensation for all costs in connection with these items of the work shall be included in the contract price for related work.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:

1. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
2. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
3. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
4. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
5. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
6. ASTM C924 - Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.

7. ASTM C969 - Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
8. ASTM C1103 - Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
9. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
10. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
11. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
12. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
13. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
14. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
15. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
16. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
17. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
18. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
19. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

1.4 SUBMITTALS

- A. Product Data: Submit data indicating pipe, pipe accessories
- B. Manufacturer's Installation Instructions: Submit special procedures required to install Products specified.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents:
 1. Accurately record actual locations of pipe runs, connections, and invert elevations.
 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with Humboldt County Public Works.
- B. Maintain one copy of each document on site.

PART 2 PRODUCTS

2.1 STORM DRAINAGE PIPING

- A. Plastic Pipe: ASTM D3034, SDR 35 Poly (Vinyl Chloride) (PVC) material; inside nominal diameter of 6 inches, bell and spigot style rubber ring sealed gasket joint.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM F477, elastomeric gaskets.

2.2 BEDDING AND COVER MATERIALS

- A. Bedding: Class 2 Aggregate Base in accordance with California Standard Specifications Section 26.
- B. Cover: Class 2 Aggregate Base in accordance with California Standard Specifications Section 26.
- C. Backfill from Above Pipe to Finish Grade: Class 2 Aggregate Base in accordance with California Standard Specifications Section 26.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify trench cut excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with Class 2 Aggregate Base in accordance with California Standard Specifications Section 26.
- B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

- A. Excavate pipe trench as indicated in the drawings and these specifications. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 8 inches loose depth.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

- A. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.
- B. Lay pipe to slope gradients noted on drawings

- C. Install aggregate at sides and over top of pipe.
- D. Connect to existing site drainage system

3.5 INSTALLATION - CATCH BASINS AND CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Level top surface of base pad; sleeve concrete shaft sections to receive storm sewer pipe sections.
- C. Establish elevations and pipe inverts for inlets and outlets as indicated on Drawings.
- D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.6 FIELD QUALITY CONTROL

- A. Request inspection prior to placing aggregate cover over pipe.
- B. Compaction Testing: In accordance with ASTM D1557.
- C. When tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Compaction Tests: minimum 3 tests per lift of fill material
- E. Infiltration Test: Test in accordance with ASTM 969.

3.7 PROTECTION OF FINISHED WORK

- A. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
 - 1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.
 - 2. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION