



MARINA COAST WATER DISTRICT

ORD VILLAGE LIFT STATION AND FORCE MAIN REPLACEMENT PROJECT

CIP NO. OS-0147

December 2020

CONTRACT DOCUMENTS FOR
ORD VILLAGE LIFT STATION AND FORCE MAIN REPLACEMENT PROJECT

CIP NO. OS-0147

Marina Coast Water District
11 Reservation Road
Marina, California 93933

Board of Directors

Jan Shriner, President
Thomas P. Moore, Vice President
Herbert Cortez
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Matt Zefferman

Submitted  12/15/2020
Andrew A. Sterbenz, P.E.
Schaaf & Wheeler Consulting Civil Engineers



Approved 
Mike Wegley, P.E. – District Engineer

TABLE OF CONTENTS

ORD VILLAGE LIFT STATION & FORCE MAIN REPLACEMENT

Document	Title
00 01 01	Cover Page
00 01 07	Signature Page
00 01 10	Table of Contents

BIDDING INSTRUCTIONS

00 11 00	Invitation to Bidders
00 21 00	Instructions to Bidders

REQUIRED BID DOCUMENTS

00 41 00	Bid Form
00 43 00	Bid Bond
00 43 93	Bid Submittal Checklist
00 45 12	List of Project References
00 45 14	Designation of Subcontractors
00 45 18	Designation of Insurance Agent or Broker
00 45 20	Stop Notice Information
00 45 22	Non-Collusion Declaration
00 45 24	Prevailing Wage
00 45 26	Public Works Contractor Registration Certification
00 45 28	Local Hiring for Public Works
00 45 30	Iran Contracting Act Certification

CONTRACTING DOCUMENTS

00 52 00	Agreement
00 61 00	Performance Bond
00 61 50	Payment Bond
00 72 00	General Conditions
00 73 00	Supplementary Conditions

ADDENDA

00 91 01	Addenda No. 1
----------	---------------

LIST OF TECHNICAL SPECIFICATIONS

Section

Title

DIVISION 01 – GENERAL REQUIREMENTS

01 11 00	Summary of Work
01 14 00	Work Restrictions
01 20 00	Measurement and Payment
01 30 00	Contractor Submittals
01 41 00	Reference Standards
01 42 13	Abbreviations of Institutions
01 53 00	Protection of Existing Facilities
01 55 00	Site Access and Storage
01 56 00	Temporary Facilities and Controls
01 57 00	Traffic Regulation
01 57 20	Erosion and Sediment Control
01 60 00	Products, Materials, Equipment and Substitutions
01 17 13	Mobilization/Demobilization
01 71 23	Field Engineering
01 75 00	Start-Up, Testing and Training
01 77 00	Project Closeout
01 78 20	Operation and Maintenance Data

DIVISION 02 – EXISTING CONDITIONS

02 01 00	Existing Facilities
02 22 20	Abandonment of Pipelines
02 41 00	Demolition

DIVISION 03 - CONCRETE

03 10 00	Concrete Forming and Accessories
03 20 00	Concrete Reinforcing
03 30 00	Cast-In-Place Concrete
03 60 00	Grouts
03 63 00	Epoxies

DIVISION 04 – MASONRY (NOT USED)

DIVISION 05 – METALS

05 50 00	Metal Fabrications
----------	--------------------

DIVISION 06 – WOOD, PLASTICS AND COMPOSITES (NOT USED)

DIVISION 07 – THERMAL AND MOISTURE PROTECTION (NOT USED)

DIVISION 08 – OPENINGS (NOT USED)

DIVISION 09 – FINISHES

09 90 00	Painting and Coating
----------	----------------------

Section**Title****DIVISION 10 – SPECIALTIES (NOT USED)****DIVISION 11 – EQUIPMENT (NOT USED)****DIVISION 12 – FURNISHINGS (NOT USED)****DIVISION 13 – SPECIAL CONSTRUCTION (NOT USED)****DIVISION 14 – CONVEYING EQUIPMENT (NOT USED)****DIVISION 21 – FIRE SUPPRESSION (NOT USED)****DIVISION 22 – PLUMBING**

22 11 13 Copper and Brass Pipe, Fittings and Appurtenances

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING (NOT USED)**DIVISION 25 – INTEGRATED AUTOMATION (NOT USED)****DIVISION 26 – ELECTRICAL**

26 00 00 Electrical General Requirements

26 05 00 Basic Electrical Materials and Methods

26 05 13 Wire and Cable

26 05 26 Grounding and Bonding

26 05 33.01 Raceways

26 05 33.02 Boxes

26 05 53 Electrical Identification

26 06 20.13 Power Pedestals

26 09 00 Control Systems

26 29 23 Variable Frequency Drive

26 32 00 Emergency Power Systems

26 36 23 Automatic Transfer Switches

DIVISION 27 – COMMUNICATIONS (NOT USED)**DIVISION 28 – ELECTRONIC SAFETY AND SECURITY (NOT USED)****DIVISION 31 – EARTHWORK**

31 05 19.13 Geotextile

31 10 00 Clearing and Demolition

31 23 00 Trenching, Backfilling and Compacting

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 12 16 Asphalt Paving and Seals

32 31 13 Chain Link Fence

32 90 00 Planting

Section Title**DIVISION 33 – UTILITIES**

33 01 30.71	Manhole Rehabilitation
33 05 05.33	Leakage and Infiltration Testing
33 05 16	Precast Concrete Utility Vaults and Wet Well
33 05 61	Precast Concrete Manholes
33 05 62	Polymer Concrete Manholes
33 11 00	General Piping Requirements
33 11 13.15	Ductile Iron Pipe and Fittings
33 11 13.90	Thrust Restraints
33 12 16	Manual Valves
33 31 11	PVC Gravity Sewer Pipe and Fittings
33 31 23	Sanitary Sewer Force Main Pipe
33 32 20	Retrofit and Relocation of Submersible Non-Clog Pumps

DIVISION 34 – TRANSPORTATION (NOT USED)**DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION (NOT USED)****DIVISION 40 – PROCESS INTEGRATION**

40 92 13	Automatic Valves
----------	------------------

DIVISION 41 – MATERIAL PROCESSING AND HANDLING EQUIPMENT (NOT USED)**DIVISION 42 – PROCESS HEATING, COOLING, AND DRYING EQUIPMENT (NOT USED)****DIVISION 43 – PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT (NOT USED)****DIVISION 44 – POLLUTION AND WASTE CONTROL EQUIPMENT (NOT USED)****DIVISION 45 – INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT (NOT USED)****DIVISION 46 – WATER AND WASTEWATER EQUIPMENT (NOT USED)****DIVISION 48 – ELECTRICAL POWER GENERATION (NOT USED)****APPENDIX**

A	CEQA Initial Study and MMRP
B	Lead and Asbestos Survey Reports
C	Permits
D	PG&E Electrical Service Design

END OF DOCUMENT

**MARINA COAST WATER DISTRICT
MARINA, CA
CIP # OS-0147, ORD VILLAGE LIFT STATION AND FORCE MAIN REPLACEMENT**

INVITATION TO BIDDERS

Sealed Bids for the construction of the Ord Village Lift Station and Force Main Replacement will be received by the Marina Coast Water District (herein after referred to as MCWD), at 11 Reservation Road, Marina, CA 93933, until **2:00 p.m.** local time on **Thursday, January 28, 2021**, at which time the Bids received will be publicly opened and read. The Project consists of constructing a new sanitary sewer lift station, 3,600 LF of 10-inch PVC force main pipeline, 1,350 LF of gravity sewer pipeline, 10 sewer manholes, demolishing and removing the existing lift station and abandoning in-place the existing force main and gravity pipeline.

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: MCWD Engineering Office, 920 Second Avenue, Suite A,, Marina, CA 93933, point of contact: Don Wilcox, (831) 883-5935, dwilcox@mcwd.org.

Prospective Bidders may examine the Bidding Documents at the Issuing Office on Mondays through Thursdays between the hours of 8:00 a.m. to 5:00 p.m., and may obtain copies of the Bidding Documents online at www.mcwd.org.

Bidding Documents also may be examined at the Central Coast Builder's Exchange Plan Room, 242 E Romie Ln, Salinas, CA 93901 (831) 883-3933. Hard copies of the Bidding Documents are not available for purchase; the Bidding Documents are only available as a free download from the Issuing Office website at www.mcwd.org. 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.

A pre-bid conference will be held at **2:00 p.m.** local time on **Tuesday, January 12, 2021** via a video-teleconference. An addendum will be issued to the plan holder's list with the login credentials prior to the pre-bid conference. A site visit will be conducted at 1:00 p.m. on Wednesday, January 13, 2021 for areas not publicly accessible. Attendance at both the pre-bid conference and site visit are mandatory. A representative must be present for each portion of the pre-bid conference if the pre-bid conference includes a site visit.

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

The right is reserved, as the interest of MCWD may require, to reject any or all bids, to waive any informality in bids, and to accept or reject any items of the bid. If the Contractor's bid is accepted, the MCWD will execute the Contract as governed by Public Contract Code 22030 through 22045. The award of the contract, if it is to be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made within **60** days after the bid opening, unless an extension is agreed to by the lowest responsible bidder.

The bidder and any of his subcontractors must be licensed as a Class A General Engineering Contractor with the Contractors State License Board of the State of California Department of Consumer Affairs. Bids will not be considered from contractors not licensed as a Class A General Engineering Contractor unless they hold a specialty license for the specific classification(s) to be performed.

To be qualified to bid on, be listed in a bid proposal or engage in the performance of any public work contract subject to Labor Code section 1720, contractors and subcontractors must be registered with the Department of Industrial Relations. Please see <http://www.dir.ca.gov/Public->

[Works/PublicWorks.html](#) for more information. No contract will be entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. If awarded a contract, the bidder and its subcontractors, of any tier, shall maintain active registration with the Department of Industrial Relations for the duration of the project.

Public Works projects exceeding \$1,000.00 require the payment of the general prevailing rate of per diem wages, copies of which are on file at the State of California, Department of Consumer Affairs Office. (Labor Code 1770, et seq.).

The MCWD contact person assigned to this project is: Don Wilcox. All inquiries regarding the project shall be directed to MCWD at (831) 883-5935 (phone), (831) 384-0197 (fax), or dwilcox@mcwd.org (e-mail). Requests for information will be received in writing until **5:00 p.m. on January 20, 2021**.

Owner: **Marina Coast Water District**

By: **Michael Wegley, PE**

Title: **District Engineer**

Date: **12/15/2020**

+ + END OF INVITATION TO BIDDERS + +

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	4
ARTICLE 9 – Contract Times	5
ARTICLE 10 – Liquidated Damages.....	5
ARTICLE 11 – Substitute and “Or-Equal” Items.....	5
ARTICLE 12 – Subcontractors and Others	5
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.....	10
ARTICLE 21 – Signing of Agreement.....	10
ARTICLE 22 – Sales and Use Taxes (NOT USED)	11
ARTICLE 23 – Retainage	11
ARTICLE 24 – Prevailing Wage	11

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, which is the MCWD Engineering Office, 920 Second Avenue, Suite A, Marina, CA 93933.

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 (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

- A. Evidence of Bidder's authority to do business in the state where the Project is located.
B. Bidder's state or other contractor license number, if applicable.
C. References for other completed projects of similar scope.

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.
B. Easements for new facilities are as shown on the Drawings.

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.
- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent 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 conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.
- B. Existing pump station is accessed through Fort Ord Dunes State Park. Coordinate with Owner for access through locked gates.
- C. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- D. 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.

- E. 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.
- F. 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 Owner 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 calendar 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 10% (ten percent) 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, or the dates by which the Work is to be substantially completed, and 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 AND OTHERS

- 12.01 A Bidder shall be prepared to retain specific Subcontractors 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 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 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 qualifications information for the Subcontractors proposed for the following portions of the Work: pipeline grouting, manhole rehabilitation and coating, restoration planting.

If requested by Owner, such qualifications information shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor 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 or other individuals or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, 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 partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership's address for receiving notices shall be shown.

13.04 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 firm's address for receiving notices shall be shown.

13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.

13.06 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 joint venture's address for receiving notices shall be shown.

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

- 13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.10 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 Base Bid with Alternates

- A. Bidders shall submit a Bid on a lump sum basis for the total base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.
- B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

14.02 *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.

14.03 *Allowances*

- A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.
- B. If the Owner includes reimbursement allowances, the allowance value will be pre-entered in the Bid Form.

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 Marina Coast Water District, 11 Reservation Road, Marina, CA 93933, ATTN: District Engineer.
- 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 proposed for those portions of the Work for which the identity of Subcontractors 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.

19.06 Bid Protests

- A. Any bid protest must be in writing and received by District's District Engineer at 11 Reservation Road Marina CA 93933 at or before 4:00 p.m. (California time) two (2) working days after bid opening (the "Bid Protest Deadline") and must comply with the following requirements:
- B. General. Only a bidder who has actually submitted a bid is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder but must timely pursue its own protest. For purposes of this Section 1.1, a "working day" means a day that District is open for normal business, and excludes weekends and holidays observed by District. Any untimely protest or protest submitted without the requisite bid protest fee will be returned to the protestor without further action.
- C. Non-refundable Bid Protest Fee. The protesting bidder must submit the following non-refundable fee via cashier's check made payable to "Marina Coast Water District" to reimburse its costs to administer the bid protest:
 - 1. Five Hundred Dollars (\$500), where the protesting bidder's bid is less than \$1,000,000;
 - 2. One Thousand Dollars (\$1,000), where the protesting bidder's bid is \$1,000,000 or more but less than \$5,000,000;
 - 3. Two Thousand Dollars (\$2,000), where the protesting bidder's bid is \$5,000,000 or more.

This applicable fee must be submitted to District no later than the Bid Protest Deadline, unless otherwise specified in the District's bid solicitation documents. Failure to make timely payment shall result in the bid protest being rejected as being incomplete.

- D. Protest Contents. The bid protest must state (a) all of the specific grounds for the protest, (b) the specific facts that support each ground, including but not limited to the specific provision(s) of the bid solicitation documents and the specific portion

- on the face of the bid being protested that are the basis of the protest, and (c) must provide all supporting documentation. Additional grounds and supporting facts for the bid protest and documentation submitted after the Bid Protest Deadline will not be considered. The protest must include the name, address, email address, and telephone number of the person representing the protesting bidder. The protest must be signed and submitted under penalty of perjury.
- E. Copy to Protested Bidder. The protesting bidder must be concurrently transmitted by fax or by email or by personal delivery by or before the Bid Protest Deadline, a copy of the protest and all supporting documentation to the bidder whose bid is being protested ("protested bidder") and to any other bidder who has a lower bid than the protesting bidder.
- F. Response to Protest. The protested bidder may submit a written response to the protest, provided the response is received by District at or before 4:00 p.m., within two working days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must include all supporting documentation. Documentation submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person representing the protested bidder. The response must be signed and submitted under penalty of perjury.
- G. Copy to Protesting Bidder. A copy of the response and all supporting documents must be concurrently transmitted by fax or by email or by personal delivery, by or before the Response Deadline, to the protesting bidder and any other bidder who has a lower bid than the protesting bidder.
- H. Exclusive Remedy. The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest. A bidder's failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing a claim pursuant to the California Government Code or initiation of any other legal proceedings.
- I. Right to Award. The District Engineer will review the bid protest for completion within a reasonable amount of time prior to the bid award. The District has the authority to issue a final determination on all bid protests. Possible actions by the District on any bid protest include (a) upholding the protest and awarding the bid to the next lowest responsible bidder, (b) rejecting the protest and awarding to the lowest responsible bidder, or (c) rejecting all bids. Nothing in this section shall be construed as a waiver of the District's right to reject all bids.

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 – SALES AND USE TAXES (NOT USED)

ARTICLE 23 – RETAINAGE

23.01 Provisions concerning Contractor's rights to deposit securities in lieu of retainage are set forth in the Supplemental Conditions.

ARTICLE 24 – PREVAILING WAGE

24.01 Prevailing wage requirements are set forth in the Supplementary Conditions.

END OF DOCUMENT

BID FORM

ORD VILLAGE LIFT STATION & FORCE MAIN RPLACEMENT

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.....	4
ARTICLE 7 – Attachments to this Bid.....	4
ARTICLE 8 – Defined Terms.....	4
ARTICLE 9 – Bid Submittal	4

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Marina Coast Water District

11 Reservation Road

Marina, CA 93933

ATTN: District Engineer

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):

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	Mobilization/Demobilization	LS	1		
2	Sheeting, Shoring and Bracing	LS	1		
3	Traffic Control	LS	1		
4	Lift Station – Civil	LS	1		
5	Lift Station – Electrical	LS	1		
6	Retrofit and Relocate Existing Pumps	LS	1		
7	Relocate Generator	LS	1		
8	10-inch C900 Force Main	LF	3,920		
9	12-inch Gravity Sewer	LF	1,090		
10	10-inch Gravity Sewer	LF	240		
11	2-inch ARV with Vault	LS	1		
12	Service Lateral Tie-In to new Sanitary Sewer	EA	8		
13	Pre-Cast Concrete Manhole	EA	7		
14	Cast-Around Concrete Manhole	EA	1		
15	Rehabilitate Existing Manholes	EA	5		
16	Abandon Existing Manholes	EA	6		
17	Flush and Abandon Existing Pipelines	LS	1		
18	Demolish Existing Lift Station	LS	1		
19	SCADA Integration Allowance	ALW	1	\$30,000	\$30,000
20	Permit Allowance	ALW	1	\$25,000	\$25,000
21	Remediation Allowance	ALW	1	\$50,000	\$50,000
Total of All Unit Price Bid Items					\$

ALW=Allowance, CF=Cubic Foot, CY=Cubic Yard, DY=Day, HR=Hour, LF=Linear Foot, LS=Lump Sum, SF=Square Foot, SY=Square Yard

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 \$ _____

5.02 Alternate Bid Item(s):

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
A1	Polymer Concrete Wet Well	LS	1		
A2	Polymer Concrete Manholes	LS	1		

Total of Alternate Item Bid Prices: \$ _____

Base Bid Price: \$ _____

Total of Base Bid Plus Alternate Items \$ _____

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 items listed in Document 00 43 93, Bid Submittal checklist, are submitted with and made a condition of this Bid.

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 Contractor

License No.: _____

(where applicable)

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*):

Marina Coast Water District
11 Reservation Road
Marina, CA 93933

BID

Bid Due Date:

Description: Ord Village Lift Station & Force Main Replacement, Seaside, Monterey County, CA

BOND

Bond Number:

Date:

Penal sum

_____ \$ _____
(10% (ten percent) of the Total Bid Value, in 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.

BID SUBMITTAL CHECKLIST

All information required by the terms of the Bid Documents must be furnished. Important items to be submitted are including, but not limited to, those listed below:

ARTICLE 1 - SUBMIT WITH BID

	Form Number	Form Name
<input type="checkbox"/>	00 41 00	Bid Form
<input type="checkbox"/>	No form included	Certificate of Contractor's License
<input type="checkbox"/>	00 43 00	Bid Bond (or Bid Security)
<input type="checkbox"/>	00 43 93	Bid Submittal Checklist (this page)
<input type="checkbox"/>	00 45 12	List of Project References
<input type="checkbox"/>	00 45 14	Designation of Subcontractors
<input type="checkbox"/>	00 45 18	Designation of Insurance Agent or Broker
<input type="checkbox"/>	00 45 20	Stop Notice Information
<input type="checkbox"/>	00 45 22	Non-Collusion Statement
<input type="checkbox"/>	00 45 24	Prevailing Wage Statement
<input type="checkbox"/>	00 45 26	Public Works Contractor Registration Certification
<input type="checkbox"/>	00 45 28	Local Hiring for Public Works
<input type="checkbox"/>	00 45 30	Iran Contracting Act Certification

ARTICLE 2 – SUBMIT PRIOR TO OWNER'S EXECUTION OF CONTRACT (After Notice of Award)

<input type="checkbox"/>	00 52 00	Agreement
<input type="checkbox"/>	00 61 00	Performance Bond
<input type="checkbox"/>	00 61 50	Payment Bond
<input type="checkbox"/>	No form included	Insurance Certificates

END OF DOCUMENT

LIST OF PROJECT REFERENCES

ORD VILLAGE LIFT STATION & FORCE MAIN REPLACEMENT

SUBMIT WITH BID

The Bidder shall provide three projects that they have successfully completed in the last ten years of like nature and equaling \$3,500,000 in total value. The Bidder shall provide the project name, owner representative and phone number. The projects listed shall be of similar scope and type as the project identified in this document.

	Project Name	Owner Representative	Owner Phone # & e-mail	Contract Amount
1				
2				
3				

END OF DOCUMENT

DESIGNATION OF SUBCONTRACTORS

ORD VILLAGE LIFT STATION & FORCE MAIN REPLACEMENT

SUBMIT WITH BID

In compliance with the provisions of Sections 4100-4113 of the Public Contract Code of the State of California, and any amendments thereof, and, if applicable, with the requirements of County relating to projects for the construction, improvement or repair of Public Works, the undersigned bidder has set forth below the name and location of the place of business of each subcontractor who will perform work or labor or render service to the undersigned in or about the construction of the work, and each subcontractor who, under subcontract, will specially fabricate and install a portion of the work or improvement according to detailed drawings contained in the plans and specifications, for such work to be performed under the Contract Documents to which the attached bid is responsive, and the portion of the work which will be done by each subcontractor and for each subcontract in excess of one half of one percent of the undersigned's total aggregate bid.

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Name of SUBCONTRACTOR: _____

Division of Work: _____ Phone: _____

Location (address, city, zip): _____

Contractor License No.: _____ DIR Number: _____

Attach additional sheets, as needed.

COMPANY NAME: _____

By: _____

Bidder's Signature

Date: _____

END OF DOCUMENT

DESIGNATION OF INSURANCE AGENT OR BROKER

ORD VILLAGE LIFT STATION & FORCE MAIN REPLACEMENT

SUBMIT WITH BID

It is proposed that the following insurance agent/broker and insurance company will provide policies of insurance or insurance certificates as required by the bid documents.

Insurance Agent or Broker: _____

Street: _____

City, State and Zip: _____

Telephone: _____

Name of Insurance Company
Providing Coverage _____

Best's Key Rating Guide of at least A VII? Yes _____ No _____

It is proposed that the following bonding agent or surety will provide payment and performance bonds as required by the bid documents.

Bonding Agent or Broker: _____

Street: _____

City, State and Zip: _____

Telephone: _____

Name of Surety Company
Providing Bonds: _____

1. Admitted in California? Yes _____ NO _____

OR

Current Treasury Listed Surety (Federal Register)? Yes _____ NO _____

AND

Current A.M. Best BBB or better rating Yes _____ NO _____

OR

2. (in lieu of 1)

An admitted surety insurer which complies with the provisions of the code of Civil Procedure, Section 995.660*.

California Code of Civil Procedure Section 995.660 in summary, states that an admitted surety must provide 1) the original, or a certified copy of instrument authorizing the person who executed the bond to do so; 2) a certified copy of the Certificate of Authority issued by the Insurance Commissioner, 3) a certificate from county Clerk of Monterey County that Certificate of Authority has not been surrendered, revoked, canceled, annulled or suspended; 4) a financial statement showing the assets and liabilities of the insurer at the end of the quarter calendar year, prior to 30 days next preceding the date of the execution of the bond.

OR

- 3. In lieu of 1 and 2, a company of equal financial size and stability that is approved by the MCWD Insurance/Risk Manager.

By signing below, the bidder certifies that:

The above comply with the MCWD standards for liability insurers and sureties pursuant to Article 6 of the General and Supplementary Conditions: Yes _____ NO _____. If "No", your bid is subject to rejection.

COMPANY NAME: _____

BY: _____
(Bidder's signature)

DATE: _____

END OF DOCUMENT

STOP NOTICE INFORMATION

SUBMIT WITH BID

PROJECT NAME: ORD VILLAGE LIFT STATION & FORCE MAIN REPLACEMENT

CONTRACTOR’S NAME AND ADDRESS: _____

Reference: California Civil Code, Division 3, Part 4, Title 15, Chapter 4

The following is provided for the information of contractors, subcontractors and suppliers of labor, materials, equipment, and services under MCWD contracts, and is not intended as legal advice. Advice of legal counsel should be obtained to ensure compliance with legal requirements relating to public works stop notices.

WHERE TO FILE: All original stop notices and preliminary-20 day notices (if required by California Civil Code 53098) must be filed with the Marina Coast Water District, 11 Reservation Road, Marina, CA 93933.

STOP NOTICE CONTENTS: See California Civil Code 3103. written notice, signed and verified by the claimant and including information such as the kind of labor, equipment, materials or service furnished or agreed to be furnished by the claimant; the name of the person/entity to or for whom the same was done or furnished; the amount in value of that already done or furnished and/or agreed to be done or furnished. Blank stop Notice forms are commercially available.

WHO MAY SERVE STOP NOTICE: See California Code 53181. All persons furnishing labor, materials, equipment or services to the job (except the original contractor) and persons furnishing provisions, provender or other supplies.

HOW THE STOP NOTICE IS SERVED: See California Code S3103. Served by personal service, registered mail, or certified mail.

TIME FOR SERVICE: See California Civil Code 3184. Stop notices must be served before the expiration of 30 days after the recording of a Notice of Completion (sometimes referred to as a Notice of Acceptance) or Notice of Cessation, if such notice is recorded or if no Notice of Completion or Notice of Cessation is recorded, 90 days after actual completion or cessation.

NOTICE OF PUBLIC ENTITY (OWNER): See California Civil Code 3185. Provided that a stop notice claimant has paid to the Clerk of the Board of Supervisors the sum of \$2.00 at the time of filing a stop notice, the Clerk shall provide each stop notice claimant with notice of filing of a Notice of

Completion or after the cessation of labor has been deemed a completion of a public work or after the acceptance of completion, whichever is later, to each stop notice claimant, by personal service or registered or certified mail.

RELEASE OF STOP NOTICE: See California Civil Code 3196 and following. A stop notice can be released if the original contractor files a corporate surety bond with the Clerk of the Board of Supervisors, in the amount of 125% of the stop notice claim. Alternatively, the original contractor may file an affidavit pursuant to California Civil Code S3198, stating objections to the validity of the stop notice. A counter affidavit may be filed by the claimant pursuant to 53200 and a summary legal proceeding may be held pursuant to 3201 and following, to determine the validity of the stop notice. If no counter affidavit is filed, the stop notice funds shall be released. Alternatively, the Stop Notice claimant may file a Release in a form which substantially complies with California Civil Code 3262.

STOP NOTICE LAWSUIT: See California Civil Code 53210 through 3214. These sections provide that a stop notice is perfected only by the filing of a lawsuit. A lawsuit must be filed no sooner than 10 days after service of a stop notice and no later than 90 days after the expiration of the time for filing stop notices. Notice of suit must be given to the Clerk of the Board within 5 days after commencement. The Court has the discretionary right to dismiss the lawsuit if it is not brought to trail within two years.

I HEREBY ACKNOWLEDGE THAT I RECEIVED AND READ THE ABOVE STOP NOTICE INFORMATION AND IF I AM AWARDED THIS CONTRACT, I AGREE TO INCLUDE A COPY OF THIS PAGE IN ALL SUBCONTRACTS AND CONTRACTS FOR LABOR, MATERIALS, EQUIPMENT, AND SERVICES THAT I ENTER INTO FOR THIS PROJECT:

Bidder's Signature: _____

Bidder's Name and Title (Print): _____

Date: _____

END OF DOCUMENT

NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER

ORD VILLAGE LIFT STATION & FORCE MAIN REPLACEMENT

SUBMIT WITH BID

I, _____, am the
(name)

_____ of _____,
(Position Title) (Company)

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

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct:

Signature

Date

END OF DOCUMENT

PREVAILING WAGE STATEMENT

SUBMIT WITH BID

If awarded the contract, we and our subcontractors shall pay all the workers we assign to the project not less than the prevailing wage as determined by the state of California, Director of Industrial Relations in compliance with Article 7 of the Supplementary Conditions. We are aware that the contractor shall be penalized for non-compliance by either the contractor or his subcontractor(s).

In addition, we are informed of the following:

Copies of the prevailing wage rates are on file at:

Marina Coast Water District
11 Reservation Road
Marina, CA 93933

or

State of California Department of Industrial Relations
Division of Labor Statistics and Research
455 Golden Gate Avenue, 10th Floor
San Francisco, CA 94104
(415) 703-4774

On-line at <https://www.dir.ca.gov/oprl/DPreWageDetermination.htm>

The successful bidder shall be required to post the prevailing wage determinations at each job site.

Each contractor and subcontractor shall keep accurate payroll records showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per them wages paid to each journeyman, apprentice, worker or other employee employed by him or her in connection the public work.

Certified copies of such payroll records must be furnished to the State Department of Industrial Relations electronically. Certified copies of such payroll records must be furnished to the Marina Coast Water District upon request.

By signing below, the bidder certifies that he shall comply with the prevailing wage laws.

Company Name: _____

Bidder's Signature: _____

Date: _____

END OF DOCUMENT

PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

SUBMIT WITH BID

Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. See <http://www.dir.ca.gov/Public-Works/PublicWorks.html> for additional information.

No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. List subcontractors on Document 00 45 14.

Bidder hereby certifies that it is aware of the registration requirements set forth in Labor Code sections 1725.5 and 1771.1 and the bidder and all bidder's subcontractors are currently registered as a contractor with the Department of Industrial Relations.

Name of Bidder: _____

DIR Registration Number: _____

Bidder further acknowledges:

1. Bidder shall maintain a current DIR registration for the duration of the project.
2. Bidder shall include the requirements of Labor Code sections 1725.5 and 1771.1 in its contract with subcontractors and ensure that all subcontractors are registered at the time of bid opening and maintain registration status for the duration of the project.
3. Failure to submit this form or comply with any of the above requirements may result in a finding that the bid is non-responsive.

Bidder's Signature: _____

Bidder's Name and Title: _____

Firm: _____

Date: _____

END OF DOCUMENT

LOCAL HIRING FOR PUBLIC WORKS

SUBMIT WITH BID

This contract is for a Marina Coast Water District public works project. All Contractors and Subcontractors are required to comply with all of the provisions of Ordinance 53 Local Hiring (Chapter 2.10 of the District Code). Failure to comply with the local hiring ordinance may subject the Contractor herein with disqualification from any future Marina Coast Water District public works contracts.

The Bidder hereby certifies that (initial as applicable):

_____ Bidder has read Ordinance 53, Local Hiring for District Public Works, and

_____ Bidder can meet the local hiring requirements of Ordinance 53, or

_____ Bidder has made a good faith effort to meet the requirements of Ordinance 53 as documented on the attached pages, and anticipates a total of _____ percent of the workforce will be residents of the Monterey Bay Area, or

_____ Bidder requires an exception because a suitable pool of persons does not exist locally for the specialized skills listed below. These workers will constitute _____ percent of the workforce.

Specialized Skill	No. of Workers	County of Residence

Company Name: _____

Contractor's Signature: _____

Date: _____

Efforts to Hire Employees (submit only if needed)

Classification	Agency Contacted	Date	Results

Efforts to Hire Subcontractors (submit only if needed)

Work Item	Company Contacted	Date	Results*

* Standard codes: DNR-did not respond, NA-not available for job, NB-not bidding, USED-included in bid, HIGH-selected lower cost bid

END OF DOCUMENT

IRAN CONTRACTING ACT CERTIFICATION

SUBMIT WITH BID

Reference: Public Contract Code Section 2200 et seq.

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

The Contractor is not:

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

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

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

The amount of the Contract payable to the Contractor for the Project does not exceed \$1,000,000.

Bidder's Signature: _____

Bidder's Name and Title: _____

Firm: _____

Date: _____

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

END OF DOCUMENT

**AGREEMENT
BETWEEN MARINA COAST WATER DISTRICT
AND [CONTRACTOR]
FOR ORD VILLAGE LIFT STATION & FORCE MAIN REPLACEMENT
CIP # OS-0147**

THIS AGREEMENT is by and between Marina Coast Water 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: Ord Village Lift Station & Force Main Replacement

ARTICLE 3 – ENGINEER

3.01 The part of the Project that pertains to the Work has been designed by Schaaf & Wheeler, Consulting Civil Engineers, 3 Quail Run Circle, Suite 101, Salinas, CA 93933.

3.02 The Owner has retained Schaaf & Wheeler (“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 335 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 365 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 \$1,500 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 Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$1,500 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.

4.04 *Special Damages*

- A. In addition to the amount provided for liquidated damages, Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.
- B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents 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):

Unit Price Work					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
1	Mobilization/Demobilization	LS	1		
2	Sheeting, Shoring and Bracing	LS	1		
3	Traffic Control	LS	1		

Unit Price Work					
Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
4	Lift Station – Civil	LS	1		
5	Lift Station – Electrical	LS	1		
6	Retrofit and Relocate Existing Pumps	LS	1		
7	Relocate Generator	LS	1		
8	10-inch C900 Force Main	LF	3,600		
9	12-inch Gravity Sewer	LF	610		
10	10-inch Gravity Sewer	LF	380		
11	8-inch Gravity Sewer	LF	360		
12	Service Lateral Tie-In to new Sanitary Sewer	EA	8		
13	Pre-Cast Concrete Manhole	EA	7		
14	Cast-Around Concrete Manhole	EA	3		
15	Epoxy Line Existing Manholes	LS	1		
16	Abandon Existing Manholes	EA	5		
17	Flush and Abandon Existing Pipelines	LS	1		
18	Demolish Existing Lift Station	LS	1		
19	SCADA Integration Allowance	ALW	1	\$25,000	\$25,000
20	Permit Allowance	ALW	1	\$25,000	\$25,000
21	Remediation Allowance	ALW	1	\$50,000	\$50,000
A1	Polymer Concrete Wet Well	LS	1		
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					\$

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.

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 30th 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. 95 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. 0 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 95 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 5 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.
 - 2. Performance bond.
 - 3. Payment bond.
 - 4. General Conditions.
 - 5. Supplementary Conditions.
 - 6. Specifications as listed in the table of contents of the Project Manual.
 - 7. Drawings (not attached but incorporated by reference).
 - 8. Addenda (numbers 1 to , inclusive).
 - 9. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (Document 00 41 00).
 - b. Contractor's Representations (Documents 00 45 12 to 00 45 30, as included in the Bid)

-
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.
 11. The Standard Plans and Specifications of the Marina Coast Water District, dated November 2007 (not attached but incorporated by reference).
- 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 anything 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 the General Conditions that are made a part of this Contract are the EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, with modifications made solely in the Supplementary Conditions.

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

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

OWNER:

CONTRACTOR:

By: _____

By: _____

Title: General Manager

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:

Marina Coast Water District

11 Reservation Road

Marina, CA 93933

License No.: _____

(where applicable)

PERFORMANCE BOND

CONTRACTOR *(name and address):*

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

OWNER *(name and address):*

Marina Coast Water District
11 Reservation Road, Marina, CA 93933

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):* Ord Village Lift Station & Force Main Replacement, Seaside, CA

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

_____ *(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 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):*

Marina Coast Water District
11 Reservation Road, Marina, CA 93933

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):* Ord Village Lift Station & Force Main Replacement, Seaside, CA

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;
 - 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.
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
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:

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STANDARD GENERAL CONDITIONS
OF THE CONSTRUCTION CONTRACT**

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**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. §§5101 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.

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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.

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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.

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- 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.

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- 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.I 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).

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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.

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- 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.

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- 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 for whom the Owner is responsible 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 11.04.C.2.a and 11.04.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.

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- 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 WORK14.01 *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 additional 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:

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- 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

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- 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
TABLE OF CONTENTS

	Page
I. General	1
II. Specific Items	1
SC- 1.01 Defined Terms	1
SC- 2.02 Copies of Documents	1
SC- 3.01 Intent.....	1
SC- -5.02 Use of Site and Other Areas	2
SC- 5.03 Subsurface and Physical Conditions.....	2
SC- 5.06 Hazardous Environmental Conditions.....	3
SC- 5.07 Environmental Reports	4
SC- 6.02 Insurance—General Provisions	4
SC- 6.03 Contractor’s Insurance	5
SC- 6.05 Property Insurance.....	6
SC- 7.02 Labor; Working Hours	7
SC- 7.08 Permits	7
SC- 7.10 Laws and Regulations.....	8
SC- 7.12 Safety and Protection.....	11
SC- 7.16 Shop Drawings, Samples and Other Submittals.....	12
SC- 7.18 Indemnification	13
SC- 8.01 Other Work	13
SC- 9.13 Owner’s Site Representative.....	14
SC- 10.03 Project Representative.....	16
SC- 11.01 Amending and Supplementing Contract Documents.....	16
SC- 11.05 Change of Contract Times	17

Ord Village Lift Station & Force Main Replacement

CIP # OS-0147

Document 00 73 00

Marina Coast Water District

SC- 12.01	Claims	17
SC- 13.02	Allowances	22
SC- 13.03	Unit Price Work	22
SC- 15.01	Progress Payments	22
SC- 15.03	Substantial Completion	23
SC- 17.02	Arbitration	23
SC- 18.06	Survival of Obligations	24
SC- 18.07	Controlling Law	24

I. General

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, Document 00 72 00 (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.

II. Specific Items

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

SC-1.01.A.28 Add the following sentence to the end of Paragraph 1.01.A.29:

The Terms "Owner", "District" and "MCWD" shall be used interchangeably and shall have the same meaning.

ARTICLE 2 – PRELIMINARY MATTERS

SC-2.02 Copies of Documents

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

- A. Owner shall furnish to Contractor 4 copies of conformed Contract Documents incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01 Intent

SC-3.01.F Add the following new paragraphs immediately after Paragraph 3.01.E:

- F. In case of conflicts between the Contract Documents, the order of precedence shall be as follows:
 - 1. Change Orders, Field Orders or Work Change Directives
 - 2. Permits from Agencies having jurisdiction
 - 3. Addenda
 - 5. Special Conditions (Document 00 73 00)

- 6. Technical Specifications (Divisions 01 to 48)
- 7. Drawings
- 8. Agreement (Document 00 52 00)
- 9. General Conditions (Document 00 72 00)
- 11. Contractor’s Bid Forms (Documents 00 41 00 – 00 45 30)
- 12. Standard Specifications
- 13. Standard Plans (Drawings)
- 14. Reference Documents
- G. With respect to the Drawings, the order of precedence shall be as follows:
 - 1. Figures govern over scaled dimensions
 - 2. Detail drawings govern over general drawings
 - 3. Addenda, Change Orders, Field Orders or Work Change Directives govern over Contract Drawings, with the most recent governing over earlier changes
 - 4. Contract Drawings govern over Standard Drawings
 - 5. Contract Drawings govern over Shop Drawings

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

SC--5.02 Use of Site and Other Areas

SC-5.02.E Add the following new paragraph immediately after Paragraph 5.02.D

- E. Contractor shall submit copies of all agreements made with property owners for property use related to this project such as material and/or equipment storage, material disposal, etc.

SC-5.03 Subsurface and Physical Conditions

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

- C. No reports of explorations or tests of subsurface conditions at or adjacent to the Site are known to Owner.
- D. The following drawings of physical conditions relating to existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities) are known to Owner:
 - 1. Drawings dated November 24, 2003, prepared by Torti Gallas and Partners, P.C., Silver Spring, MD, entitled “Hayes Park Construction Plans, Fort Ord, Monterey, CA”, consisting of 61 sheets numbered C1 to C61, inclusive.
 - a. None of the contents of such drawings is Technical Data on whose accuracy Contractor may rely.

2. Drawings dated July 2003, prepared by Ruggeri, Jensen and Azar and Associates, Gilroy, CA, entitled "Improvement Plans for Seaside Highlands, Phase 1B", consisting of 44 sheets, numbered 1 to 44, inclusive.
 - a. None of the contents of such drawings is Technical Data on whose accuracy Contractor may rely.
 3. Drawings dated January 2003, prepared by Ruggeri, Jensen and Azar and Associates, Gilroy, CA, entitled "Improvement Plans for Seaside Highlands Model Complex", consisting of 26 sheets, numbered 1 to 26, inclusive.
 - a. None of the contents of such drawings is Technical Data on whose accuracy Contractor may rely.
 4. Drawings dated January 1997, prepared by Bestor Engineers, Inc., Monterey, CA, entitled "Fort Ord Reuse Authority, Wastewater System Improvements", consisting of 47 sheets, numbered T-01-01 through 10-03-01.
 - a. Sheets numbered 1-02-01 through 1-03-04 and sheet 2-03-04 show the existing Ord Village Lift Station.
 - b. None of the contents of such drawings is Technical Data on whose accuracy Contractor may rely.
 5. Drawings dated January 1964, prepared by U.S Army Corp of Engineers, entitled "Ord Village treatment Plant and Force Main", sheets numbers 1 through 9 and 13 through 18.
 - a. None of the contents of such drawings is Technical Data on whose accuracy Contractor may rely, except for the size and materials of the existing structures to be removed and the dimensions and locations of manholes to be rehabilitated or abandoned.
- E. Contractor may examine copies of reports and drawings identified in SC 5.03.C and SC 5.03.D that were not included with the Bidding Documents at Marina Coast Water District, Engineering Office, 920 Second Ave, Suite A, Marina, CA 93933, during regular business hours, or may request copies from Engineer.

SC-5.06 Hazardous Environmental Conditions

SC-5.06 Add the following new subparagraphs immediately after Paragraph 5.06.A.2:

- A.3 The following reports regarding Hazardous Environmental Conditions at the Site are known to Owner:
- a. Report dated July 2005, prepared by MACTEC, entitled: "Finding of Suitability to Transfer, Former Fort Ord, California, Track 0 Plug-In C, Track 1 and Track 1 Plug-In (Report Number OTH-223G)", consisting of 137 pages. The Technical Data contained in such report upon whose accuracy Contractor may rely are records of surveys and removals at Site FTO-059, Ord Village Pump Station.
 - b. Report dated January 16, 2020, prepared by M³ Environmental LLC, entitled: Asbestos and Lead Paint Inspections Prior to Demolition of Fort Ord Village Wastewater Lift Station Site Located at West of Highway 1 in Seaside, California",

consisting of 20 pages. The Technical Data contained in such report upon whose accuracy Contractor may rely tests of materials at the existing pump station.

SC 5.06.I Delete Paragraph 5.06.I in its entirety.

SC-5.07 Environmental Reports

Add the following new subparagraphs immediately before Article 6:

SC-5.07 Environmental Reports

- A. Environmental Report(s) have been prepared for this project under the California Environmental Quality Act (CEQA), as listed below. Contractor shall familiarize himself with these reports and implement the applicable mitigation measures during construction as outlined therein.
 - 1. Report dated August 2019, prepared by Denise Duffy & Associates, Inc., Monterey, CA, entitled: "Initial Study / Mitigated Negative Declaration for the Ord Village Force Main Replacement Project", consisting of 78 pages.
 - 2. Report dated August 2019, prepared by Denise Duffy & Associates, Inc., Monterey, CA, entitled: "Ord Village Force Main Replacement Project, Biological Resources Report", consisting of 90 pages.
- B. Copies of reports itemized in SC-5.07.A that are not included with Bidding Documents may be examined at Marina Coast Water District, Engineering Office, 920 Second Ave, Suite A, Marina, CA 93933 during regular business hours. These reports are not part of the Contract Documents, but the controls and mitigation measures contained therein which are required for performance of the Work are incorporated therein by reference.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.02 Insurance—General Provisions

SC-6.02.A Replace 6.02.A with the following text:

"Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions."

SC-6.02.B Delete the words "Owner or" in first sentence of 6.02.B.

SC-6.02.C Add the following paragraph immediately after Paragraph 6.02.C:

All insurance shall be provided on policy forms acceptable to the Owner (Accord Form 25-S or equivalent), signed by the insurer's representative. Such evidence shall include an original copy of the additional insured endorsement signed by the insurer's representative. Each policy shall contain a cross liability or severability of interest clause or endorsement.

SC-6.02.D Delete paragraph 6.02.D in its entirety.

SC-6.02.E Delete paragraph 6.02.E. and replace with following text:

"Failure of Owner to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner to identify a

deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.”

SC-6.02.I Delete paragraph 6.02I in its entirety.

SC-6.03 *Contractor’s Insurance*

SC-6.03.C.7 Remove the following text:

”; or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent”.

SC 6.03 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 \$ 1,000,000.00

Bodily injury by disease, each employee \$ 1,000,000.00

Bodily injury/disease aggregate \$ 1,000,000.00

Foreign voluntary worker compensation Statutory

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

General Aggregate \$ 2,000,000.00

Products - Completed Operations Aggregate \$ 1,000,000.00

Personal and Advertising Injury \$ 1,000,000.00

Each Occurrence (Bodily Injury and Property Damage) \$ 1,000,000.00

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

Bodily Injury:

Each person \$ 1,000,000.00

Each accident	\$ <u>1,000,000.00</u>
Property Damage:	
Each accident	\$ <u>1,000,000.00</u>
4. Excess or Umbrella Liability:	
Per Occurrence	\$ <u>1,000,000.00</u>
General Aggregate	\$ <u>1,000,000.00</u>
5. Contractor’s Pollution Liability:	
Each Occurrence	\$ <u>2,000,000.00</u>
General Aggregate	\$ <u>1,000,000.00</u>

If box is checked, Contractor is not required to provide Contractor’s Pollution Liability insurance under this Contract

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following:
- a. Owner’s inspector
 - b. City of Seaside, CA
 - c. United States Army
 - d. California State Parks
 - e. Monterey Bay Military Housing, LLC
7. Contractor’s Professional Liability:
- | | |
|------------------|------------------------|
| Each Claim | \$ <u>1,000,000.00</u> |
| Annual Aggregate | \$ <u>2,000,000.00</u> |
8. All insurance maintained by the Contractor shall include coverage for work in and around areas of with munitions and explosives of concern, or claims, damage or injury which arise from munitions or explosives of concern.

SC-6.05 *Property Insurance*

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:
 - 1. Owner’s inspector
 - 2. City of Seaside, CA

- 3. United States Army
- 4. California State Parks
- 5. Monterey Bay Military Housing, LLC

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

- 14. include by express endorsement coverage of damage to Contractor's equipment.
- 15. be payable to MCWD as trustee for the insureds as their interests may appear. Any insured loss shall be adjusted with MCWD as trustee.
- 16. include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:
 - a. Flygt pumps, model NP-3202, 3 each, \$40,800 each
 - b. 175 kW Generator, Caterpillar model D175, 1 each, \$53,000.

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

SC-7.02 Labor; Working Hours

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

- 2. Owner's legal holidays are:
 - a. New Year's Day
 - b. Martin Luther King Day
 - c. President's Day
 - d. Memorial Day
 - e. Independence Day
 - f. Labor Day
 - g. Veterans Day
 - h. Thanksgiving Weekend (Thursday and Friday)
 - i. Working Day immediately preceding Christmas Day
 - j. Christmas Day

SC-7.08 Permits

SC-7.08 Add the following new subparagraph immediately after Paragraph 7.08.A:

- B. The Owner shall provide the following permits:
 - 1. CEQA Negative Declaration / Mitigated Negative Declaration
 - 2. Construction easement / right of entry
 - 3. Caltrans Encroachment Permit
 - 4. Coastal Development Permit (demolition permit within State Park)

SC-7.10 Laws and Regulations

SC-7.10 Add the following new paragraphs immediately after Paragraph 7.10.C:

7.10.D. Public Contract Provisions

1. The Contractor is responsible for his own compliance, and is responsible for all Subcontractors' compliance, with all applicable sections of the California Labor Code regarding the payment of wages, the employment of apprentices, and hours of work, all as set forth in Section 1170 through Section 1815 of that Code. Those requirements are set forth below.
2. Payment of Prevailing Wages
 - a. Pursuant to Sections 1774 and 1775 of the Labor Code, unless the contract price is under \$1,000.00, the Contractor and any subcontractor under him, shall pay not less than the general prevailing rate of per diem wages, including holiday and overtime pay, to all workmen employed in the execution of this Contract. Failure to so comply will result in a fine of \$25.00 per day per violation, and the obligation to compensate each such employee the difference between the wage actually paid and the prevailing wage applicable to that employee's craft.
 - b. Pursuant to Section 1773.2 of the California Labor Code, the District has on file at its principal office, copies of the prevailing rate of per diem wages for each craft, and classification or type of workman needed to execute the contract, and a copy shall be available to any interested party upon request.
 - c. The Contractor shall obtain and post copies of the prevailing per diem wage rates at the job site during the term of this project.
 - d. Pursuant to Labor Code Section 1776, the Contractor and each subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by the Contractor or subcontractor in connection with the project, and such other information as required by law, and such payroll records shall be certified and made available for inspection and release all in accordance with Labor Code Section 1776 and 8 California Code of Regulations Section 16000 et seq. All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement). The Contractor shall file with the District certified copies of its and all its subcontractors' payroll records within thirty (30) calendar days after completion of each payroll period at no cost to the District.
 - e. Pursuant to Section 1773.8 of the Labor Code, travel and subsistence payments shall also be paid to each workman needed to execute such work if such travel and subsistence payments are set forth in the applicable collective bargaining agreements and filed with the Department of Industrial Relations thirty (30) days prior to the call for bids.
 - f. Unless the Contract amount is under \$30,000 or will be completed in less than twenty (20) days (or if this Contract involves a specialty contractor under \$2,000 or

- less than 5 days) the Contractor shall comply with Section 1777.5 regarding the employment of registered apprentices upon public works by hiring, and by requiring that all subcontractors hire apprentices at the wage rate and ratio required, if at all, and by requiring the contribution of funds to appreciable crafts or trades as applicable under Section 1777.5.
- g. The Contractor shall, as a penalty to the District, forfeit not more than two hundred dollars (\$200.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of the Department of Industrial Relations for such work or craft in which such worker is employed for any public work done under this contract by the Contractor or by any subcontractor under the Contractor. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor. Labor Code Section 1775.
- h. Required California Department of Industrial Relations provisions:
- No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
 - No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.
 - This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.
- i. The Contractor certifies that the Contractor and all subcontractors for this public works project have been registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.
- j. The District shall not recognize any claim for additional compensation from the Contractor because of the payment by the Contractor of any wage rate in excess of the prevailing rate of per diem wages. The possibility of wage increases is one of the elements to be considered by the Contractor in determining its bid and will not, under any circumstances, be considered as the basis of a claim against the District under this contract.
3. Hours of Labor
- a. Pursuant to Sections 1810 through 1815 of the Labor Code, eight hours of labor constitutes a legal day's work, and work performed by employees of the Contractor or any subcontractor in excess of eight hours per day, and forty hours in any one week, shall be compensated at not less than one and one-half times their basic rate of pay. Violation of this condition shall result in a penalty of \$25.00 per day per workman so underpaid.
4. Unidentified Utilities – Costs (Government Code 4215)
- a. The District shall be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the construction site, if such utilities are not identified in the plans and specifications for the work. The

Contractor shall be compensated for his actual costs of locating, repairing damage not due to his failure to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy and for equipment on the project necessarily idled during such work. If the Contractor discovers utility facilities not identified in the contract plans or specifications, he shall immediately notify the District and the utility in writing. The Contractor shall not be assessed liquidated damages for delay if caused by the failure of the District or the owner of the utility to provide for removal or relocation of such utility facilities. The District shall provide a layout of all main lines and existing service laterals. The Contractor shall exercise due care in verifying the locations provided by the District and shall notify the District of site conditions that differ from those indicated.

5. Dispute Resolution Procedures for Claims of Less Than \$375,000
 - a. Sections 20104 - 20104.6 of the Public Contract Code set forth required procedures for the parties to resolve claim disputes involving less than \$375,000, including the presentation of written claims with substantiating documents on or before the date of final payment, requests for additional documentation, time limits for responding to written claims, and requiring a conference to meet and confer; and also relating to filing a claim before suit, and required arbitration provisions in the event of a civil action filed to resolve the claim. All of such procedures, time limits and requirements shall be complied with if such Code sections are applicable to disputed claim.
6. Assignment of Antitrust/Unfair Business Practice Claims
 - a. Pursuant to Public Contract Code Section 7103, Contractor and any subcontractors supplying goods, services or materials under this contract agree to assign District all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C Sec. 15) or under the Cartwright Act (Chapter 2 commencing with Section 16700 of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to this contract or the subcontract.
7. Substitution of Securities for Retention. Pursuant to Public Contract Code Section 22300 and upon Contractor's request, the District will make payments into escrow of funds which would otherwise be retained from progress payments under the payments to contractor provisions in the Agreement and the Supplementary and General Conditions if the Contractor deposits into that escrow securities eligible for investment under Public Contract Code Section 22300 (hereafter collectively referred to as "securities"), upon the following terms and conditions:
 - a. The escrow agent shall be either the District Treasurer or a state or federal chartered bank acceptable to the District.
 - b. The Contractor shall bear all expenses of the District and of the escrow agent in connection with the escrow.
 - c. The fair market value of the securities shall be at least equal to 100 percent of the cash amount withheld as retention under the contract and the amount of the required securities shall be adjusted from time to time based upon changes in the

fair market value of the securities on deposit with the escrow agent. Such securities shall be valued by the District Treasurer whose decision on valuation of the securities shall be final.

- d. The Contractor shall enter into an escrow agreement substantially similar in form to that prescribed in Public Contract Code Section 22300.
- e. The Contractor shall obtain the written consent to the escrow agreement of the surety or sureties furnishing Contractor with its performance and payment bonds.

SC-7.12 Safety and Protection

SC-7.12 Add the following new paragraphs after paragraph 7.12.G:

- H. In carrying out his/her work, the Contractor shall at all times, exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all federal, state and local statutory and regulatory requirements including California Department of Industrial Relations (Cal/OSHA) regulations; and the U.S. Department of Transportation Omnibus Transportation Employee Testing Act (as applicable). Safety precautions as applicable shall include, but shall not be limited to, adequate life protection, and lifesaving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees such as machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks; confined space procedures; trenching and shoring; fall protection; and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents, injuries, or illnesses; and adequate facilities for the proper inspection and maintenance of all safety measures.
- I. The Contractor shall be responsible for the safeguarding of all utilities. At least two working days before beginning work, the Contractor shall call the Underground Service Alert (USA) in order to determine the location of sub-structures. The Contractor shall immediately notify the District and the utility owner if he/she disturbs, disconnects, or damages any utility.
- J. In accordance with Section 6705 of the California Labor Code, the Contractor shall submit to the District specific plans to show details of provisions for worker protection from caving ground during excavations of trenches of five feet or more in depth. The excavation/trench safety plan shall be submitted to and accepted by the District prior to starting excavation. The trench safety plan shall have details showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground. If such a plan varies from the shoring system standards established by the Construction Safety Orders of the California Department of Industrial Relations (Cal/OSHA), the plan shall be prepared by a California registered civil or structural engineer. As part of the plan, a note shall be included stating that the registered civil or structural engineer certifies that the plan complies with the Cal/OSHA Construction Safety Orders, or that the registered civil or structural engineer certifies that the plan is not less effective than the shoring, bracing, sloping or other provisions of the Safety Orders. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders. Submission of this plan in no way relieves the Contractor of the requirement to

maintain safety in all areas. If excavations or trench work requiring a Cal/OSHA permit are to be undertaken, the Contractor shall submit his/her permit with the excavation/trench work safety plan to the District before work begins.

- K. Trench Excavation: Approval of Plan for Protection from Caving
 - 1. If the contract involves an estimated expenditure of more than \$25,000, for the excavation of any trench or trenches five feet or more in depth, the Contractor shall submit, for acceptance and approval by the District or its designated engineer, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provision to be made for worker protection from the hazard of caving ground during such excavation, all in accordance with Labor Code Section 6705.
- L. Excavations Deeper than Four Feet Involving Hazardous Wastes or Materially Different Site Conditions
 - 1. If the contract involves digging trenches or other excavations that extend deeper than four feet below the surface:
 - a. The Contractor shall promptly, and before any of the following conditions are disturbed, notify the District, in writing, of any:
 - (1) Material that the Contractor believes may be material that is hazardous waste as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law;
 - (2) Subsurface or latent physical conditions at the site differing from those indicated;
 - (3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.
 - b. The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the work, it shall issue a change order under the procedures described in the Agreement.
 - c. In the event that a dispute arises between the District and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Agreement, but shall proceed with all work to be performed under the Agreement. The Contractor shall retain any and all rights provided either by contract or by law, which pertains to the resolution of disputes and protests between the contracting parties.

SC-7.16 Shop Drawings, Samples and Other Submittals

SC-7.16.E Delete Paragraph 7.16.E.2 in its entirety and insert the following in its place:

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than two submittals. Engineer will record Engineer's time for reviewing a third 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.

SC-7.18 Indemnification

SC-7.18.A Delete paragraph 7.18.A in its entirety and insert the following in its place:

- 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, 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 or the failure, neglect or refusal of the Contractor to perform the Work and all obligations under the Contract, 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.

ARTICLE 8 – OTHER WORK AT THE SITE

SC-8.01 Other Work

SC-8.01.E Add the following new paragraph immediately after Paragraph 8.01.D of the General Conditions:

- E. Owner is aware of Other Work at the Site which is planned by others and relates to the Work contemplated by these Bidding Documents:
 1. Seaside Senior Living Development, 550 Monterey Road, Seaside, CA. Pipelines to be abandoned under this project cross that property which may have active construction during this Work.
 2. Presidio of Monterey Annex, Lower Stilwell Neighborhood Military Housing. The pipeline to be installed in Okinawa Road under this project is within the limits of the Military Housing work.
 3. PG&E Gas Transmission Main Replacement in Monterey Road, south of Coe Avenue. This work is adjacent to the new pump station and force main.

ARTICLE 9 – OWNER’S RESPONSIBILITIES

SC-9.13 Owner’s Site Representative

SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:

SC-9.13 Owner will engage a Construction Manager (CM) to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner’s Construction Manager is not Engineer’s consultant, agent, or employee. Owner’s Construction Manager will be [TBD]. The authority and responsibilities of Owner’s Construction Manager follow:

- A. General: CM's dealings in matters pertaining to the Work in general shall be with Owner, Engineer and Contractor. CM's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor.
- B. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
- C. Conferences and Meetings: Schedule and run meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.
- D. Liaison:
 - 1. Serve as Owner’s liaison with Contractor. Working principally through Contractor’s authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
 - 2. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
- E. Interpretation of Contract Documents: Report to Owner and Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
- F. Shop Drawings and Samples:
 - 1. Record date of receipt of Samples and Contractor-approved Shop Drawings.
 - 2. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
 - 3. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which CM believes that the submittal has not been approved by Engineer.
- G. Modifications: Consider and evaluate Contractor’s suggestions for modifications in Drawings or Specifications and report such suggestions, together with CM’s recommendations, if any, to Owner and Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

- H. Review of Work and Rejection of Defective Work:
 - 1. Conduct On-Site observations of Contractor's work in progress to assist Owner and Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - 2. Report to Owner and Engineer whenever CM believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Owner and Engineer of that part of work in progress that CM believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
- I. Inspections, Tests, and System Start-ups:
 - 1. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
 - 2. Observe, record, and report to Owner and Engineer appropriate details relative to the test procedures and systems start-ups.
- J. Records:
 - 1. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Owner and Engineer.
 - 2. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
 - 3. Maintain records for use in preparing Project documentation.
- K. Reports:
 - 1. Furnish to Owner and Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.
 - 2. Draft and recommend to Owner and Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
 - 3. Immediately notify Owner and Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.
- L. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with

recommendations to Owner and Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

- M. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
- N. Completion:
 - 1. Participate in Engineer’s visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.
 - 2. Participate in Engineer’s final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.
 - 3. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

B. On this Project, by agreement with the Owner, Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work.

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

SC-11.01 Amending and Supplementing Contract Documents

SC-11.01 Insert the following subparagraphs immediately following 11.01.A.1.b.

- c. In signing a Change Order, the Owner and Contractor acknowledge and agree that:
 - 1) the stipulated compensation (Contract Price or Contract Times, or both) set forth in the Change Order includes not only all direct costs of Contractor such as labor, material, job overhead, and profit markup, but also includes any costs for modifications or changes in sequence of work to be performed, delays, rescheduling, disruptions, extended direct overhead or general overhead, acceleration, material or other escalation which includes wages and other impact costs. This document will become a supplement to the Contract and all Contract provisions will apply hereto. It is understood that this Change Order shall be effective on the date approved by the Owner’s Representative.
 - 2) the Change Order constitutes full mutual accord and satisfaction for the change to

the Work;

- 3) no reservation of rights to pursue subsequent claims on the Change Order will be made by either party; and
- 4) no subsequent claim or amendment of the Contract Documents will arise out of or as a result of the Change Order.

SC-11.05 *Change of Contract Times*

SC-11.05 Add the following new paragraphs immediately after 11.05.B:

C. Use of Float:

- 1. A request for adjustment of Contract Times (or Milestones), otherwise allowable under the Contract Documents, shall be granted only when the time lost or gained exceeds the float for the activity at the time of the event giving rise to the claim. Float, the amount of time between the early start date and the late start date, or the early finish date and the late finish date, is jointly owned by both Owner and Contractor whether expressly disclosed or implied in any manner.
- 2. Contractor shall not use float suppression techniques (including, but not limited to, preferential sequencing caused by late starts of follow-up trades, unreasonably small crews, extended durations, or imposed dates) in information provided to Engineer.

D. Weather Days:

- 1. The Contract Time includes a weather day allowance of 25 working days. No extension in Contract Time will be allowed for the first 25 working days lost due to weather conditions.

ARTICLE ARTICLE 12 - CLAIMS

SC-12.01 *Claims*

SC-12.01 Delete Paragraph 12.01 in its entirety and insert the following in its place:

SC-12.01 Claims:

- A. Claims between the Owner and Contractor shall be addressed as provided by California Public Contract Code Section 9204, which is set forth in its entirety:

9204. Legislative findings and declarations regarding timely and complete payment of contractors for public works projects; claims process

- (a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

- (b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10

(commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:

(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

(A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.

(B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.

(C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3) *Public entity definition*

(A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.

(B) "Public entity" shall not include the following:

(i) The Department of Water Resources as to any project under the jurisdiction of that department.

(ii) The Department of Transportation as to any project under the jurisdiction of that department.

(iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.

(iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.

(v) The Military Department as to any project under the jurisdiction of that department.

(vi) The Department of General Services as to all other projects.

(vii) The High-Speed Rail Authority.

(4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) Claims Process

(1) Claims review and response

(A) Upon receipt of a claim pursuant to this Section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

(B) The claimant shall furnish reasonable documentation to support the claim.

(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to 3 days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) Claims dispute

(A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this Section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the

portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

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

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this Section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on their own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be

presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

- (e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.
- (f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.
- (g) This section applies to contracts entered into on or after January 1, 2017.
- (h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.
- (i) This section shall remain in effect only until January 1, 2027, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2027, deletes or extends that date.

End of PCC Section 9204

B. Claims Process Additional Requirements:

1. Claims asserted by the Owner against the Contractor shall be submitted according to the procedures set forth above.
2. 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. Such a claim shall be submitted 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.
3. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

C. Mediation:

1. 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.

- D. Claims of \$375,000 or less shall be resolved in accordance with California Public Contract Code Section 20104 et seq. unless Owner elects to resolve the dispute in accordance with California Public Contract Code Section 10240 et seq.

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

SC-13.02 Allowances

SC 13.02 Add the following new subparagraph immediately paragraph 13.02.D:

- E. *Reimbursement Allowance:* Contractor agrees that a reimbursement allowance, if any, is for reimbursement of the actual cost or fee for which it is designated (typically permits), without additional markup for overhead, profit or handling. If the Owner includes a reimbursement allowance in the Bid Form, the Owner will establish its value.

SC-13.03 Unit Price Work

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 25 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 10 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 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC-15.01 Progress Payments

15.01.C Delete Paragraph 15.01.C.1 in its entirety and insert the following in its place:

1. Engineer will, within 7 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.

15.01.D Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

1. Thirty calendar 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.

SC-15.03 Substantial Completion

SC 15.03.A Add the following subparagraphs immediately after Paragraph 15.03.A:

1. To be considered substantially complete, all Work must be operational and ready for Owner's continuous use as intended.
2. Portions of the Work not essential to operation, which can be completed without interruption operation, may be completed after the Work is accepted as Substantially Complete, and may include the following items:
 - a. As-built documents.
 - b. Final clean-up.

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.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

SC-17.02 Arbitration

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

SC-17.02 Arbitration

- A. All matters subject to final resolution under this Article will be decided by arbitration in accordance with the rules of AJMS Endispute Streamlined Arbitration Rules and Procedures, subject to the conditions and limitations of this paragraph. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.
- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in this Article, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations. The demand for arbitration should include specific reference to Paragraph SC-17.02.D below.

- C. No arbitration arising out of or relating to the Contract shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer’s consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
 - 1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and
 - 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.
- D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include a concise breakdown of the award, and a written explanation of the award specifically citing the Contract provisions deemed applicable and relied on in making the award.
- E. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.
- F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.

ARTICLE 18 – MISCELLANEOUS

SC-18.06 Survival of Obligations

SC-18.06 Delete paragraph 18.06.A in its entirety and replace it with the following:

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations in accordance with California Commercial Code, Section 1101 et seq., and as 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.

SC-18.07 Controlling Law

SC-18.07 Delete paragraph 18.07.A in its entirety and replace it with the following:

- A. This Contract shall be construed and enforced according to the laws of the State of California, and the parties hereby agree that the County of Monterey shall be the proper venue for any dispute arising hereunder.

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Description of Work
- B. Construction Sequence
- C. Contractor Use of Site
- D. Owner Use of Facilities
- E. Standard Specifications
- F. Project Meetings

1.02 DESCRIPTION OF WORK

Provide a new sanitary sewer lift station and force main, complete and in-place, and demolish the existing lift station. The Work includes, but is not limited to, the following items:

- A. Provide a new sanitary sewer lift station, including the wet well, valve vault, piping, valves, appurtenances, and motor control center, which will include an automatic transfer switch, PLC, two VFDs, and SCADA telemetry;
- B. Remove three existing wastewater pumps from the existing lift station, reconfigure each from dry-pit to wet-pit operation and install two of them in the new wet well. Provide the third to the Owner for storage;
- C. Relocate an existing 175 kW generator from the existing lift station to the new lift station;
- D. Provide 4,050-LF of 10-inch C900 PVC force main with fittings, valves, thrust restraints and appurtenances;
- E. Provide 3 cast around manholes and connecting gravity pipelines;
- F. Provide service lateral tie-ins to sanitary sewer for existing residences;
- G. Provide 7 new manholes and 1,350 LF of SDR 26 PVC gravity sewer;
- H. Flush, plug and abandon in place approximately 6,300 LF of existing sewer pipes;
- I. Abandon in place 5 manholes; and
- J. Demolish and remove the existing lift station, including all structures, pedestals, electrical equipment, mechanical equipment, fences and pavements.

1.03 CONSTRUCTION SEQUENCE

- A. The new pump station and force main shall be constructed in parallel to the existing pump station and force main system. The sequence of the work is as follows:
 - 1. Construct new pump station and force main system (concurrent items):

- a. Construct new lift station, including wet well, yard piping and MCC panels. Coordinate PG&E meter installation and energizing of system.
 - b. Construct and test new force main and gravity sewers. Connect to existing gravity sewer.
 - c. Rehabilitate existing manholes C6, C7, C8, C9 and C10.
 - d. Construct new SSMH and gravity sewers to new wet well. Leave plugged.
2. Transfer, reconfigure and test first pump in new lift station.
 3. Transfer, reconfigure and test second pump in new lift station.
 4. Remove gravity sewer plugs to make new lift station primary. Plug gravity sewers leading to SSMH SH1 and SH1A.
 5. Transfer existing generator from old lift station to new lift station.
 6. Flush existing sanitary sewer and force main with clean water from SSMH SH1 or SH1A to old pump station. Flushing rate shall be 850 gpm (capacity of remaining pump). Minimum volume shall be 16,000 gallons.
 7. Drain and dispose of water from existing SSFM.
 8. Demolish old lift station and abandon existing pipelines.
 - a. Recover remaining equipment from existing lift station and deliver to MCWD corporation yard.
 - b. Cut and abandon pipelines crossing Highway 1/TAMC ROW by grouting.
 - c. Abandon existing force main.
 - d. Abandon existing gravity sewers and SSMH SH1, SH1A, B900, B901, B902, B903A, C1, C2, C3, C4 and C5.
 - e. Demolish and remove existing lift station.

1.04 CONTRACTOR USE OF SITE

- A. The lift station and gravity collection system are located within City of Seaside property. Permanent and temporary construction easement limits are shown on the Drawings. Contractor shall coordinate with the City of Seaside for additional on-site laydown and staging areas, if needed.
- B. A portion of the Work is within City of Seaside streets and subject to the conditions of the City of Seaside Encroachment Permit. The encroachment permit application and conditions are at Appendix C of the Project Manual.
- C. A portion of the Work is within the Presidio of Monterey Annex and subject to the conditions of the Presidio Construction Permit. The Construction Permit is at Appendix C of the Project Manual.
- D. Contractor shall coordinate any additional staging and storage areas per Section 01 55 00.

1.05 OWNER USE OF FACILITIES

- A. The existing Ord Village Pump Station will remain in operation until the replacement pump station is constructed, tested and placed into service. Coordinate the transition with the Owner's Staff, Construction manager and the Engineer.

1.06 PROJECT MEETINGS

- A. Preconstruction Conference:

1. Prior to the commencement of Work at the site, one preconstruction conference will be held at a mutually agreed time and place which shall be attended by the Contractor's Project Manager, its Superintendent, and its Subcontractors as the Contractor deems appropriate. Other attendees will be:
 - a. Engineer.
 - b. Representatives of Owner.
 - c. Representatives of Property Owner.
 - d. Governmental representatives as appropriate.
 - e. Others as requested by Engineer, Contractor, or Owner.
 2. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the Contractor prior to the meeting date. However, the Contractor should be prepared to discuss all of the items listed below.
 - a. Status of Contractor's insurance and bonds.
 - b. Contractor's tentative schedules.
 - c. Processing applications for payment.
 - d. Maintaining record documents.
 - e. Critical work sequencing.
 - f. Field decisions and Change Orders.
 - g. Use of project site, office and storage areas, security, housekeeping, and Owner's needs.
 - h. Major equipment deliveries and priorities.
 - i. Contractor's assignments for safety and first aid.
 3. The Engineer will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.
 4. The Contractor and its Subcontractors should plan on the conference taking 2 hours.
- B. Progress Meetings:
1. The Contractor shall attend regular on-site progress meetings at least weekly -and at other times as requested by Engineer or as required by progress of the Work. The Contractor, Engineer, and all Subcontractors active on the site must attend each meeting. Contractor may at its discretion request attendance by representatives of its Suppliers, manufacturers, and other Subcontractors.
 2. The Engineer shall preside at the meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the Contractor is required to present any issues which may impact his work, with a view to resolve these issues expeditiously.
- C. Pre-start-up Meeting:
1. The Contractor shall schedule a pre-start-up coordination meeting a minimum of three weeks in advance of the transition between the existing and new pump stations.
 2. Provide a detailed schedule showing daily activities. Highlight those activities that require the attendance or assistance of the Owner's staff or the Engineer.
 3. Provide a spill-response plan for the transition period where one or both pump stations may be operating on a single pump.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Requirements for sequencing and scheduling the Work affected by existing site and facility, work restrictions, and coordination between construction operations and plant operations.

1.02 DEFINITION OF JURISDICTIONS

- A. The following are approximate locations of jurisdictions throughout the project. See the drawings for more detailed information.
- B. California State Parks: Existing Ord Village Lift Station and adjacent pipelines up to the railroad right-of-way
- C. Transportation Agency of Monterey County (TAMC): pipelines crossing the 100-ft wide rail right-of-way
- D. California Department of Transportation (Caltrans): pipelines crossing the Highway 1 right-of-way
- E. City of Seaside: the new lift station site, pipeline in Monterey Road
- F. Presidio of Monterey Annex, Directorate of Public Works: pipelines in Bougainville Road, Buna Road, Kiska Road, Okinawa Road, and the existing force main and gravity sewer along the east edge of the Highway 1 right-of-way
- G. Public Health Agencies
 - 1. California Department of Public Health
 - 2. Monterey County Health Department

1.03 GENERAL CONSTRAINTS ON WORK AND SCHEDULING OF WORK

- A. The listing of schedule constraints in this Section and Section 01 55 00 – Traffic Control; and elsewhere in the contract documents shall not mean that all constraints or special conditions have been identified. The list does not substitute for the Contractor's coordination and planning for completion of work within the Contract Time in the Agreement.
- B. The Contractor shall allow for construction and schedule constraints in preparing the construction schedules. The schedules shall include the Contractor's activities necessary to satisfy all constraints included and referenced in the Contract Documents.

- C. Utilize description of critical events in work constraints in this Section as a guideline for scheduling and undertaking the Work.
- D. Business Licenses:
1. Contractor shall obtain business licenses from the City of Seaside prior to commencing work within that jurisdiction. Business license information can be found on each jurisdiction's website.
- E. Public Health Orders related to Covid-19:
1. The Contractor shall comply with the most current health orders from the State and County Public Health Officers.
 2. The Contractor shall prepare a written workplace-specific plan per the State Guidance for Construction Employers. This plan may be included in the overall Health and Safety Plan, or as a separate document.
- F. General:
1. The Contractor shall schedule construction activities at each location in accordance with the requirements of all permits.
 2. The Contractor shall coordinate with local property owners before and during construction in accordance with the project specifications and requirements of all governing agencies.
 3. Only MCWD shall operate MCWD valves. The Contractor shall provide the MCWD with a minimum 2 weeks advance notice for any valve closure requests, such as those required for a temporary shutdown to tie-in new facilities. All closures / openings of existing MCWD valves shall be performed by the MCWD.
 4. For all segments of the project located in paved roadways, the Contractor shall at a minimum, backfill, compact and install temporary asphalt paving (or steel plating as allowed) for all open trenches, and reopen the roadway to traffic by the end of every working day.
 5. Temporary paving shall not be left in place for more than 30 consecutive days. Contractor shall inspect temporary paving for failure each calendar day. Where temporary paving has failed, Contractor shall immediately repair or replace it.
 6. For specific temporary traffic control constraints see Section 01550 – Traffic Control. Contractor shall inspect temporary traffic control facilities each calendar day. Where temporary traffic control facilities are damaged or different than the approved traffic control plan, Contractor shall immediately repair or replace the temporary traffic control facilities.
 7. The Contractor is responsible for complying with all mitigation and monitoring measures identified in the CEQA/NEPA documents provided in the Appendices.
 8. The Contractor shall sweep the streets daily to maintain the roadway clear of all debris and loose material.
 9. Contractor shall provide a construction schedule, traffic control plans, and road closure schedule to all affected agencies and property owners not later than 30-days prior to start of construction activities.
 10. In addition to MCWD, agencies include but are not limited to:
 - a. City of Seaside
 - b. Caltrans
 - c. TAMC

- d. California State Parks
- e. Presidio of Monterey DPW
- f. Monterey Bay Military Housing, LLC

11. General Work restrictions:

- a. Work days:
 - 1) Work days are Monday through Friday, except Marina Coast Water District holidays, which are listed in Section 00 73 00 - Supplementary Conditions.
 - 2) Agencies where the work occurs may further restrict work days.
- b. Work hours:
 - 1) Work hours are specific to the governing agency where work occurs, but not beyond Marina Coast Water District's work hours.
 - 2) Extended work hours, holiday, nighttime, and weekend work will be allowed only when approved in writing by the governing agency and Construction Manager.
 - 3) When extended hours, holiday, nighttime and/or weekend work is allowed, Contractor shall pay the costs for inspection by the Construction Manager during that time.
 - 4) Extended hours are any working hours over 8.5 consecutive work hours in a single day.
 - 5) Work outside of the normal working hours is subject to the availability of the Construction Manager/inspector.
- c. Special Events:
 - 1) Pebble Beach Pro-Am Golf Tournament: Contractor shall anticipate that work will not be allowed in Monterey Road the Wednesday, Thursday, and Friday of the golf tournament and the Monday following the tournament.
 - 2) Monterey Car Week: Contractor shall anticipate that work will not be allowed in Monterey Road the Wednesday, Thursday, and Friday of and the Monday following the Car Week event.

G. Marina Coast Water District:

- 1. Work days: Per the general work restrictions.
- 2. Work Hours: Allowable working hours on Marina Coast Water District property are 7:00 a.m. to 5:00 p.m.

H. Draft Encroachment Permit:

- 1. Draft encroachment permits are included in the Appendices. Contractor shall anticipate the requirement to comply with all conditions of the draft encroachment permits.

I. City of Seaside:

- 1. Road section: The standard road section is 4-inches of asphalt concrete over 12-inches of aggregate base course.
- 2. Work Days: Per the general work restrictions and draft encroachment permit included in the Appendices. Where there is a conflict, the more restrictive requirements will govern.
- 3. Work Hours: Per the draft encroachment permit included in the Appendices.
- 4. Monterey Road:
 - a. Work in Monterey Road should be scheduled to occur during the MPUSD summer break, which generally occurs from the second week in June to the first week in

August. Contractor shall schedule work to occur during the time and anticipate normal allowable working hours when school is not in session.

- b. If the Contractor is unable to complete work during the summer break, work hours will be limited to 9:00 a.m. to 2:00 p.m. and 3:30 p.m. to 5:00 p.m. when schools are in session.

J. Presidio of Monterey Annex:

1. Road section: The standard road section is 3.5-inches of asphalt concrete over 6.5-inches of aggregate base course.
2. Work Days: Same as City of Seaside Monterey Road
3. Work Hours: Same as City of Seaside Monterey Road.

K. California State Parks

1. Road section: The standard road section is 4-inches of asphalt concrete over 8-inches of aggregate base course.
2. Work Days: Per the general work restrictions.
3. Work Hours: Per the general work restrictions.
4. Biological monitoring by the Owner's consultant for protected plant and animal species is required. Coordinate through the Construction Manager to schedule the required worker training and on-site monitoring.

L. California Department of Transportation:

1. Road section: Not applicable. Work includes abandoning existing pipelines by grouting and capping from outside the right-of-way limits.
2. Work Days: Per the Caltrans Encroachment Permit
3. Work Hours: Per the Caltrans Encroachment Permit

M. Transportation Agency of Monterey County:

1. Road section: Not applicable. Work includes abandoning existing pipelines by grouting and capping from outside the right-of-way limits.
2. Work Days: Same as Caltrans Encroachment Permit
3. Work Hours: Same as Caltrans Encroachment Permit

1.04 UTILITIES

- A. Provide advance notice to and utilize services of Underground Services Alert (U.S.A.) for location and marking of underground utilities operated by utility agencies other than the Owner.
- B. Maintain electrical, telephone, water, gas, sanitary facilities, and other utilities within existing facilities in service. Provide temporary utilities when necessary.
- C. New yard utilities were designed using existing facility drawings:
 1. Field verification of utilities locations was not performed during design.
 2. Services crossed or located nearby by new yard utilities may require relocation and possible shutdowns.
 3. Pipe alignments as indicated on the Drawings.

D. Contact information for utility owners and property owners is listed below:

1. City of Seaside:
 - a. Scott Ottmar, P.E., City of Seaside - Senior Civil Engineer, 440 Harcourt Ave, Seaside, CA 93966, (831) 899-6885, Sottmar@ci.seaside.ca.us
 - b. Nisha Patel, P.E., City of Seaside - City Engineer, 440 Harcourt Ave, Seaside, CA 93966, (831)899-6884, NPatel@ci.seaside.ca.us
2. Presidio of Monterey
 - a. Directorate of Public Works, Bldg 4450 Gigling Road, Seaside, CA 93966, (831) 242-7916
 - b. Monterey Bay Military Housing, LLC – Owner Representative/Development Manager, Jose Cruz, 328 Hatten Road, Seaside, CA 93955, (831) 583-2721
 - c. The Parks at Monterey Bay – Property Manager, Teresa Watkins, Community Director, 1200 Fechteler Drive, Monterey, CA 93940, (831) 644-0400, twatkins@tmo.com
3. California State Parks
 - a. Stephen Bachman, Senior Park & Recreation Specialist, 2211 Garden Road, Monterey, CA 93940, (831) 649-2862
4. Caltrans:
 - a. Caltrans District 5, 50 Higuera Street, San Luis Obispo, CA 93401-5415, (805) 549-3111, Info-d5@dot.ca.gov
 - b. Caltrans-Salinas Maintenance Facility, 850 Elvee Dr, Salinas, CA 93901, (831) 783-3000
5. TAMC:
 - a. TAMC, 55-B Plaza Circle, Salinas, CA 93901, (831)775-0903, info@tamcmonterey.org
6. PG&E:
 - a. Electrical: Katrina Lopez, PG&E, 2311 Garden Road, Monterey, CA 93940, (831)784-3581, K1HC@pge.com
 - b. Gas: Kelvin Qiu, PG&E, 6121 Bollinger Canyon Road, San Ramon, CA 94583, (925) 244-3839, YXQ1@pge.com
7. AT&T:
 - a. Susan Barraza, 515 Chappell Road, Watsonville, CA 95076, (831)728-6571, sb8239@att.com
8. Comcast:
 - a. Comcast, 2440 Fremont Street Suite 207, Monterey, CA 93940, (800)391-3000
9. Suddenlink Communications:
 - a. Robert Hager, Sudden Link Communications, 761 Neeson Rd, Suite #7, Marina, CA 93933, (831)901-5682, Robert.Hager@Suddenlink.com

1.05 PERMIT FEES

- A. For bidding purposes, estimated permit fees are included in the Document 00 41 00 - Bid Form. Upon project completion, actual fees paid shall be compared to the estimated permit fees. Excess fees paid will be credited to the project; shortfall of fees paid will be owed to the Contractor.

1.06 PUBLIC OUTREACH

- A. Contractor shall pay for and perform the following public outreach activities:

1. Install door hangers on all properties on the street where work will occur, within 500 feet of the work, 1 month before work will begin.
2. Install door hangers on all properties on the street where work will occur, within 100 feet of the work, 1 week before work will begin.
3. Depending on the timing of work, separate door hangers may be needed for separate work activities such as pipeline installation and paving.
4. Door hangers shall be submitted for review and approval prior to being used.
5. Door hangers shall include the following:
 - a. Name of Project
 - b. Name of Contractor
 - c. Phone number to contact (Contractor's phone number)
 - d. Name of Owner
 - e. Date(s) when work is expected to occur at or near the residence
 - f. Type of work being performed
 - g. Date(s) when work is expected to be completed

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 20 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Methods of Measurement
- B. Description of Bid Items

1.02 METHODS OF MEASUREMENT

- A. Materials and items of work which are to be paid for on the basis of measurement shall be measured in accordance with the method stipulated in the particular sections involved. In determining quantities, all measurements shall be made in a horizontal plane unless otherwise specified.
- B. Measurements shall be in accordance with U.S. Standard Measures. A pound is an avoirdupois pound. A ton is 2,000 pounds avoirdupois. The unit of liquid measure is the U.S. gallon. The unit of length is feet. The unit of volume is cubic yards.
- C. Material not used from a transporting vehicle shall be determined by the ENGINEER and deducted from the certified tag.
- D. When material is to be measured and paid for on a volume basis and it would be impractical to determine the volume, or when requested by the CONTRACTOR in writing and approved by the ENGINEER in writing, the material will be weighed and converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the ENGINEER and shall be agreed to by the CONTRACTOR before such method of measurement of pay quantities will be adopted.
- E. Full compensation for all expense involved in conforming to the above requirements for measuring and weighing materials shall be considered as included in the unit prices paid for the materials being measured or weighed and no additional allowances will be made therefore.
- F. Quantities of material wasted or disposed of in a manner not called for under the Contract; or rejected loads of material, including material rejected after it has been placed by reason of failure of the CONTRACTOR to conform to the provisions of the Contract; or material not unloaded from the transporting vehicle; or material placed outside the lines indicated on the plans or given by the ENGINEER; or material remaining on hand after completion of the Contract, will not be paid for and such quantities will not be included in the final total quantities. No compensation will be allowed for hauling rejected material.

- G. Bid items include all work necessary to complete the specific item described and not otherwise included in other bid items. The CONTRACTOR shall include in each bid item **all** costs required to construct the work in accordance with the Contract Documents and as identified below.

1.03 DESCRIPTION OF BID ITEMS

A. Bid Item 1: Mobilization/Demobilization.

- 1. The lump sum bid price for this item shall constitute full compensation for mobilization and demobilization including but not limited to equipment shipping and delivery, equipment set up, materials shipping and delivery, utility coordination, permitting including the Monterey County Demolition Permit and the City of Seaside Encroachment Permit, removal of Contractor's equipment, and project closeout. The Mobilization/Demobilization bid item shall not be in excess of ten percent (10%) of the total bid schedule. Twenty-five percent (25%) of the total Mobilization / Demobilization bid price shall be considered the cost of Demobilization and will not be paid until completion of the work.

B. Bid Item 2: Sheeting, Shoring and Bracing

- 1. The lump sum bid price for this item shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide sheeting, shoring and bracing of excavations, trenches and grading as required in the Contract Documents. Cost shall include any engineering or geotechnical investigations performed by the Contractor.

C. Bid Item 3: Traffic Control

- 1. The lump sum bid price for this item shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide traffic control around the work as required in the Encroachment Permit(s).

D. Bid Item 4: Lift Station - Civil.

- 1. The lump sum bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide a duplex sewer lift station, as shown on the plans. This item includes excavation, base rock, cast-in-place wet well base, pre-cast concrete wet well and valve vault, epoxy-coating of the wet well and base, backfill and compaction, site grading and paving, ductile iron pipes, valves, fittings, appurtenances, and fences.
- 2. The price shall also include two cast-around manholes and the 8-inch and 15-inch PVC gravity sewers connecting them to the wet well.
- 3. The price shall also include in-kind replacement of wood fences, access driveway bollards and landscape irrigation systems.
- 4. The price shall also include costs for dewatering excavations and treating or disposing of removed water.

E. Bid Item 5: Lift Station – Electrical

- 1. The lump sum bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide the meter pedestal, automatic transfer switch, motor control center (PLC, two VFDs and SCADA Telemetry),

instruments, controls, conduits, cables, equipment pads, antenna mast, and all electrical equipment and appurtenances not paid under other items.

2. The price shall include costs for SCADA integration and programming.

F. Bid Item 6: Retrofit and Relocate Existing Pumps.

1. The lump sum bid price shall include the removal of three pumps from existing lift station and converting the pumps from NT to NP installation (slide rail), installing and testing two (2) pumps into new lift station and providing third pump to OWNER as a spare. The work of this item shall be sequenced with the start-up and testing of the new pump station.
2. This item includes all components provided by the pump manufacturer, as listed in Section 33 32 20.

G. Bid Item 7: Relocate Generator.

1. The lump sum bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to relocate the existing 175 kW diesel electric generator set from the existing lift station and installing it at the new lift station. The price shall include anchoring hardware, providing and terminating power and control cables, and functional testing of the installed equipment.

H. Bid Item 8: 10-inch C900 Force Main.

1. The unit bid price per linear foot for this item shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide a 10-inch PVC C900 pipeline by open trench construction from the pump station to the terminal manhole, as shown on the plans. The price shall include furnishing and installing all pipe, tracer wire, fittings, air relief valves and appurtenances as described on the plans, and hydrostatically testing these structures according to the specifications, and making final connections to other portions of the Work. The price shall also include the removal and disposal of existing pavement, removal and disposal of excess excavation, backfill of excavations, and traffic control.
2. The price shall also include costs for restoring the streets and all other properties, back to initial condition.
3. The price shall also include costs for dewatering excavations and treating or disposing of removed water.

I. Bid Item 9: 12-inch Gravity Sewer Pipe PVC SDR 26.

1. The unit bid price per linear foot shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide all 12-inch PVC gravity sewer pipes as shown on the plans.
2. The price shall include furnishing and installing all PVC sewer pipes, fittings, cleanouts, building laterals, flushing inlets, and hydrostatically testing these structures according to the specifications. The price shall also include trenching, excavation, bedding, backfill, the removal and disposal of existing pavement, removal and disposal of excess excavation, and traffic control.
3. The price shall also include costs for restoring the streets and all other properties, back to initial condition.
4. The price shall also include costs for dewatering excavations and treating or disposing of removed water.

- J. Bid Item 10: 10-inch Gravity Sewer Pipe PVC SDR 26.
1. The unit bid price per linear foot shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide all 10-inch PVC gravity sewer pipes as shown on the plans.
 2. The price shall include furnishing and installing all PVC sewer pipes, fittings, cleanouts, building laterals, flushing inlets, and hydrostatically testing these structures according to the specifications. The price shall also include trenching, excavation, bedding, backfill, the removal and disposal of existing pavement, removal and disposal of excess excavation, and traffic control.
 3. The price shall also include costs for restoring the streets and all other properties, back to initial condition.
 4. The price shall also include costs for dewatering excavations and treating or disposing of removed water.
- K. Bid Item 11: 2-inch Air-Vac Valve with Vault.
1. The lump sum bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide the combination air-release and vacuum breaker valve, with fittings, isolation valve and manhole, as shown on the plans. This item includes excavation, base rock, cast-in-place base, pre-cast concrete manhole with ring and lid, backfill and compaction.
- L. Bid Item 12: Service Lateral Tie-in to New Sanitary Sewer
1. The unit bid price per service shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide all sewer service lateral tie-ins gravity sewer pipes as shown on the plans. The price shall include excavation, backfill, surface restoration, pipe and fittings as specified.
 2. This bid item's quantity shall be adjustable (increase or decrease) without limit to accommodate actual quantities found in the field.
- M. Bid Items 13: Pre-Cast Concrete Manholes.
1. The unit bid price per manhole shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide all pre-cast concrete sewer manholes as shown on the plans.
 2. The price shall include furnishing and installing all cast-in-place manhole bases, pre-cast concrete sewer manholes, and grade rings and lids as described on the plans, epoxy-coating the manhole interior, and hydrostatically testing these structures according to the specifications. The price shall also include trenching, excavation, bedding, backfill, the removal and disposal of existing pavement, removal and disposal of excess excavation, and traffic control.
 3. The price shall also include costs for restoring the streets and all other properties, back to initial condition.
 4. The price shall also include costs for dewatering excavations and treating or disposing of removed water.
- N. Bid Items 14: Cast-Around Concrete Manholes.
1. The unit bid price per manhole shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide all cast-around concrete sewer manholes as shown on the plans.

2. The price shall include furnishing and installing all cast-around manhole bases, pre-cast concrete sewer manholes, and grade rings and lids as described on the plans, epoxy-coating the manhole interior, and hydrostatically testing these structures according to the specifications. The price shall also include trenching, excavation, bedding, backfill, the removal and disposal of existing pavement, removal and disposal of excess excavation, and traffic control.
 3. The price shall also include costs for restoring the streets and all other properties, back to initial condition.
 4. The price shall also include costs for dewatering excavations and treating or disposing of removed water.
- O. Bid Item 15: Rehabilitate Existing Manholes:
1. The unit bid price per manhole for this item shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide mortar lining and epoxy coating for five existing manholes, including replacement rims and lids. Payment shall include surface preparation, minor concrete spot repairs and temporary by-pass pumping.
 2. Manholes are 4-ft diameter, nominally 8-feet deep.
- P. Bid Item 16: Abandon Existing Manholes:
1. The unit bid price per manhole for this item shall constitute full compensation for all material, labor, equipment, tools, and services necessary to provide sand backfill for abandoning manholes in-place. Payment shall include all pipeline plugs or appurtenances required for the work.
- Q. Bid Item 17: Flush and Abandon Existing Pipelines
1. The lump sum bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to flush the existing force main and gravity sewers to be abandoned, capturing and disposing of flushing water, exposing and cutting the pipelines at the locations indicated on the Drawings, and setting grout plugs at each end of the abandoned segments. This item includes backfilling and compacting removed soil and restoring the site.
 2. The price shall also include filling existing pipelines with cement slurry within the limits shown on the plans.
- R. Bid Item 18: Demolish Existing Lift Station
1. The lump sum bid price shall constitute full compensation for all material, labor, equipment, tools, and services necessary to abandon the existing sewer lift station including pedestals, electrical equipment, mechanical equipment, fences and pavement as shown on the plans. This item includes pumping out the existing lift station wet well, excavation, removal and disposal of lids, removing and disposing of pipes, breaking out of floors and inverts, backfilling and compacting removed soil and restoring the site.
 2. The price shall also include costs for dewatering excavations and treating or disposing of removed water.
- S. Bid Item 19: SCADA Integration Allowance.
1. This allowance shall be compensation for work performed by the District's SCADA Integrator, as directed in the Contract Documents. The allowance shall include

materials, equipment, programming and support for start-up and testing. The value of this allowance is pre-entered in the Bid Form.

2. Payment for SCADA Integration Allowance will be made at actual cost plus a 5% General Contractor's mark-up, which price shall constitute full compensation for the completion of all such work as required per the Contract Documents.
3. Additional items of work subcontracted to the District SCADA Integrator beyond those required in the Contract Documents (if any) shall be included in Bid Item No. 5, Lift Station Electrical.

T. Bid Item 20: Permit Allowance.

1. This allowance is for the reimbursement of the permit fees charged by the City of Seaside for Encroachment and Construction Permits. The value of this allowance is pre-entered in the Bid Form.
2. Payment under this item shall be for the actual cost of the permit fees, as reflected on the issuing agency invoices. Contractor's costs with respect to obtaining permits shall be included under Bid Item 1, Mobilization/Demobilization.

U. Bid Item 21: Remediation Allowance.

1. This allowance is for the reimbursement of pre-demolition remediation of potential environmental conditions at the existing lift station prior to demolition. The value of this allowance is pre-entered in the Bid Form.
2. Payment under this item shall be for the actual cost of material testing, permitting, selective removal of material(s), waste transport to disposal facility, disposal fees and reporting.

V. Add Alternate Bid Item A1: Polymer Concrete Wet Well

1. The lump sum bid price for this item shall include the incremental cost difference for providing a polymer concrete wet well per Section 33 05 62, instead of an epoxy-coated Portland cement concrete wet well per Section 33 05 61.
2. The Owner shall determine which wet well material will be included in the contract at the time of award.

W. Add Alternate Bid Item A2: Polymer Concrete Manholes

1. The lump sum bid price for this item shall include the incremental cost difference for providing a polymer concrete manholes per Section 33 05 62, instead of an epoxy-coated Portland cement concrete manholes per Section 33 05 61.
2. Where cast-in-place Portland cement concrete bases are used for cast-around manholes, the manhole invert must still be epoxy-coated.
3. The Owner shall determine which wet well material will be included in the contract at the time of award.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 30 00

CONTRACTOR SUBMITTALS

PART 1 - GENERAL

1.01 GENERAL

- A. Wherever submittals are required hereunder, all such submittals by the Contractor shall be submitted to the Engineer.
- B. Prior to receiving Notice to Proceed, the Contractor shall submit a Site Specific Safety Plan as required in Article 25 of the General Conditions.
- C. Within 14 days after the date of commencement as stated in the Notice to Proceed or at Preconstruction Conference, whichever occurs earliest, the Contractor shall submit the following items to the Engineer for review:
 - 1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitutes ("Or-Equal") submittals listed in the Bid.
 - 2. A list of all permits and licenses the Contractor shall obtain indicating the agency required to grant the permit and the expected date of submittal for the permit and required date for receipt of the permit.

1.02 PRECONSTRUCTION CONFERENCE SUBMITTALS

- A. At the preconstruction conference referred to in Section 01 11 00, "Summary of Work," the Contractor shall submit the following items to the Engineer for review:
 - 1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitute ("Or-Equal") submittals listed in the Bid.
 - 2. A list of all permits and licenses the Contractor shall obtain indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.
 - 3. Construction schedule for entire project.
 - 4. A preliminary schedule of values for lump sum pay items.

1.03 SHOP DRAWINGS

- A. Shop drawings shall be submitted electronically (.pdf format print or scan) via e-mail to the Owner's project manager. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items. Whenever the Contractor is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an Engineer registered in the appropriate engineering branch and in the State of California, unless otherwise directed.

- B. Wherever hard copy original submittals are called for in the Contract Documents or required by the Engineer, the Contractor shall furnish to the Engineer for review, 8 copies of each shop drawing submittal.
- C. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the Engineer.
- D. Except as may otherwise be indicated herein, the Engineer will return each submittal to the Contractor with its comments noted thereon, within 7 working days following their receipt by the Engineer. It is considered reasonable that the Contractor shall make a complete and acceptable submittal to the Engineer by the second submission of a submittal item. The OWNER reserves the right to withhold monies due to the Contractor to cover additional costs of the Engineer's review beyond the second submittal. The Engineer's maximum review period for each submittal, including all resubmittals, will be 7 working days per submittal. In other words, for a submittal that requires two resubmittals before it is complete, the maximum review period for that submittal could be 14 working days. No extension of Contract Time will be granted for delays due to resubmittals that are reviewed within the number of days specified.
- E. If a submittal is returned to the Contractor marked "NO EXCEPTIONS TAKEN," no revisions are required.
- F. If a submittal is returned to the Contractor marked "MAKE CORRECTIONS NOTED," the noted revisions must be made but resubmission of said submittal will not be required.
- G. If a submittal is returned to the Contractor marked "REVISE AND RESUBMIT," the Contractor shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the Engineer.
- H. If a submittal is returned to the Contractor marked "REJECTED-RESUBMIT," the Contractor shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the Engineer.
- I. Submittals which are for information only or which must be reviewed and approved by a permitting jurisdiction will be marked "RECEIPT ACKNOWLEDGED" by the Engineer.
- J. Fabrication of an item shall be commenced only after the Engineer has reviewed the pertinent submittals and returned copies to the Contractor marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED." Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the contract requirements.
- K. All Contractor shop drawings submittals shall be carefully reviewed by an authorized representative of the Contractor, prior to submittal to the Engineer. Each submittal shall

be dated, signed, and certified by the Contractor, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the Engineer of any Contractor submittals will be made for any items which have not been so certified by the Contractor. All non-certified submittals will be returned to the Contractor without action taken by the Engineer, and any delays caused thereby shall be the total responsibility of the Contractor.

- L. The Engineer's review of Contractor shop drawings submittals shall not relieve the Contractor of the entire responsibility for the correctness of details and dimensions. The Contractor shall assume all responsibility and risk for any misfits due to any errors in Contractor submittals. The Contractor shall be responsible for the dimensions and the design of connections between provided items (parts must fit together) and for the anchorage of supplied equipment when not detailed on the design drawings.

1.04 CONTRACTOR'S SCHEDULE

- A. Prepare construction schedule showing sequence of activities and proposed shutdowns.
- B. Submit a preliminary construction schedule not later than the Pre Construction Meeting.
- C. Update construction schedule on monthly basis and submit with request for Progress Payment.

1.05 RECORD DRAWINGS

- A. The Contractor shall keep and maintain, at the job site, one record set of Drawings. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the WORK as actually constructed. These master record drawings of the Contractor's representation of as-built conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the WORK. Copies of the modified record drawings shall be submitted on completion of WORK.
- B. Record drawings shall be accessible to the Engineer at all times during the construction period. Owner may hold a progress payment amount of \$5,000 until Contract Record Drawings are up-to-date.
- C. Final payment will not be acted upon until the Contractor's record drawings have been prepared and delivered to the Engineer. Said up-to date record drawings shall be in the form of a set of Contract Documents prints with any changes from the original Contract Documents carefully plotted on the prints in red ink.
- D. Upon substantial completion of the WORK and prior to final acceptance, the Contractor shall finalize and deliver a complete set of record drawings to the Engineer for

transmittal to the OWNER, conforming to the construction records of the Contractor. This set of drawings shall consist of corrected drawings showing the reported location of the WORK. The information submitted by the Contractor and incorporated by the Engineer into the Record Drawings will be assumed to be correct, and the Contractor shall be responsible for the accuracy of such information, and for any errors or omissions which may appear on the Record Drawings as a result.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 41 00

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 GENERAL

A. Titles of Sections and Paragraphs

1. Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. Applicable Publications

1. Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. Specialists, Assignments

1. In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- ###### A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.

- ###### B. All Work within this Project is subject to the requirements of the California Building Standards Code. The latest edition of the code as approved by California Building Standards Commission and used by the local agency as of the date that the Work is advertised for bids, or as adopted by the agency having jurisdiction, shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto. References herein to:

1. "Building Code" or "Uniform Building Code" shall mean the California Building Code;

2. "Mechanical Code" or "Uniform Mechanical Code" shall mean the California Mechanical Code;
 3. "Plumbing Code" or "Uniform Plumbing Code" shall mean the California Plumbing Code;
 4. "Fire Code" or "Uniform Fire Code," shall mean the California Fire Code;
 5. "Electric Code" or "National Electric Code (NEC)" shall mean the California Electrical Code.
- C. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or furnishing labor. The Contractor shall bid for the most stringent requirements.
- D. The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.
1. References in the Contract Documents to "CALTRANS Standard Specifications" shall mean the State of California Department of Transportation Standard Specifications and Standard Plans. The Contractor should be prepared to distinguish between these two references.
 2. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
 3. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
 4. Applicable Safety Standards
 - a. References herein to "Cal-OSHA" shall mean State of California Department of Industrial Relations, Construction Safety Orders, as amended to date, and all changes and amendments thereto.
 5. Accessibility requirements shall conform to Title 24 of the California Administration Code and ADA Guidelines.

1.03 REGULATIONS RELATED TO CONSTRUCTION ACTIVITIES.

- A. The Contractor is responsible that all Work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing construction activities, as referenced in Section 00 70 00, "General Conditions."

1.04 REGULATIONS RELATED TO HAZARDOUS MATERIALS

- A. The Contractor is responsible that all Work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

- B. Where no specific regulations exist, all chemical, hazardous, and petroleum product piping and storage in underground locations must be installed with double containment piping and tanks, or in separate concrete trenches and vaults, or with an approved lining which cannot be penetrated by the chemicals, unless waived in writing by the OWNER.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 42 13

ABBREVIATIONS OF INSTITUTIONS

PART 1 - GENERAL

1.01 GENERAL

- A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms or abbreviations which may appear in these Specifications shall have the meanings indicated herein.

1.02 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANS-	American Nuclear Society
ANSI	American National Standards Institute, Inc.

APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International
BHMA	Builders Hardware Manufacturer's Association
CBM	Certified Ballast Manufacturers
CEMA	Conveyors Equipment Manufacturer's Association
CGA	Compressed Gas Association
CLPCA	California Lathing and Plastering Contractors Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute

DCDMA	Diamond Core Drill Manufacturer's Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
EPA	Environmental Protection Agency
FM	Factory Mutual System
FPL	Forest Products Laboratory
HI	Hydronics Institute
APMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturer's Association
MPTA	Mechanical Power Transmission Association
MSS	Manufacturers Standardization Society
MTI	Marine Testing Institute
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards

NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NLGI	National Lubricating Grease Institute
NMA	National Microfilm Association
NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PPI	Plastics Pipe Institute
RCRA	Resource Conservation and Recovery Act
RIS	Redwood Inspection Service
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SMA	Screen Manufacturers Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry, Inc.
SPIB	Southern Pine Inspection Bureau
SPR	Simplified Practice Recommendation
SSA	Swedish Standards Association
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction

TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WEF	Water Environment Federation
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 53 00

PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 GENERAL

- A. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.
- B. The Contractor shall verify the exact locations and depths of existing utilities shown that will be affected by the work. Contractor shall make exploratory excavations as necessary to confirm locations shown. The depths shown for existing underground utilities are based on record drawings, limited potholing, and survey information, and are approximate only (± 1 foot vertical and ± 5 feet horizontal). Where the depths are not shown, no such information was obtained during design. When such exploratory excavations show the utility location as shown to be in error, the Contractor shall immediately notify the Engineer when existing utilities are not as shown on the drawings.
- C. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities. The Contractor shall also notify Underground Service Alert-North at 1-800-227-2600 at least 2 days, but no more than 14 days, prior to such excavation.
- D. Contractor shall photograph and document all project sites before and after construction. Contractor shall provide the Engineer with site pictures before work begins. Contractor shall provide the Engineer with photographs of completed work before requesting final payment.

1.02 PROTECTION OF STREET OR ROADWAY MARKERS AND MONUMENTS

- A. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced. All survey markers or points disturbed by the Contractor shall be restored accurately after all street or roadway resurfacing has been completed.

1.03 RESTORATION OF PAVEMENT

- A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of at least equal thickness to

match the existing adjacent undisturbed areas. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.

- B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the Contractor shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements. Temporary surfacing shall be replaced with permanent pavement within no more than 5 days after completion of work in an area. At no time shall the Contractor have more than 2,000 feet of trench with temporary surfacing.
- C. Restoration of Sidewalks or Private Driveways: Wherever sidewalks or private roads have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the Contractor shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

1.04 EXISTING UTILITIES AND IMPROVEMENTS

A. General

- 1. The Contractor shall protect all Underground Utilities and other improvements which may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary. The following clearances shall be met for gas mains and electric lines encountered:
 - a. Five feet from power pole to edge of straight trench.
 - b. Three feet from edge of slope for sloped trench.
 - c. Five feet from anchor blocks.
 - d. Three feet from edge of gas main to edge of pipeline.
 - e. One foot minimum crossing of gas main with pipeline.
 - f. A minimum of ten radial feet from the conductors on overhead power lines.
- 2. Clearances to be met for telephone are the following:
 - a. Five feet for anchor blocks and telephone poles.
 - b. Three feet for sloped trench.

B. Utilities to be Moved:

- 1. In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the Contractor, be notified by the Owner to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

- C. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal. The Contractor shall arrange with the utility for utility poles to be moved whenever any of the clearances described above cannot be maintained. Contractor shall pay for such utility pole relocation. No extra compensation shall be paid to the Contractor for movement of utility poles.
- D. Owner's Right of Access:
1. The right is reserved to the Owner and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.
- E. Underground Utilities Indicated:
1. Existing utility lines that are indicated or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the Contractor.
- F. Underground Utilities Not Indicated:
1. In the event that the Contractor damages any existing utility lines that are not indicated or the locations of which are not made known to the Contractor prior to excavation, a written report thereof shall be made immediately to the Engineer.
- G. Approval of Repairs:
1. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill or other work.
- H. Maintaining in Service:
1. All oil and gasoline pipelines, power, and telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The Contractor shall be responsible for all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 55 00

SITE ACCESS AND STORAGE

PART 1 - GENERAL

1.01 HAUL ROADWAYS

- A. The Contractor shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the Work.
- B. Provide traffic control as specified in Section 01 57 00.

1.02 CONTRACTOR'S WORK AND STORAGE AREA

- A. The Contractor shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the Work.
- B. Contractor may use the pump station site for temporary staging and storage, at the location shown on the Drawings. The use of additional areas along the alignment must be coordinated directly with the affected jurisdiction or property Owner.
- C. Contractor shall be responsible for the security of its equipment, materials, and facilities stored in the temporary staging and storage areas.
- D. Contractor shall not use temporary staging and storage areas for maintenance of vehicles and equipment used in constructing the Work without prior approval by the Property Owner.

1.03 PARKING

- A. The Contractor shall direct its employees to park in areas that do not interfere with traffic or the agricultural activity on adjacent parcels.
- B. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The Contractor shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

1.04 ACCESS THROUGH STATE PARK

- A. Coordinate with the Owner for access to the existing pump station located in Fort Ord Dunes State Park.
- B. Access to site is along the paved bicycle path (former Range Road). Traffic shall be limited to rubber-tired vehicles. Speeds on the bicycle path shall be limited to 25 mph.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 56 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Temporary facilities for the project including sanitary facilities, storage of materials, safety requirements, first aid equipment, fire protection, security measures, protection of the Work and property, access roads and parking, environmental controls, disposal of trash, debris and excavated material, and pest and rodent control.
- B. The facilities and controls specified in this section are considered minimum for the Project. The Contractor may provide additional facilities and controls for the proper execution of the Work and to meet Contractor's responsibilities for protection of persons and property.

1.02 CONTRACTOR'S RESPONSIBILITY

- A. Comply with applicable requirements as specified in other Sections.
 - 1. Maintain and operate temporary facilities and systems to assure continuous service.
 - 2. Modify and extend systems as Work progress requires.
 - 3. Completely remove temporary materials and equipment when their use is no longer required.
 - 4. Restore existing facilities used for temporary services to specified or to original condition.

1.03 TEMPORARY UTILITIES

- A. Obtaining Temporary Service:
 - 1. Make arrangements with utility service companies for temporary services.
 - 2. Abide by rules and regulations of the utility service companies or authorities having jurisdiction.
 - 3. Be responsible for utility service costs until the Work is substantially complete. Included are fuel, power, light, heat, and other utility services necessary for execution, completion, testing, and initial operation of the Work.
- B. Water:
 - 1. Provide water required for and in connection with Work to be performed or for other use as required for proper completion of the Work.
 - 2. For water to be drawn from public fire hydrants or other points of connection designated by the District, obtain special permit and meter from the District. All temporary connections shall be protected with an approved backflow prevention device or air-gap. Backflow prevention device must have proof of proper function (inspection certificate).

3. Provide and maintain an adequate supply of potable water for domestic consumption by Contractor personnel and Engineer or his Representatives.
- C. Electricity and Lighting:
1. Electrical power is not currently available on the well site.
 2. Provide electric power service as required for the Work. Provide power for operation of the Contractor's equipment, or for any other use by Contractor.
- D. Sanitary Facilities:
1. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction. Locate toilets near the Work site and secluded from view insofar as possible. Keep toilets clean and supplied throughout the course of the Work.
 2. Sanitary and Other Organic Wastes: The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Engineer and in accordance with all laws and regulations pertaining thereto.
- E. Rubbish
1. During the progress of the Work, the Contractor shall keep the site of the Work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.04 FIELD OFFICE - NOT USED

1.05 STORAGE OF MATERIALS

- A. Storage of materials not susceptible to weather damage may be on blocks off the ground.
- B. Store materials in a neat and orderly manner. Place materials to permit easy access for identification, inspection and inventory.
- C. Fill and grade site for temporary structures to provide drainage away from temporary and existing buildings.

1.06 SAFETY REQUIREMENTS

- A. Contractor shall prepare and implement a Site-Specific Health and Safety Plan. Prepare supplemental safety plans, if required, to address the Contractor's means and methods. Contractor shall keep a copy of this plan on-site at all times.

- B. Conduct operations in strict accord with applicable Federal, State and local safety codes and statutes and with good construction practice. The Contractor is fully responsible and obligated to establish and maintain procedures for safety of all work, personnel and equipment involved in the Project.
- C. Observance of and compliance with the regulations shall be solely and without qualification the responsibility of the Contractor without reliance or superintendence of or direction by the Engineer or the Engineer's representative. Immediately advise the Engineer of investigation or inspection by Federal Safety and Health inspectors of the Contractor or subcontractor's work or place of work on the job site under this Contract, and after such investigation or inspection, advise the Engineer of the results. Submit one copy of accident reports to Engineer within 10 days of occurrence.
- D. Protect areas occupied by workmen using the best available devices for detection of lethal and combustible gases. Test such devices frequently to assure their functional capability. Constantly observe infiltration of liquids into the Work area for visual or odor evidences of contamination, immediate take appropriate steps to seal off entry of contaminated liquids to the Work area.
- E. Safety measures, including but not limited to safety personnel, first aid equipment, ventilating equipment and safety equipment, in the specifications and shown on the Drawings are obligations of the Contractor.
- F. Maintain required coordination with the Police and Fire Departments during the entire period covered by the Contract.

1.07 FIRST AID EQUIPMENT

- A. Provide a first aid kit throughout the construction period. List telephone numbers for physicians, hospitals, and ambulance services in each first aid kit.
- B. Have at least one person thoroughly trained in first aid procedures present on the site whenever Work is in progress.

1.08 FIRE PROTECTION

- A. Conform to specified fire protection and prevention requirements established by Federal, State or local governmental agencies and as provided in Contractor's Safety Program.

1.09 SECURITY MEASURES

- A. Protect all Work materials, equipment, and property from loss, theft, damage, and vandalism. Contractor's duty to protect property includes Owner's property used in connection with the performance of the Contract.
- B. If existing fencing or barriers are breached or removed for purposes of construction, provide and maintain temporary security fencing equal to existing.
- C. Provide temporary fencing as needed to secure the construction site.

1.10 PROTECTION OF PUBLIC UTILITIES

- A. Prevent damage to existing public utilities during construction. Give owners of utilities at least 48 hours notice before commencing Work in the area, for locating utilities during construction, and for making adjustments or relocation of utilities when they conflict with the proposed Work.

1.11 PRE-CONSTRUCTION PHOTOGRAPHS

- A. Provide photographs and video of the condition of the entire site, including each area of the Work and temporary work, equipment storage and laydown areas prior to the start of the Work.
 - 1. Areas to be photographed and videoed shall include the site of the Work and all existing facilities either on or adjoining the Project site, including the interior of existing structures that could be damaged as a result of the Contractor's work.
 - 2. Include general condition, structures and vegetation in all staging, storing, working, parking and excavation areas.
 - 3. Pre-construction video of pipeline alignments shall be performed in each direction with a continuous video for each alignment. Videoing the alignment in a slow-moving (20 mph) vehicle with a Go-Pro or similar camera is acceptable.
- B. Submit photographs and videos per Section 01 30 00
 - 1. Submittal media may be:
 - a. PC-compatible DVD
 - b. PC-compatible flash (USB) drive
 - c. Web-based file sharing system (download from Contractor's site or upload to owner's site)
- C. Provide photos as individual, indexed JPG files with the following characteristics:
 - 1. Compression shall be set to preserve quality over file size
 - 2. JPG image resolution shall be 5 megapixels at 2400 x 1800 or higher.
 - 3. Images shall have rectangular clean edges.
 - 4. Images shall have time/date stamp
 - 5. Images or image index shall include:
 - a. Project name
 - b. Description of vantage point, indicating location and direction by compass point.
- D. Provide videos as MPG, MP4 or AVI files with the following characteristics:
 - 1. Video quality shall be 1080p or greater.
 - 2. Digital video color format
 - 3. Audio, if used, shall be sufficiently free from electrical interference and background noise to provide complete intelligibility of oral report.
 - 4. Label video with project name, location and date of recording.

1.12 PROTECTION OF THE WORK AND PROPERTY

- A. Preventive Actions:
 - 1. Take precautions, provide programs, and take actions necessary to protect the Work and public and private property from damage.

2. Take action to prevent damage, injury or loss, including, but not be limited to, the following:
 - a. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with progress of the Work or the Owner's operations.
 - b. Provide suitable storage for materials which are subject to damage by exposure to weather, theft, breakage, or otherwise.
 - c. Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.
 - d. Frequently clean up refuse, rubbish, scrap materials, and debris caused by construction operations, keeping the Project site safe and orderly.
 - e. Provide safe barricades and guard rails around openings, for scaffolding, for temporary stairs and ramps, around excavations, elevated walkways, and other hazardous areas.
 3. Obtain written consent from proper parties before entering or occupying with workers, tools, materials or equipment, privately owned land.
 4. Assume full responsibility for the preservation of public and private property on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect, or misconduct in execution of the Work by the Contractor, it shall be restored by the Contractor to a condition equal to or better than that existing before the damage was done.
- B. Barricades and Warning Signals: Where Work is performed on or adjacent to any roadway, right of way, or public place, furnish and erect barricades, fences, lights, warning signs, and danger signals; provide watchmen; and take other precautionary measures for the protection of persons or property and protection of the Work. Use barricades painted to be visible at night. From sunset to sunrise, furnish and maintain at least one light at each barricade. Erect sufficient barricades to keep vehicles from being driven on or into Work under construction. Furnish watchmen in sufficient numbers to protect the Work. Maintain barricades, signs, and lights, and provide watchmen until the Project is accepted by the Owner.
- C. Protection of Existing Structures:
1. Underground Structures:
 - a. Underground structures are defined to include, but not be limited to, sewer, water, gas, and other piping, and manholes, chambers, electrical and signal conduits, tunnels, and other existing subsurface installations located within or adjacent to the limits of the Work.
 - b. Known underground structures, including existing siphons are shown on the Drawings. This information is shown for the assistance of the Contractor in accordance with the best information available, but is not guaranteed to be correct or complete.
 - c. Explore ahead of trenching and excavation work and uncover obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption of utility services. Restore to original condition damages to underground structure at no additional cost to the Owner.
 - d. Necessary changes in location of the Work may be made by the Engineer to avoid unanticipated underground structures.
 - e. If permanent relocation of an underground structure or other subsurface installations is required and not otherwise provided for in the Contract Documents, the Engineer will direct Contractor in writing to perform the Work,

which shall be paid for under the provisions for changes in the Contract Price as described in Document 00700 - General Conditions.

2. Surface Structures: Surface structures are defined as existing buildings, structures and other constructed installations above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks, guard cables, fencing, and other facilities that are visible above the ground surface.
3. Protection of Underground and Surface Structures:
 - a. Support in place and protect from direct or indirect injury underground and surface structures located within or adjacent to the limits of the Work. Install such supports carefully and as required by the party owning or controlling such structure. Before installing structure supports, Contractor shall satisfy the Engineer that the methods and procedures to be used have been approved by the owner of the structure.
 - b. Avoid moving or in any way changing the property of public utilities or private service corporations without prior written consent of a responsible official of that service or public utility. Representatives of these utilities reserve the right to enter within the limits of this project for the purpose of maintaining their properties, or of making such changes or repairs to their property that may be considered necessary by performance of this Contract.
 - c. Notify the owners and/or operators of utilities and pipelines of the nature of construction operations to be performed and the date or dates on which those operations will be performed. When construction operations are required in the immediate vicinity of existing structures, pipelines, or utilities, give a minimum of 5 working days advance notice. Probe and flag the location of underground utilities prior to commencement of excavation. Keep flags in place until construction operation reach and uncover the utility.
 - d. Assume risks attending the presence or proximity of underground and surface structures within or adjacent to the limits to the Work including but not limited to damage and expense for direct or indirect injury caused by his Work to any structure. Immediately repair damage caused, to the satisfaction of the owner of the damaged structure.

D. Protection of Installed Products:

1. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to completion of Work.
2. Control traffic to prevent damage to equipment, materials, and surfaces.
3. Provide coverings to protect equipment and materials from damage.

1.13 ROADS AND PARKING

- A. Prevent interference with traffic on existing roads.
- B. Designate temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking. Locate as approved by Engineer.
- C. Minimize use by construction traffic of existing streets and driveways.

- D. Do not allow heavy vehicles or construction equipment in existing parking areas.

1.14 ENVIRONMENTAL CONTROLS

- A. Provide and maintain methods, equipment, and temporary construction as necessary for controls over environmental conditions at the construction site and adjacent areas.
- B. Comply with statutes, regulations, and ordinances which relate to the proposed Work for the prevention of environmental pollution and preservation of natural resources, including but not limited to the National Environmental Policy Act of 1969, PL 91 190, Executive Order 11514.
- C. The Owner recognizes that the site has considerable natural value and that construction of projects should have minimum impact to the surrounding environment. The Contractor shall adopt construction procedures that do not cause unnecessary excavation and filling of the terrain, indiscriminate destruction of vegetation, air or stream pollution, nor the harassment or destruction of wildlife.
- D. Recognize and adhere to the environmental requirements of the Project. Disturbed areas shall be strictly limited to boundaries established by the Contract Documents. Particularly avoid pollution of "on site" streams, wells or other water sources.
- E. Burning of rubbish, debris or waste materials is not permitted.
- F. Comply with the Mitigation and Monitoring Plan in the Initial Study/ Mitigated Negative Declaration adopted for the Project.

1.15 POLLUTION CONTROL

- A. Prepare a Spill Response and Prevention Plan, specific to the Contractor's means and methods. Submit prior to mobilization per Section 01 30 00, Contractor Submittals.
- B. Provide methods, means, and facilities required to prevent contamination of soil, water or atmosphere by discharge of noxious substances from construction operations.
- C. Provide equipment and personnel to perform emergency measures required to contain any spillage, and to remove contaminated soils or liquids. Excavate and dispose of any contaminated earth off-site, and replace with suitable compacted fill and topsoil.
- D. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.
- E. Prevent toxic concentrations of chemicals.
- F. Prevent harmful dispersal of pollutants into the atmosphere.
- G. Use equipment during construction that conforms to current Federal, State and local laws and regulations.
- H. Dispose of all trash and debris in permitted landfills or recycling facilities, as applicable, in accordance with state and local laws and regulations.

1.16 PEST AND RODENT CONTROL

- A. Provide rodent and pest control as necessary to prevent infestation of construction or storage areas.
- B. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.

1.17 NOISE CONTROL

- A. Provide vehicles, equipment, and construction activities that minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and local ordinances.
- B. Conduct construction operations during daylight hours except as approved by Engineer.
- C. Select construction equipment to operate with minimum noise and vibration. If in the opinion of the Engineer, objectionable noise or vibration is produced by equipment, rectify such conditions without additional cost to the Owner. The Sound Power Level (PWL) of any equipment shall not exceed 85 dbA (re: 10-12 watts) measured 50 feet from the piece of equipment, or the levels prescribed by local ordinances, whichever is lower. Explicit equipment noise requirements are specified with equipment specifications.

1.18 EXPLOSIVES AND BLASTING

- A. The use of explosives on the Work will not be permitted.

1.19 DUST AND MUD ABATEMENT

- A. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust and/or mud in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from any dust and/or mud originating from its operations. The dust or mud abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.

1.20 CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.
- B. All chemicals used during the project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, fertilizer, disinfectants, polymers, reactants, fuel, oil, hydraulic fluid, detergent, paint, solvent, glue, or any other classification, shall be stored within a containment area that minimizes contact of the chemicals and the storage containers with surface waters. The Contractor shall notify the

Engineer to determine if the surface water has been contaminated or may be allowed to be discharged to the storm drains or stream channels. If the surface water flows have become contaminated due to contact with the chemicals or the storage containers, the Contractor shall provide for removal and/or treatment of the surface water flows at no additional costs to the Owner. If spills occur in the containment area, the Contractor shall immediately notify the Engineer and contain and cleanup the spill to prevent spilled material from entering storm drains, stream channels, or groundwater or from being absorbed by the underlying pavement or soil.

1.21 TRENCH SPOILS DISPOSAL

- A. All trench spoils shall be hauled in trucks fitted with tarps and tailgates.
- B. All trench spoils shall be disposed of at suitable sites retained by the Contractor and in compliance with fill and grading permits, copies of which shall be provided to the Engineer.
- C. If disposing of trench spoils on private property, Contractor shall provide a release of liability from property owner upon construction completion.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 57 00

TRAFFIC REGULATION

PART 1 - GENERAL

1.01 TRAFFIC CONTROL REQUIREMENTS

- A. Traffic control plans shall comply with the encroachment permit issued by City of Seaside.
- B. Contractor shall supply and install all traffic control devices (including all warning, regulatory and guide signs) as required in Section 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction area Traffic Control Devices," of the CALTRANS Standard Specifications.
- C. Contractor shall furnish traffic control plans for approval by Presidio of Monterey Public Works Department and City of Seaside Public Works Department a minimum of three (3) full working days prior to the site mobilization. The traffic control plans must be approved by the Presidio and City prior to any installation of traffic control devices. Submit a copy of the plans to the Engineer "For Information Only".
- D. The traffic control plans shall be to scale and complete for each significant portion of the work requiring lane closures, traffic detours and/or restriction of traffic movements. The traffic control plans shall indicate the work area, all proposed signs, the spacing and location of all traffic control devices (arrow boards, flagmen, barricades, cones, pylon construction markers, etc.) the limits of proposed parking prohibitions, and the width and location of any rerouted traffic lanes.
- E. All open trenches must be adequately delineated by use of acceptable warning signs and devices during non-construction hours. The Contractor shall devise a typical plan indicating the type and spacing of barricades, signs, arrow boards, warning lights, pylon construction markers, construction tape, etc. to be used during non-construction hours. This plan must be submitted to the Engineer at the preconstruction meeting for review and approval.
- F. It is imperative that field traffic control be handled in such a manner as to adequately and safely direct all traffic movements in the project area. The Contractor shall not be allowed to proceed with construction at any time that, in the opinion of the Engineer, traffic control is inadequate to meet the field conditions. Traffic control measures, in addition to those indicated on the approved traffic control plans may be required as field conditions dictate.

1.02 TEMPORARY CROSSINGS

- A. General:
 - 1. Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial, agricultural and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, and

hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 500 feet shall be provided. The Contractor shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time.

B. Temporary Bridges:

1. Wherever necessary, the Contractor shall provide suitable temporary bridges or steel plates over unfilled excavations. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the Contractor shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required. If Contractor does not consider temporary bridge or steel plates necessary. Contractor shall secure written approval to omit the steel plates from the Engineer prior to excavation

1.03 STREET USE

- A. Nothing herein shall be construed to entitle the Contractor to the exclusive use of any public street, alleyway, or parking area during the performance of the Work hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the Engineer and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the Engineer or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.
- B. Do not block driveway access to adjacent properties without the consent of the affected landowner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 57 20

EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. General erosion and sediment controls and other control-related practices. Provide and maintain erosion and sediment controls until the site is finally stabilized or as directed by Engineer. Contractor shall prepare, submit and obtain SWPPP permit from State. Contractor shall prepare and submit all required documentation to State and Owner throughout project duration.
- B. Filter Fabric Fences:
 - 1. Type 1: Temporary filter fabric fences for erosion and sediment control in non-channelized flow areas.
 - 2. Type 2: Temporary reinforced filter fabric fences for erosion and sediment control in channelized flow areas.
- C. Straw Bale Fence.
- D. Dust controls are specified in Section 01 56 00 – Temporary Facilities and Controls.

1.02 REFERENCES

- A. National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002, State Water Resources Control Board
- B. Stormwater Best Management Practice Handbook, Construction, California Stormwater Quality Association (CASQA), January 2003
- C. Caltrans Storm Water Quality Handbook, Construction Site Best Management Practices Manual, March 1, 2003
- D. ASTM:
 - 1. D3786 - Standard Test Method for Hydraulic Bursting Strength for Knitted Goods and Nonwoven Fabrics.
 - 2. D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

1.03 SYSTEM DESCRIPTIONS

- A. Filter Fabric Fence Type 1 and Type 2: Install to allow surface or channel runoff percolation through fabric in sheet-flow manner and to retain and accumulate sediment. Maintain Filter Fabric Fences to remain in proper position and configuration at all times.

- B. Straw Bale Fence: Install to allow surface runoff percolation through straw in sheet-flow manner and to retain and accumulate sediment. Maintain Straw Bale Fence to remain in proper position and configuration at all times.

1.04 SUBMITTALS

- A. Follow Section 01 30 00 – Contractor Submittals.
- B. Submit manufacturer's catalog sheets and other product data on filter fabric and wire fencing.
- C. Submit the Storm Water Pollution Prevention Plan (SWPPP) prior to Notice to Proceed.
- D. Submit documentation verifying SWPPP compliance, including periodic inspection records and post-rain event reports. Contractor shall maintain SWPPP documentation on construction site and make available for review by Owner when requested.

PART 2 - PRODUCTS

2.01 EROSION CONTROL PRODUCTS AND SYSTEMS

- A. Sandbags: Polypropylene, polyethylene, or polyamide woven fabric, with minimum unit weight of 4 ounces per square yard, Muller burst strength exceeding 300 psi, and ultraviolet stability exceeding 70 percent. Fill bags with bank-run sand.
- B. Standpipe for Sediment Pump Pits: Galvanized round culvert pipe or round PVC pipe, minimum of 12-inch and a maximum of 24-inch diameter, perforate at 6 to 12 inch centers around circumference.
- C. Sediment Pump Pit Aggregate: Nominal 2-inch diameter river gravel.
- D. Portable Sediment Tank System: Standard 55-gallon steel or plastic drums, free of hazardous material contamination.
- E. Shop or field fabricate tanks in series with main inlet pipe, inter-tank pipes and discharge pipes, using quantities sufficient to collect sediments from discharge water.
- F. Straw: Standard-baled agricultural hay bound by wire, nylon, or polypropylene rope. Do not use jute or cotton binding.
- G. Straw Bale Stakes (applicable where bales are on soil): No. 3 diameter concrete reinforcing bars, deformed or smooth at Contractor's option, length as required for minimum 8 inch bury and full height bales.
- H. Filter Fabric: Mirafi, Inc., Synthetic Industries, or equivalent following Section 31 05 19.13.
 - 1. Woven or nonwoven geotextile filter fabric made of either polypropylene, polyethylene, ethylene, or polyamide material, in continuous rolls of longest practical length.

2. Grab Strength: 100 psi in any principal direction (ASTM D-4632), Mullen burst strength >200 psi (ASTM D-3786), and equivalent opening size between 50 and 140.
 3. Furnish ultraviolet inhibitors and stabilizers for minimum 6 months of expected usable construction life at temperature range of 0 degrees F to 120 degrees F.
- I. Wire Fencing: Woven galvanized steel wire, 14 gauge by 6 inch square mesh spacing, minimum 24 inch roll or sheet width of longest practical length.
 - J. Fence Stakes: Nominal 2 by 2 inch moisture-resistant treated wood; length as required for minimum 8 inch bury and full height of filter fabric.

PART 3 - EXECUTION

3.01 GENERAL

- A. Do not clear, grub or rough cut until erosion and sediment controls are in place, other than site work specifically directed by Engineer to allow surveying and soil testing.
- B. Maintain existing erosion and sediment controls, if any, until directed by Engineer to remove and dispose of existing controls.
- C. Prohibit equipment and vehicles from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Immediately repair damage, caused by construction traffic, to erosion and sediment control systems.

3.02 INSPECTION AND REPAIR

- A. Inspect erosion and sedimentation controls daily during periods of prolonged rainfall, at end of rainfall period, and minimum once each week.
- B. Repair or replace damaged sections immediately.
- C. Remove eroded and sedimented products when silt reaches a depth one-third the height of the control or 6 inches, whichever is less.

3.03 FILTER FABRIC FENCES

- A. Layout fence lines with wood stakes.
- B. Fence Type 1:
 1. Install stakes 3 feet on center maximum and firmly embed minimum 8 inches in soil. If filter fabric is factory preassembled with support netting, then maximum support spacing is 8 feet. Install wood stakes at a slight angle toward the source of anticipated runoff.
 2. Trench in the toe of the fence lines so the downward face of the trenches are flat and perpendicular to direction of flow. V trench configuration as shown on Drawings may also be used.
 3. Lay fabric along edges of trenches in longest practical continuous runs to minimize joints. Make joints only at a support post. Splice with minimum 6-inch overlap and seal securely.

4. Staple filter fabric to stakes at maximum 3 inches on center. Extend fabric minimum 18 inches and maximum 36 inches above natural ground.
 5. Backfill and compact trench.
- C. Fence Type 2:
1. Layout fences same as for Type 1.
 2. Install stakes at 6 feet on center maximum and at each joint in wire fence, firmly embedded 1-foot minimum, and inclined it as for Type 1.
 3. Tie wire fence to stakes with wire at 6 inches on center maximum. Overlap joints minimum one bay of mesh.
 4. Install trench same as for Type 1.
 5. Fasten filter fabric wire fence with tie wires at 3 inches on center maximum.
 6. Layout fabric same as for Type 1. Fasten to wire fence with wire ties at 3 inches on center maximum and, if applicable, to stakes above top of wire fence it as for Type 1.
 7. Backfill and compact trench.

3.04 STRAW BALE FENCES

- A. Install bales in a row with ends tightly abutting adjacent bales. Place bales with bindings parallel to ground surface. Where bales are installed on soil:
1. Embed bales in soil 4 inches minimum.
 2. Anchor bales with 2 stakes driven into soil, with top end of stake flush with top of bales. Angle the first stake in each bale toward previously laid bale to force bales together.
 3. Fill gaps between bales with straw to prevent water from escaping between bales. Wedge carefully to not separate bales.

3.05 STREET AND SIDEWALK CLEANING

- A. Keep areas clean of construction debris and mud carried by construction vehicles and equipment.
- B. In lieu of or in addition to stabilized construction exits, shovel or sweep pavements as required to keep areas clean. Do not hose or sweep debris and mud off street into adjacent areas, except, hose sidewalks during off-peak hours, after sweeping.

3.06 WASTE COLLECTION AREAS

- A. Prevent water runoff from passing through waste collection areas, and prevent water runoff from waste collection areas migrating outside collection areas.

3.07 EQUIPMENT MAINTENANCE AND REPAIR

- A. Confine maintenance and repair of construction machinery and equipment to areas specifically designated for that purpose, so fuels, lubricants, solvents, and other potential pollutants are not washed directly into receiving streams or storm water conveyance systems. Provide these areas with adequate waste disposal receptacles for liquid and solid waste. Clean and inspect maintenance areas daily.

- B. Where designated equipment maintenance areas are not feasible, take precautions during each individual repair or maintenance operation to prevent potential pollutants from washing into streams or conveyance systems. Provide temporary waste disposal receptacles.

3.08 PRODUCT STORAGE

- A. Follow Sections 01 56 00 - Temporary Facilities and Controls for basic storage requirements.
- B. Isolate areas where cements, solvents, paints, or other potential water pollutants are stored so they do not cause runoff pollution.
- C. Store toxic products, such as pesticides, paints, and acids following manufacturer's guidelines. Protect groundwater resources from leaching, with plastic mats, packed clay, tarpaper, or other impervious materials on areas where toxic products are opened and stored.

3.09 WATER RUNOFF AND EROSION CONTROL

- A. Control surface water, runoff, subsurface water, and water from excavations and structures to prevent damage to the Work, the site, or adjoining properties.
- B. Control fill, grading and ditching to direct water away from excavations, pits, tunnels, and other construction areas, and to direct drainage to proper runoff courses to prevent erosion, sedimentation or damage.
- C. Provide, operate, and maintain equipment and facilities of adequate size to control surface water.
- D. Dispose of drainage water to prevent flooding, erosion, or other damage to the site or adjoining areas. Follow environmental requirements.
- E. Retain existing drainage patterns external to the site by constructing temporary earth berms, sedimentation basins, retaining areas, and temporary ground cover as required to control conditions.
- F. Plan and execute construction and earth work to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
 - 1. Hold area of bare soil exposed at one time to a minimum.
 - 2. Provide temporary controls such as berms, dikes, and drains.
- G. Construct fill and waste areas by selective placement to eliminate surface silts or clays which will erode.
- H. Inspect earthwork periodically to detect start of erosion. Immediately apply corrective measures as required to control erosion.
- I. Unless otherwise indicated, compact embankments, excavations, and trenches by mechanically blading, tamping, and rolling soil in maximum of 8-inch layers. Provide

compaction density at minimum 90 percent Standard Proctor ASTM D-698-78 density. Make at least one test per 500 cubic yards of embankment.

- J. Do not maneuver vehicles on areas outside of dedicated rights-of-way and easements for construction. Immediately repair damage to erosion and sedimentation control systems caused by construction traffic.
- K. Do not damage existing trees intended to remain.

3.10 REMOVAL OF CONTROLS

- A. Remove erosion and sediment controls when the site is finally stabilized or as directed by Engineer.
- B. Dispose of sediments and waste products following Section 01 56 00 - Temporary Facilities and Controls.

END OF SECTION

SECTION 01 60 00

PRODUCTS, MATERIALS, EQUIPMENT AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 DEFINITIONS

- A. The word "Products," as used herein, is defined to include purchased items for incorporation into the WORK, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the WORK.

1.02 QUALITY ASSURANCE

- A. Source Limitations: To the greatest extent possible for each unit of work, the CONTRACTOR shall provide products, materials, and equipment of a singular generic kind from a single source.
- B. Compatibility of Options: Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products, materials, or equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.03 PRODUCT DELIVERY AND STORAGE

- A. The CONTRACTOR shall deliver and store the WORK in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the CONTRACTOR shall ensure coordination to ensure minimum holding or storage times for flammable, hazardous, easily damaged, or sensitive materials to deterioration, theft, and other sources of loss.
- B. The CONTRACTOR shall provide a certificate of compliance for all materials to be incorporated in the Work.

1.04 TRANSPORTATION AND HANDLING

- A. Products shall be transported by methods to avoid damage and shall be delivered in undamaged condition in manufacturers unopened containers and packaging.
- B. The CONTRACTOR shall provide equipment and personnel to handle products, materials, and equipment, including those provided by OWNER, by methods to prevent soiling and damage.
- C. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.05 STORAGE AND PROTECTION

- A. Products shall be stored in accordance with manufacturer's written instructions and with seals and labels intact and legible. Sensitive products shall be stored in weather-tight climate controlled enclosures and temperature and humidity ranges shall be maintained within tolerances required by manufacturer's recommendations.
- B. For exterior storage of fabricated products including pipe, products shall be placed on sloped supports above ground. Products subject to deterioration, including all ferrous metals, shall be covered with impervious sheet covering and heat and ventilation shall be provided to avoid condensation. PVC pipe shall be stored to avoid prolonged exposure to sunlight.
- C. Loose granular materials shall be stored on solid flat surfaces in a well-drained area and shall be prevented from mixing with foreign matter.
- D. Storage shall be arranged to provide access for inspection. The CONTRACTOR shall periodically inspect to assure products are undamaged and are maintained under required conditions.
- E. Storage shall be arranged in a manner to provide access for maintenance of stored items and for inspection.
- F. The CONTRACTOR shall comply with manufacturer's product storage requirements and recommendations.
- G. The CONTRACTOR shall maintain manufacturer-required environmental conditions continually.
- H. The CONTRACTOR shall ensure that surfaces of products exposed to the elements are not adversely affected and that weathering of finishes does not occur.
- I. For mechanical and electrical equipment, the CONTRACTOR shall provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.
- J. Products shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to acceptance by the OWNER in accordance with the Contract Documents.

1.06 PROPOSED SUBSTITUTES OR "OR-EQUAL" ITEM

- A. Whenever materials or equipment are indicated in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function, and quality required. If the name is followed by the words "or equal" indicating that a substitution is permitted, materials or equipment of other suppliers may be accepted if sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named, subject to the following requirements:
1. The burden of proof as to the type, function, and quality of any such substitute product, material or equipment shall be upon the CONTRACTOR.
 2. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitute and the ENGINEER'S decision shall be final.
 3. The ENGINEER may require the CONTRACTOR to furnish at the CONTRACTOR'S expense additional data about the proposed substitute.
 4. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR'S expense a special performance guarantee or other surety with respect to any substitute.
 5. Acceptance by the ENGINEER of a substitute item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract Documents and for adequacy of the substitute.
 6. The CONTRACTOR shall be responsible for resultant changes including design and construction changes and all additional costs resulting from the changes which the accepted substitution requires in the CONTRACTOR'S WORK, the WORK of its subcontractors and of other contractors, and shall effect such changes without cost to the OWNER.
- B. The procedure for review by the ENGINEER will include the following:
1. If the CONTRACTOR wishes to provide a substitute item, the CONTRACTOR shall make written application to the ENGINEER on a "Substitution Request Form."
 2. Unless otherwise provided by law or authorized in writing by the ENGINEER, the "Substitution Request Form(s)" shall be submitted within the 14 days after award of the Contract.
 3. Wherever a proposed substitute item has not been requested as specified herein, or wherever the submission of a proposed substitute material or equipment has been judged to be unacceptable by the ENGINEER, the CONTRACTOR shall provide the material or equipment indicated in the Contract Documents.
 4. The CONTRACTOR shall certify that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as that specified.
 5. The ENGINEER will evaluate each proposed substitute within a reasonable period of time.
 6. As applicable, no shop drawing submittals shall be made for a substitute item nor shall any substitute item be ordered, installed, or utilized without the ENGINEER'S prior written acceptance of the CONTRACTOR'S "Substitution Request Form."
 7. The ENGINEER will record the time required by the ENGINEER in evaluating substitutions proposed by the CONTRACTOR and in making changes by the CONTRACTOR in the Contract Documents occasioned thereby. Whether or not the

ENGINEER accepts a proposed substitute, the CONTRACTOR shall reimburse the OWNER for the charges of the ENGINEER for evaluating each proposed substitute.

- C. The CONTRACTOR's "Substitution Request Forms" shall contain the following statements and information which shall be considered by the ENGINEER in evaluating the proposed substitution:
1. The evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's achievement of substantial completion on time.
 2. Whether or not acceptance of the substitute for use in the WORK will require a change in any of the Contract Documents to adopt the design to the proposed substitute.
 3. Whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty.
 4. All variations of the proposed substitute from the items originally specified will be identified.
 5. Available maintenance, repair, and replacement service will be indicated. The manufacturer shall have a local service agency (within 50 miles of the site) which maintains properly trained personnel and adequate spare parts and is able to respond and complete repairs within 24 hours.
 6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including cost of redesign and claims of other contractors affected by the resulting change.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 77 00

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 FINAL CLEANUP

- A. The Contractor shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the Work by the Owner will be withheld until the Contractor has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

1.02 CLOSEOUT TIMETABLE

- A. The Contractor shall establish a date for acceptance of work. The date shall be established not less than one week prior to beginning any of the foregoing items, to allow the Owner, the Engineer, and their authorized representatives sufficient time to schedule attendance at such activities.

1.03 FINAL SUBMITTALS

- A. The Contractor, prior to requesting final payment, shall obtain and submit the following items to the Engineer for transmittal to the Owner:
 - 1. Written guarantees, where required.
 - 2. Operating manuals and instructions.
 - 3. Maintenance stock items; spare parts; special tools.
 - 4. Completed record drawings.
 - 5. Geospatially referenced locations of all installed facilities and equipment (i.e., GPS data)
 - 6. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 - 7. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.04 MAINTENANCE AND GUARANTEE

- A. The Contractor shall comply with the warranty requirements contained in the Construction Contract.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the Contractor shall have obtained a statement in writing from the affected private owner or public agency releasing the Owner from further responsibility in connection with such repair or resurfacing.

- C. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Contractor fails to make such repairs or replacements promptly, the Owner reserves the right to do the Work and the Contractor and his surety shall be liable to the Owner for the cost thereof.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 71 13

MOBILIZATION/DEMobilIZATION

PART 1 - GENERAL

1.01 GENERAL

- A. Mobilization shall include the obtaining of all permits; moving onto and off of the site of all plant and equipment; furnishing and erecting plants, temporary buildings, and other construction facilities, including the dismantling and removal of such plants, buildings, and facilities; and implementing security requirements; all as required for the proper performance and completion of the Work. Mobilization shall include the following principal items:
1. Moving on to the site of all Contractor's plant and equipment required for first month operations.
 2. Providing Contractor's field office trailers, complete with all specified furnishings and utility services including telephones, telephone appurtenances, etc., required to manage the WORK.
 3. Providing on-site sanitary facilities and potable water facilities.
 4. Arranging for and erection of Contractor's work and storage yard.
 5. Obtaining all required permits.
 6. Having all OSHA required notices and establishment of safety programs.
 7. Having the Contractor's superintendent at the job site full time.
 8. Submitting initial submittals, including those required for the Preconstruction Conference.
 9. Completing the Preconstruction Conference.
 10. Taking pre-construction photographs of existing conditions
- B. Demobilization shall include moving off the site all plant and equipment; temporary buildings; and other construction facilities; final cleaning of all work sites and the Contractor's staging area; completion of all punch list items; and submittal of construction record drawings, any required permits signed by the issuing agency, certifications, and operation and maintenance manuals.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes field engineering to establish lines and grades for the Work.

1.02 QUALITY CONTROL

- A. Employ a State of California Licensed Land Surveyor acceptable to Engineer for:
 - 1. Recovering control points established by District.
 - 2. Verifying benchmarks furnished by District.
 - 3. Establishing temporary benchmarks and construction control points.
 - 4. Recording location(s) and elevation(s) of temporary benchmarks and construction control points.
 - 5. Setting stakes for grading and fill placement, slopes, and inverts.
 - 6. Survey cross-sections of completed excavations.
- B. The survey activities shall be performed under direct supervision of the Licensed Land Surveyor.

1.03 SUBMITTALS

- A. Submit the name, address, and telephone number of Surveyor before starting survey work.
- B. On request, submit documentation verifying accuracy of survey work.
- C. Submit 3 original copies of certificate, signed by surveyor and sealed, stating that horizontal and vertical control lines, elevations, and benchmarks follow Contract Documents.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain a complete and accurate log of control and survey work as it progresses.
- B. Submit Record Documents following Section 01 70 00 - Project Closeout.
 - 1. Record, on as-built drawings, locations where pipeline alignments changed.
 - 2. Provide certified site survey to 0.01 foot precision of buildings, structures, pads and benchmarks signed by the professional land surveyor.

1.05 EXAMINATION

- A. Establish benchmarks, control points, lines and elevations prior to starting work. Notify Engineer immediately of discrepancies discovered between stated attributes of Owner-furnished data and surveyor's verification.

1.06 SURVEY REFERENCE POINTS

- A. Control datum for survey is that indicated on the Drawings.
- B. Contractor is required to establish its own control and references points as required to properly lay out the Work.
- C. Locate and protect benchmarks, control points, lines and elevations prior to starting site work. Preserve permanent reference points during construction.
- D. Notify Engineer 48 hours in advance of need for relocation of reference points due to changes in grades or other reasons.
- E. Report promptly to Engineer the loss or destruction of reference points.
- F. Reestablishment of permanent reference points disturbed by Contractor's operations shall be at the Contractor's expense.

1.07 SURVEY REQUIREMENTS

- A. Utilize recognized engineering survey practices.
- B. Establish a minimum of 2 permanent benchmarks on site, referenced to established control points. Record locations, with horizontal and vertical data, on Record Documents.
- C. Establish elevations, lines and levels to provide appropriate controls for the Work. Locate and lay out by instrumentation and similar appropriate means.
- D. Periodically verify layouts by same means.
- E. Utilize the project-specific coordinate system as defined on the Drawings.

1.08 CONSTRUCTION STAKES, LINES AND GRADES

- A. Execute the Work in accordance with the lines and grades indicated.
- B. Make distances and measurements on horizontal planes, except elevations and structural dimensions.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 75 00

START-UP, TESTING AND TRAINING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for equipment and system testing and facility startup, including the following:
 - 1. Start-up Plan.
 - 2. Performance Testing.
 - 3. General Start-up and Testing Procedures.
 - 4. Functional Testing.
 - 5. Operational Testing.
 - 6. Certificate of Proper Installation.
 - 7. Services of manufacturer's representatives.
 - 8. Training of Owner's personnel.
 - 9. Final testing requirements for the complete facility.

1.02 GENERAL TESTING, TRAINING, AND START-UP REQUIREMENTS

- A. Contract Requirements: Testing, training, and start-up are requisite to the satisfactory completion of the Contract.
- B. Complete testing, training, and start-up within the Contract Times.
- C. Allow realistic durations in the Progress Schedule for testing, training, and start-up activities.
- D. Furnish labor, power, chemicals, tools, equipment, instruments, and services required for and incidental to completing functional testing, performance testing, and operational testing.
- E. Provide competent, experienced technical representatives of equipment manufacturers for assembly, installation and testing guidance, and operator training.

1.03 START-UP PLAN

- A. Submit start-up plan for each piece of equipment and each system not less than 3 weeks prior to planned initial start-up of equipment or system.
- B. Provide detailed sub-network of Progress Schedule with the following activities identified:
 - 1. Manufacturer's services and source testing.
 - 2. Installation certifications.
 - 3. Operator training.

4. Submission of Operation and Maintenance Manual.
 5. Functional testing.
 6. Performance testing.
 7. Operational testing.
- C. Provide testing plan with test logs for each item of equipment and each system when specified. Include testing of alarms, control circuits, capacities, speeds, flows, pressures, vibrations, sound levels, and other parameters.
- D. Provide summary of shutdown requirements for existing systems which are necessary to complete start-up of new equipment and systems.
- E. Revise and update start-up plan based upon review comments, actual progress, or to accommodate changes in the sequence of activities.

1.04 FACTORY TESTING

- A. Test equipment for proper performance at point of manufacture or assembly when specified.
- B. When source quality control testing is specified:
1. Demonstrate equipment meets specified performance requirements.
 2. Provide certified copies of test results.
 3. Do not ship equipment until certified copies have received written acceptance from Engineer. Written acceptance of factory test results does not constitute final acceptance.
 4. Perform testing as specified in the equipment specification sections.

1.05 GENERAL START-UP AND TESTING PROCEDURES

- A. Mechanical Systems: As specified in the individual equipment specification sections:
1. Remove rust preventatives and oils applied to protect equipment during construction.
 2. Flush lubrication systems and dispose of flushing oils. Recharge lubrication system with lubricant recommended by manufacturer.
 3. Flush fuel system and provide fuel for testing and start-up.
 4. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
 5. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
 6. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
 7. Perform cold alignment and hot alignment to manufacturer's tolerances.
 8. Adjust V-belt tension and variable pitch sheaves.
 9. Inspect hand and motorized valves for proper adjustment. Tighten packing glands to ensure no leakage, but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.
 10. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.

11. Install gratings, safety chains, handrails, shaft guards, and sidewalks prior to operational testing.
- B. Electrical Systems: As specified in the individual equipment specification sections:
 1. Perform insulation resistance tests on wiring except 120 volt lighting wiring, and control wiring inside electrical panels.
 2. Perform continuity tests on grounding systems.
 3. Test and set switchgear and circuit breaker relays for proper operation.
 4. Perform direct current high potential tests on all cables that will operate at more than 2,000 volts. Obtain services of independent testing lab to perform tests.
 5. Check motors for actual full load amperage draw. Compare to nameplate value.
- C. Instrumentation Systems: As specified in the individual equipment specification sections:
 1. Bench or field calibrate instruments and make required adjustments and control point settings.
 2. Leak test pneumatic controls and instrument air piping.
 3. Energize transmitting and control signal systems, verify proper operation, ranges and settings.

1.06 FUNCTIONAL TESTING

- A. Perform checkout and performance testing as specified in the individual equipment specification sections.
- B. Functionally test mechanical and electrical equipment, and instrumentation and controls systems for proper operation after general start-up and testing tasks have been completed.
- C. Demonstrate proper rotation, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration. Perform initial checks in the presence of and with the assistance of the manufacturer's representative.
- D. Demonstrate proper operation of each instrument loop function including alarms, local and remote controls, instrumentation and other equipment functions. Generate signals with test equipment to simulate operating conditions in each control mode.
- E. Conduct continuous 8-hour test under full load conditions. Replace parts which operate improperly.

1.07 OPERATIONAL TESTING

- A. After completion of operator training, conduct operational test of the entire facility. Demonstrate satisfactory operation of equipment and systems in actual operation.
- B. Conduct operational test for continuous 7-day period.
- C. Owner will provide operations personnel, power, fuel, and other consumables for duration of test.

- D. Immediately correct defects in material, workmanship, or equipment which become evident during operational test.
- E. Repeat operational test when malfunctions or deficiencies cause shutdown or partial operation of the facility or results in performance that is less than specified.

1.08 CERTIFICATE OF PROPER INSTALLATION

- A. At completion of Functional Testing, furnish written report prepared and signed by manufacturer's authorized representative, certifying equipment:
 - 1. Has been properly installed, adjusted, aligned, and lubricated.
 - 2. Is free of any stresses imposed by connecting piping or anchor bolts.
 - 3. Is suitable for satisfactory full-time operation under full load conditions.
 - 4. Operates within the allowable limits for vibration.
 - 5. Controls, protective devices, instrumentation, and control panels furnished as part of the equipment package are properly installed, calibrated, and functioning.
 - 6. Control logic for start-up, shutdown, sequencing, interlocks, and emergency shutdown have been tested and are properly functioning.
- B. Furnish written report prepared and signed by the electrical and/or instrumentation Subcontractor certifying:
 - 1. Motor control logic that resides in motor control centers, control panels, and circuit boards furnished by the electrical and/or instrumentation subcontractor has been calibrated and tested and is properly operating.
 - 2. Control logic for equipment start-up, shutdown, sequencing, interlocks and emergency shutdown has been tested and is properly operating.
 - 3. Co-sign the reports along with the manufacturer's representative and subcontractors.

1.09 TRAINING OF OWNER'S PERSONNEL

- A. Provide operations and maintenance training for items of mechanical, electrical and instrumentation equipment. Utilize manufacturer's representatives to conduct training sessions.
- B. Coordinate training sessions to prevent overlapping sessions. Arrange sessions so that individual operators and maintenance technicians do not attend more than 2 sessions per week.
- C. Provide Operation and Maintenance Manual for specific pieces of equipment or systems one (1) month prior to training session for that piece of equipment or system.
- D. Satisfactorily complete functional testing before beginning operator training.
- E. Training Sessions: Provide training sessions for equipment as specified in the individual equipment specification sections. At a minimum, training shall address:
 - 1. Submersible pump operation and maintenance
 - 2. Adjustable valve settings
 - 3. Level transducer type and calibration

4. System control panel, manual operation and set-point adjustments
 5. SCADA control logic and component addressing
- F. The Contractor shall designate and provide one or more persons to be responsible for coordinating and expediting his/her training duties. The person or persons so designated shall be present at all training coordination meetings with the Owner.
- G. The Contractor's coordinator shall coordinate the training periods with Owner personnel and manufacturer's representatives, and shall submit a training schedule for each piece of equipment or system for which training is to be provided. Such training schedule shall be submitted not less than 21 calendar days prior to the time that the associated training is to be provided and shall be based on the current plan of operation.

1.10 RECORD KEEPING

- A. Maintain and submit following records generated during start-up and testing phase of Project:
1. Daily logs of equipment testing identifying all tests conducted and outcome.
 2. Logs of time spent by manufacturer's representatives performing services on the job site.
 3. Equipment lubrication records.
 4. Electrical phase, voltage, and amperage measurements.
 5. Insulation resistance measurements.
 6. Data sheets of control loop testing including testing and calibration of instrumentation devices and setpoints.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 78 20

OPERATIONS AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Preparation and submittal of Operation and Maintenance Manuals.
- B. Related Sections:
 - 1. Section 22 05 19 – Field Instrumentation.
 - 2. Section 26 24 13 – Switchboards
 - 3. Section 26 22 00 – Low Voltage Controllers.
 - 4. Section 26 28 26 – Enclosed Transfer Switches
 - 5. Section 26 29 24 – Control System
 - 6. Section 26 32 00 – Engine-Generator Set
 - 7. Section 33 32 20 – Submersible Non-Clog Pumps.

1.02 SUBMITTALS

- A. Submit Operation and Maintenance Manuals as part of the shop drawing approval process.
- B. Make additions and revisions to the Manuals in accordance with Engineer's review comments.
- C. Submit four (4) complete Manuals for each piece of equipment or system after shop drawing approval.

1.03 OPERATION AND MAINTENANCE MANUALS

- A. Preparation:
 - 1. Provide Operations and Maintenance Manuals in 3-ring binders with rigid covers. Utilize tab sheets to organize information.
- B. Contents of Operation and Maintenance Manuals:
 - 1. Cover Page: Equipment name, equipment tag number, project name, Owner's name, appropriate date.
 - 2. Table of Contents: General description of information provided within each tab section.
 - 3. Lubrication Information: Required lubricants and lubrication schedules.
 - 4. Control Diagrams:
 - a. Internal and connection wiring, including logic diagrams, wiring diagrams for control panels, ladder logic for computer based systems, and connections between

existing systems and new additions, and adjustments such as calibrations and set points for relays, and control or alarm contact settings.

5. Start-up Procedures: Recommendations for installation, adjustment, calibration, and troubleshooting.
6. Operating Procedures:
 - a. Step-by-step procedures for starting, operating, and stopping equipment under specified modes of operation.
 - b. Include safety precautions and emergency operating shutdown instructions.
7. Preventative Maintenance Procedures: Recommended steps and schedules for maintaining equipment.
8. Overhaul Instructions: Directions for disassembly, inspection, repair and reassembly of the equipment; safety precautions; and recommended tolerances, critical bolt torques, and special tools that are required.
9. Parts List: Generic title and identification number of each component part of equipment; include bearing manufacturer, model and ball or roller pass frequencies for every bearing.
10. Spare Parts List: Recommended number of parts to be stored at the site and special storage precautions.
11. Drawings: Exploded view or plan and section views with detailed callouts.
12. Provide electrical and instrumentation schematic record drawings.
13. Provide approved shop and fabrication drawings.
14. Source (Factory) Quality Control Test Results: Provide copies of factory test reports as specified in the applicable equipment section.
15. Field Quality Control Test Results: After field testing is completed, insert field test reports as specified in the applicable equipment section.
16. Equipment Summary Form: Completed form in the format attached at the end of this Section. Insert Equipment Summary Form after the tab sheet of each equipment section. The manufacturer's standard form will not be acceptable.
17. Manufacturer's Warranty Documents: Provide copies of standard warranty documents with the initial O&M Manual submittal. Submit equipment specific warranties (listing serial numbers and expiration dates) at project close-out.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM _____
2. MANUFACTURER _____
3. EQUIPMENT IDENTIFICATION NUMBER(S) _____

4. LOCATION OF EQUIPMENT _____
5. NAMEPLATE DATA -
Horsepower _____
Amperage _____
Voltage _____
Service Factor (S.F.) _____
Speed _____
Enclosure Type _____
Capacity _____
Other _____
6. MANUFACTURER'S LOCAL REPRESENTATIVE
Name _____
Address _____
Telephone Number _____
7. MAINTENANCE REQUIREMENTS _____

8. LUBRICANT LIST _____

9. SPARE PARTS (recommendations) _____

10. COMMENTS _____

SECTION 02 01 00

EXISTING FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes requirements for connection to and abandonment of existing facilities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).
- B. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
 - 1. Abandonment of Pipelines 02 22 20
 - 2. Trenching, Backfilling, and Compacting: 31 23 00
 - 3. Manual Valves: 33 12 16

1.03 SUBMITTALS

- A. Submit a connection plan detailing the schedule and methods for transitioning each building from the current septic system to the new wastewater collection system.

1.04 CONDITION OF EXISTING FACILITIES

- A. The Owner does not warranty the condition, size, material, and location of existing facilities.

1.05 LOCATION

- A. The Contractor shall be responsible for potholing and verifying in advance the location of all existing pipelines as shown on the plans. Discrepancies shall be reported to the Engineer, prior to the fabrication of, or purchase of material affected by the discrepancy.

1.06 PROTECTION OF EXISTING UTILITIES AND FACILITIES

- A. The Contractor shall be responsible for the care and protection of all existing sewer pipe, water pipe, gas mains, culverts, power or communications lines, sidewalks, curbs, pavement, or other facilities and structures that may be encountered in or near the area of the work.
- B. It shall be the duty of the Contractor to notify Underground Service Alert and each agency of jurisdiction and make arrangements for locating their facilities prior to beginning construction.

- C. In the event of damage to any existing facilities during the progress of the work, the Contractor shall pay for the cost of all repairs and protection to said facilities. The Contractor's work may be stopped until repair operations are complete.

1.07 PROTECTION OF LANDSCAPING

- A. The Contractor shall be responsible for the protection of all the trees, shrubs, irrigation systems, fences, and other landscape items adjacent to or within the work area, unless they are directed to do otherwise on the plans.
- B. In the event of damage to landscape items, the Contractor shall replace the damaged items to the satisfaction of the Engineer and the Owner, or pay damages to the property Owner as directed by the Owner.
- C. When the proposed pipeline is to be within planted or other improved areas in public or private easements, the Contractor shall restore such areas to the original condition after completion of the work. This restoration shall include grading, a placement of 5 inches of good topsoil, re-sodding, and replacement of all landscape items indicated.
- D. If the Contractor does not proceed with the restoration after completion of the work or does not complete the restoration in a satisfactory manner, the Engineer reserves the right to have the work done and to charge the Contractor for the actual cost of the restoration including all labor, material, and overhead required for restoration.

1.08 PERMITS

- A. All work shall conform to the specifications and requirements of the State of California Department of Transportation, the County, the city having jurisdiction, or the other affected agencies involved. The Contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits. Permits shall also include any related to the abandonment of an existing water or sewer pipe.

PART 2 - MATERIALS

All materials used in making the connection or removing the facility from service shall conform to the applicable sections of these specifications.

2.01 GROUT

- A. Grout used for filling or plugging abandoned facilities shall be in accordance with Section 02 22 20.

2.02 CONCRETE

- A. Concrete used for the replacement of damaged or removed facilities shall be in accordance with Section 03 30 00 and shall match the mix design of the existing facility and per the requirement of the jurisdictional agency.

PART 3 - EXECUTION

3.01 CONNECTION TO EXISTING FACILITIES

- A. All connections shall be made by the Contractor unless shown otherwise on the plans or specified herein.
- B. If multiple connections to the sewer system are anticipated, the Contractor shall submit a connection plan developed with the intent of minimizing the down time to customers.
- C. When customers are affected, the Contractor shall notify the Owner a minimum of seven working days before the time of any proposed shutdown of existing mains or services. The Owner's inspector may postpone or reschedule any shutdown operation if for any reason he feels that the Contractor is improperly prepared with competent personnel, equipment, or materials to proceed with the connection work.
- D. When no customers are affected, the Contractor shall notify the Owner a minimum of two working days before the time of any proposed shutdown of existing mains or services. The Owner's inspector may postpone or reschedule any shutdown operation if for any reason he feels that the Contractor is improperly prepared with competent personnel, equipment, or materials to proceed with the connection work.
- E. Connections shall be made only in the presence of the Owner or Owner's inspector, and no connection work shall proceed until the Engineer has given notice to proceed. If progress is inadequate during the connection operations to complete the connection in the time specified, the Engineer shall order necessary corrective measures. All costs for corrective measures shall be paid by the Contractor.
- F. The Contractor shall furnish all pipe and materials including furnishing all labor and equipment necessary to make the connections, all required excavation, backfill, pavement replacement, lights, and barricades, and may be required to include a water truck, high line hose, and fittings as part of this equipment for making the connections. In addition, the Contractor shall assist the Owner in alleviating any hardship incurred during the shutdown for connections. Standby equipment or materials may be required by the Engineer.
- G. The Contractor shall de-water existing mains, as required, in the presence of the Owner's inspector.
- H. New pipelines shall not be connected to existing facilities until the new pipelines have been successfully tested and accepted by the Owner.

3.02 REMOVAL FROM SERVICE OF EXISTING MAINS AND APPURTENANCES

- A. Existing mains and appurtenances shall be removed from service at the locations shown on the plans or as directed by the Engineer.
- B. Abandoned pipe shall be filled with flowable fill in accordance with Section 02 22 20.
- C. Existing pipe and appurtenances removed from the ground will require backfill and repair of surface in accordance with Section 31 23 00.

- D. Removed pipe and appurtenances shall be temporarily stockpiled on the job in a location that will not disrupt traffic or be a safety hazard, disposed of in a proper manner (as determined by the Engineer). The Contractor shall remove and dispose of all removed pipe at his own expense to a landfill permitted to accept such materials.
- E. Before excavating for installing mains that are to replace existing pipes and/or services, the Contractor shall make proper provisions for the maintenance and continuation of service as directed by the Engineer unless otherwise specified.
- F. If the meter box is to be removed from an abandoned water service, the service line is to be removed and the corporation stop closed and capped. If there is no corporation stop on the service, the adapter is to be removed and a brass plug is to be installed in the service saddle.
- G. Asbestos Cement Pipe (ACP) shall be cut, removed and disposed of in a proper manner. The Contractor shall be responsible for the proper manifesting of any and all ACP at an authorized disposal site.

3.03 CUTTING AND RESTORING STREET SURFACING.

- A. In cutting or breaking up street surfacing, the Contractor shall not use equipment that will damage adjacent pavement.
- B. All asphalt and/or Portland cement concrete surfaces shall be scored with sawing equipment of a type meeting the approval of the Owner; providing however, that any cement concrete base under an asphaltic mix surface will not be required to be scored by sawing. Existing paving surfaces shall be sawcut back beyond the edges of the trenches to form neat square cuts before repaving is commenced.
- C. Pavement, sidewalks, curbs, or gutters removed or destroyed in connection with performance of the work shall be saw cut to the nearest score marks, if any, and shall be replaced with pavement sidewalks, curbs, or gutters of the same kind, or better by the Contractor in accordance with the latest specifications, rules, and regulations and subject to the inspection of the agency having jurisdiction over the street or highway.
- D. Aggregate base shall be placed beneath the restored pavement to the thickness required by the agency having jurisdiction.

END OF SECTION

SECTION 02 22 20

ABANDONMENT OF PIPELINES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes abandonment in place of existing pipelines and manholes, when indicated on the Drawings for abandonment.
- B. Related Work Specified Elsewhere
 - 1. All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).
 - 2. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
 - a. Trenching, Backfilling, and Compacting: 31 23 00

1.02 REFERENCE STANDARDS

- A. ASTM C150 – Standard Specification for Portland Cement.
- B. ASTM C494 – Standard Specification for Chemical Admixture for Concrete.
- C. ASTM C618 – Standard Specification for Fly Ash and Raw or Calcinated Natural Pozzolan for use as Mineral Admixture in Portland Cement Concrete.
- D. ASTM C940 – Standard test Method for Expansion and Bleeding of Freshly Mixed grout for Replaced Aggregate Concrete in the Laboratory.
- E. ASTM C1017 – Standard Specification for Chemical Admixture for Use in Producing Flowing Concrete.
- F. ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).

1.03 DEFINITIONS

- A. Abandonment. Pipeline abandonment consists of filling or plugging portions of existing pipelines with flowable fill or grout plugs, as indicated on the Drawings. Manhole abandonment consists of removing cylinders, rings and lids above the depth indicated on the Drawings, and filling the remainder with flowable fill.
- B. Flowable Fill. Flowable fill shall be controlled low-strength material consisting of fluid mixture of cement, fly ash, aggregate, water and with admixtures as necessary to provide workable properties. Placement of flowable fill may be by grouting techniques in pipelines or other restricted areas, or as mass placement by chutes or tremie methods in

unrestricted locations with open access. Long-term hardened strength shall be within specified range.

- C. Backgrouting. Secondary stage pressure grouting to ensure that voids have been filled within abandoned pipes. Backgrouting will only be required at critical locations indicated on the Drawings or if there is evidence of incomplete flowable fill placements.

1.04 SUBMITTALS

- A. Submit flowable fill mix design report.
 - 1. Flowable fill type and production method. Describe if fill will be mixed to final proportions and consistency in batch plant or if constituents will be added in transit mixer at placement location.
 - 2. Aggregate gradation of fill. Aggregate gradation of mix shall be used as pilot curve for quality control during production.
 - 3. Fill mix constituents and proportions including materials by weight and volume, and air content. Give types and amounts of admixtures including air entrainment or air generating compounds.
 - 4. Fill densities and viscosities, including wet density at point of placement.
 - 5. Initial time of set.
 - 6. Bleeding and shrinkage.
 - 7. Compressive strength.
- B. Submit technical information for equipment and operational procedures including projected injection rate, grout pressure, method for controlling grout pressure, bulkhead and vent design and number of stages for grout application.

PART 2 - MATERIALS

2.01 FLOWABLE FILL

- A. Design Mix Criteria. Provide design of one or more mixes to meet design criteria and conditions for placement. Present mix design information required by Part 1, Paragraph 1.04.A, to include the following:
 - 1. Cement: ASTM C150 Type I or II. Volume and weight per cubic yard of fill. Provide minimum cement content of 50 pounds per cubic yard.
 - 2. Fly ash: ASTM C618, Class C or F. Volume and weight per cubic yard of fill. Provide minimum fly ash content of 200 pounds per cubic yard.
 - 3. Potable water: Volume and weight per cubic yard of fill. Amount of water determined by mix design testing.
 - 4. Aggregate gradation: 100 percent passing 3/8-inch sieve and not more than 10 percent passing No. 200 sieve. Mix design report shall define pilot gradation based on following sieve sizes: 3/8 inch, No. 4, 8, 16, 30, 50 100 and 200. Do not deviate from pilot gradation by more than plus or minus 10 percentage points for any sieve for production material.

5. Aggregate source material: Screened or crushed aggregate, pit or bank run fine gravels or sand, or crushed concrete. If crushed concrete is used, add at least 30 percent natural aggregate to provide workability.
 6. Admixtures: use admixtures meeting ASTM C494 and ASTM C1017 as needed to improve pumpability, to control time of set and to reduce bleeding.
 7. Fluidifier: Use fluidifier meeting ASTM C937 as necessary to hold solid constituents in suspension. Add shrinkage compensator if necessary.
 8. Performance additive: Use flowable fill performance additive, if needed, to control fill properties.
- B. Flowable Fill Requirements:
1. Unconfined compressive strength: minimum 75 psi and maximum 150 psi at 56 days as determined based on an average of three tests for same placement. Present at least three acceptable strength tests for proposed mix design in mix design report.
 2. Placement characteristics: self-leveling.
 3. Shrinkage characteristics: non-shrink.
 4. Water bleeding for fill to be placed by grouting method in pipes: not to exceed 2 percent according to ASTM C940.
 5. Minimum wet density: 90 pounds per cubic foot.

2.02 GROUT PLUGS

- A. Cement-based dry-pack grout conforming to ASTM C1107, Grade B or C.

PART 3 - EXECUTION

3.01 REQUIREMENTS BY PIPE LOCATION, SIZE AND DEPTH

- A. General areas, up to 5-feet of cover from finished grade. Abandonment not allowed except within specific listed areas. Pipes with less than 60-inches cover shall be removed and properly disposed.
- B. General areas, pipes greater than 8-inch diameter, greater than 5-feet of cover from finished grade. Pipes indicated on the Drawings to be abandoned in place shall be completely filled with flowable fill.
- C. General areas, pipes equal or less than 8-inch diameter, greater than 5-feet of cover from finished grade. Pipes indicated on the Drawings to be abandoned in place shall be cut and a grout plug set at each end.
- D. Pipes under structures, waterways, roads, railroads tracks, rail right-of-ways or similar surface obstructions, and depth or diameter. Pipes indicated on the Drawings to be abandoned in place shall be completely filled with flowable fill.

3.02 FLUSHING OF SANITARY SEWER PIPES

- A. Prior to abandoning sanitary sewer pipes, Contractor shall flush the line with clean water and dispose of the residual sewage.

- B. Disposal may be by:
 - 1. Discharge into the existing sanitary sewer collection system, where indicated on the plans;
 - 2. Truck and haul to a designated sanitary sewer manhole, where indicated on the plans;
 - 3. Truck and haul to the nearest wastewater treatment facility: Monterey One Water Regional Treatment Plant, 14811 Del Monte Blvd, Marina, CA 93933.
 - 4. Drain the flushing water from the pipelines prior to grouting.

3.03 PREPARATION

- A. Notify inspector at least 24-hours in advance of grouting with flowable fill.
- B. Select fill placement equipment and follow procedures with sufficient safety and care to avoid damage to existing underground utilities and structures. Operate equipment at pressure that will not distort or imperil portions of the work, new or existing.
- C. Cut and cap portions of the piping system to remain, as shown on the Drawings. Drain water mains to be abandoned.
- D. Clean gravity sewer lines and video to identify connections and locate obstructions. Locate previously unidentified connections which have not been redirected or reconnected as part of the work and report them to the Project Manager. During placement of fill, compensate for irregularities in sewer pipe, such as obstructions or open joints, to ensure no voids remain unfilled.
- E. Perform demolition work prior to starting fill placement. Clean placement areas for pipes and manholes of debris that may hinder fill placement. Remove excessive amounts of sludge and other substances that may degrade performance of the fill. Do not leave sludge or other debris in place if filling more than 2 percent of placement volume. Dispose of waste material in accordance with applicable codes and regulations.
- F. Remove free water prior to fill placement.

3.04 EQUIPMENT

- A. Mix flowable fill in automated batch plant and deliver it to site in ready-mix trucks. Performance additives may be added at placement site if required by mix design.
- B. Use concrete or grout pumps capable of continuous delivery at planned placement rate.

3.05 DEMOLITION OF MANHOLES PRIOR TO ABANDONMENT

- A. Remove covers and castings and dispose or recycle as applicable.
- B. Demolish and remove precast concrete rings to the depth indicated on the plans. Minimum depth of removal shall be 4-feet below finished grade, or 12-inches below any crossing utility, whichever is greater.
- C. Clean manholes, break out inverts and backfill as shown on the Drawings.

3.06 INSTALLATION OF FLOWABLE FILL

- A. Abandon pipelines, as required 3.01, by completely filling with flowable fill. Abandon manholes by filling the portion not removed with flowable fill.
- B. Place flowable fill equal to volume of pipe being filled. Continuously place flowable fill from manhole to manhole with no intermediate pour points, but not exceeding 500 linear feet of pipe per fill segment.
- C. Perform operation with experienced crews with equipment to monitor density of flowable fill and to control pressure.
- D. Temporarily plug or cap pipe segments which are to remain in operation during filling to keep lines free of flowable fill.
- E. Pump flowable fill through bulkheads or use other suitable construction methods to contain flowable fill in lines to be abandoned.
- F. Place flowable fill under pressure flow conditions into properly vented open system until flowable fill emerges from vent pipes. Pump flowable fill with sufficient pressure to overcome friction. Fill sewers from the downstream end to vent at upstream end.
- G. Backfill excavations per Section 31 23 00, Trenching, Backfilling and Compacting.
- H. Collect and dispose of excess flowable fill material and debris.

3.07 INSTALLATION OF GROUT PLUGS

- A. Abandon pipelines of diameter 8-inches and below, as required in Part 3, Paragraph A, by cutting and placing grout plugs.
- B. Clean inside surface of pipe at least 12-inches from ends, achieving firm bond and seal grout plug to pipe surface. Similarly clean and prepare exterior surface if manufactured cap is to be used.
- C. Place temporary plug or bulkhead approximately 12-inches inside pipe. Fill pipe end completely with dry-pack grout mixture.
- D. Backfill excavations per Section 31 23 00, Trenching, Backfilling and Compacting.
- E. Collect and dispose of excess grout material and debris.

3.08 QUALITY CONTROL

- A. Provide batch plant tickets for each truck delivery of flowable fill. Note on tickets addition of admixtures at site.
- B. Check flow characteristics and workability of fill as placement proceeds.
- C. Obtain at least three test cylinders from each placement area for determination of 56-day compressive strength and bleeding. Acceptance of placement will be based on average strength of three tests.

- D. Record volume of flowable fill placement to demonstrate that voids have been filled. If voids exceed 10% of pipeline volume, injection grouting may be required at the direction of the Project Manager.

3.09 PROTECTION OF PERSONS AND PROPERTY.

- A. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.
- B. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks or passageways adjacent to the work.

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Demolishing and removing existing buildings and structures, and associated foundations and slabs, and all associated equipment and materials and other improvements within the limits indicated on the Drawings.
- B. Removing concrete paving, sidewalks, driveways and asphaltic concrete pavement.
- C. Removing other improvements, including pipe culverts, sewers, and miscellaneous concrete/masonry structures.
- D. Recycling or disposing of demolished/removed materials and equipment.
- E. Restoring the sites by rough grading.

1.02 REGULATORY REQUIREMENTS

- A. Remove items containing lead paint at buildings and structures before beginning demolition or removal of those structures. Removal shall be by a licensed lead abatement contractor.
- B. Conform to applicable federal, state and local codes for demolition activities, disposal of debris, and for recycling or salvaging of materials.
- C. Coordinate removal work with utility companies.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01 30 00, Contractor Submittals
- B. Submit a Demolition/Removal Plan, including:
 - 1. Proposed methods, equipment, and sequence of operations for demolition of buildings and structures. Describe coordination for shutting off, capping, and removing temporary utilities.
 - 2. Proposed methods, equipment, materials and sequence of operations for removal of pavements and other improvements.
 - 3. Proposed moving, demolition and removal schedule.
 - 4. Proposed plan for reclamation/disposal of equipment, materials, waste and debris, including permits, as applicable, of reclamation/disposal facilities, and for recycling or salvaging materials.
- C. Obtain permit from the Monterey Bay Air Resources District for building demolition, as required.

D. Submit load tickets from disposal or recycling facilities for all removed materials.

1.04 SCHEDULE

A. Demolition of the existing pump station and gravity manholes shall not commence until the replacement pump station is tested and fully operational.

1.05 OWNERSHIP OF MATERIAL AND EQUIPMENT

A. All materials and equipment designated for demolition and removal become the property of the Contractor.

B. Items to be retained by Owner:

1. Submersible wastewater pumps. See Section 33 32 20
2. Diesel-Electric Generator and enclosure, to be relocated to replacement pump station.
3. Items to be removed and delivered to the Owner's Corporation Yard at 2840 4th Avenue, Marina, CA 93933.
 - a. Diesel Fuel Tank at Generator (drain and disconnect).
 - b. PLC Cabinet and control components
 - c. ARI air relief valve from force main
 - d. Pressure transducer from force main
 - e. Floats from wet well
 - f. Radio antenna
 - g. Copper louver
 - h. Surge valve
 - i. Check Valves (3)
 - j. Water service backflow preventer (1" RP)

C. Items to remain:

1. Two monitoring wells as indicated on the Drawings. Protect these in place during the Work.

1.06 STORAGE AND HANDLING

A. Remove equipment and materials and all waste and debris resulting from demolition from site. Remove material as work progresses to avoid clutter.

1.07 ENVIRONMENTAL CONTROLS

A. Inspections for asbestos and lead paint at the existing site have been performed, and the results are provided in the Appendix. Materials with paint that contains in excess of 0.5 percent lead are identified in the report. Asbestos materials were not detected.

B. Notify and protect workers in accordance with applicable Federal, State, and Local laws, regulations and ordinances. Note: The lead-based paint does not create a hazardous waste condition, so disposal is not affected.

C. If, in the course of the Work, materials are exposed which may require remediation, special handling or special disposal, Contractor shall notify the Engineer and test those

materials to determine if remediation is required. If remediation is required, segregate and dispose of those materials separately.

- D. Minimize spread of dust and flying particles. If required by governing regulations, use temporary enclosures and other suitable methods to prevent the spread of dust, dirt and debris.
- E. Use appropriate controls to limit noise from demolition to levels designated in City ordinances and following OSHA regulations.
- F. Do not use water where it can create dangerous or objectionable conditions, such as localized flooding, erosion, or sedimentation of nearby ditches or streams.

PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS FOR DEMOLITION

- A. Use equipment approved under Paragraph 1.03 of this section.

2.02 BACKFILL MATERIALS

- A. Suitable materials consist of:
 - 1. Excess soils excavated during other portions of the Work.
 - 2. Any locally obtained mineral soil capable of meeting the compaction requirements of this section.
 - 3. Any materials containing vegetable or organic matters, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Notify Engineer in writing at least 48 hours before starting demolition of each property.
- B. Prior to demolition, make an inspection with Engineer to determine the condition of existing structures and features adjacent to items designated for demolition.
- C. Do not proceed with demolition or removal operations until after the joint inspection and subsequent authorization by Engineer.

3.02 PREPARATION

- A. Identify known below-grade utilities to be preserved, if any. Stake and flag locations.

3.03 PROTECTION OF PERSONS AND PROPERTY

- A. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.

- B. Maintain safe access to adjacent property and buildings. Do not obstruct roadways adjacent to the work.
- C. Perform demolition/removal activities in a manner to prevent damage to adjacent property.
- D. The Contractor shall be responsible for safety of adjacent structures.
- E. Erect and maintain enclosures, barriers, warning lights, and other required protective devices.

3.04 PROTECT THE FOLLOWING FROM DAMAGE OR DISPLACEMENT:

- A. Adjacent properties not designated for demolition/removal under this contract.
- B. Trees and plants identified to remain by the project biologist.
- C. Utilities designated to remain.
- D. Pavement and utility structures not designated for demolition/removal under this contract.
- E. Bench marks, monuments, and existing structures not designated for demolition/removal under this contract.

3.05 UTILITY SERVICES

- A. Follow rules and regulations of authorities or companies having jurisdiction over communications, pipelines, and electrical distribution services.
- B. Notify and coordinate with utility company when temporary interruption of utility service is necessary.

3.06 BUILDING DEMOLITION

- A. Demolish all buildings and structures as shown on the plans.
- B. Proceed with demolition from the top of the structure to the ground.
- C. Carefully remove structural framing members.
- D. Do not overload existing roof or structures.
- E. Remove foundations of demolished structures.
- F. Fires are not permitted.

3.07 REMOVALS

- A. Remove pavements and other improvements by methods that will not damage underground utilities that are not designated for removal under this contract.
- B. Minimize amount of earth loadings during removal operations.

3.08 DISPOSAL

- A. Dispose of removed equipment, materials, waste and debris in a manner conforming to applicable laws and regulations.
- B. Remove from the site all items contained in or upon the structure. Conform to requirements of Section 01 56 00, Temporary Environmental Controls.
- C. To the extent possible, concrete and asphalt shall be recycled.
 - 1. Segregate concrete, asphalt and other materials into separate truckloads to facilitate processing at the disposal facility.
- D. Document costs for transport and disposal of any materials requiring remediation and disposal at facilities other than municipal landfills.

3.09 BACKFILL

- A. Backfill removal areas level with adjacent natural ground.
- B. Place and compact backfill in 8- to 12-inch lifts.
- C. Compact backfill to not less than 90 percent of maximum dry density as determined by ASTM D 698.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section Includes: Formwork for concrete, with shoring, bracing and anchorage.
- B. Related Sections:
 - 1. Section 03 20 00 - Concrete Reinforcement
 - 2. Section 03 30 00 - Cast-in-Place Concrete

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301 - Specifications for Structural Concrete for Buildings.
 - 3. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
 - 4. ACI 347 - Guide to Formwork for Concrete.
- 5. ASTM International (ASTM):
 - 6. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 7. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 8. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - 9. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

1.03 SUBMITTALS

- A. Section 01 30 00 – Contractor Submittals, for submittal procedures
- B. Product Data: Provide data on formwork release agent or form liner proposed for use with each formed surface.
- C. Formwork Facing Materials: Data on form-facing materials proposed for smooth-form finish if different from that specified in Article 2.02.
- D. Construction and Contraction Joints: Location of construction and contraction joints proposed if different from those indicated in the Contract Documents.

- E. Testing for Formwork Removal: Data on method for determining strength of concrete for removal of formwork when a method other than field-cured cylinders (ASTM C31 and ASTM C39) is proposed.
- F. Formwork Removal Plans: Detail plans for formwork removal operations when removal of forms at concrete strengths lower than that specified in Article 3.08 is proposed.

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified.
 - 1. California Building Code, current governing edition.
 - 2. ACI 318.
 - 3. ACI 347.

PART 2 - PRODUCTS

2.01 FORMWORK - GENERAL

- A. Maximum deflection of facing materials reflected on concrete surfaces exposed to public view shall be 1/240 of the span between structural members of the formwork.
- B. Formed Construction and Contraction Joints
 - 1. Locate and form construction joints that least impair strength of the structure and meet the requirements of Section 03 30 00 - Cast-in-Place Concrete, Article 3.05.
 - 2. Unless otherwise specified or permitted, locate and detail formed construction joints to the following requirements:
 - a. Locate joints in walls and columns at the tops of footings or slabs; and
 - b. Make joints perpendicular to the main reinforcement.
 - 3. Provide keyways where indicated on Contract Documents. Unless otherwise specified, longitudinal keyways indicated on the Contract Documents, shall be a minimum of 1-1/2 in. deep in joints in walls and between walls and slabs or footings.
 - 4. Provide construction and contraction joints where indicated on the Contract Documents. Submit for acceptance the location of construction and contraction joints differing from those indicated on the Contract Documents.

2.02 FORM MATERIALS

- A. Form-facing materials: Materials for form faces in contact with concrete shall meet the requirements of "Concrete Finishing" Section 03 30 00 - Cast-in-Place Concrete and the following requirements unless otherwise specified in Contract Documents.
 - 1. For smooth-form finish, use plywood, tempered concrete-form-grade hardboard, metal, plastic, paper, or other acceptable materials capable of producing the desired finish for form-facing materials. Form-facing materials shall produce a smooth, uniform texture on the concrete. Do not use form-facing materials with raised grain, torn surfaces, worn edges, dents, or other defects that will impair the texture of concrete surfaces. Facing materials shall be supported with studs or other backing

capable of maintaining deflections within the tolerances specified in Article 2.01 herein.

2.03 FORMWORK ACCESSORIES

- A. Use commercially manufactured accessories for formwork accessories that are partially or wholly embedded in concrete, including ties and hangers. Do not use non-fabricated wire form ties.

2.04 FORMWORK RELEASE AGENT

- A. Use commercially manufactured formwork release agents that prevent formwork absorption of moisture, prevent bond with concrete, and do not stain the concrete surfaces.

2.05 EXPANSION JOINT FILLER

- A. Pre-molded expansion joint filler shall conform to ASTM D994 or ASTM D1751.

2.06 FABRICATION AND MANUFACTURE

- A. Formwork shall be tight to prevent loss of mortar from concrete.
- B. Place 3/4 inch chamfer strips in the corners of formwork to produce beveled edges on permanently exposed surfaces unless otherwise specified. Do not bevel reentrant corners or edges of formed joints of concrete unless specified in the Contract Documents.
- C. Inspect formwork and remove deleterious material immediately before concrete is placed. Provide temporary openings where needed at the base of column and wall formwork to facilitate cleaning and inspection.
- D. Fabricate form ties so ends or end fasteners can be removed with minimum spalling at the faces of concrete.

PART 3 - EXECUTION

3.01 EARTH FORMS

- A. Where sides of excavations have been cut neat and accurate to size for pouring of concrete directly against the excavation, forms for footings will not be required. Remove loose soil prior to placing concrete.

3.02 CONSTRUCTION AND ERECTION OF FORMWORK

- A. At construction joints, lap contact surface of the form sheathing for flush surfaces exposed to view over the hardened concrete in the previous placement. Ensure formwork is sealed against hardened concrete to prevent offsets or loss of mortar at construction joints and to maintain a true surface.

- B. Provide positive means of adjustment (such as wedges or jacks) of shores and struts. Do not make adjustments in the formwork after concrete has reached its time of initial setting. Brace formwork securely against lateral deflection and lateral instability.
- C. Fasten form wedges in place after final adjustment of forms and before concrete placement.
- D. Anchor formwork to shores, supporting surfaces, or members to prevent upward or lateral movement of the formwork system during concrete placement. Form supports shall be placed on adequate foundations and have sufficient strength and bracing to prevent settlement or distortion from the weight of the concrete or other cause. Support shall rest on double wedged shim, or other approved means, so that the forms will be maintained at the proper grade.
- E. Provide runways for moving equipment and support runways directly on the formwork or structural member without resting on the reinforcing steel.
- F. All formed joints on concrete surfaces to be exposed shall be taped and shall align so joints will not be apparent on the concrete surfaces.
- G. Any movement or bellying of forms during construction shall be considered just cause for their removal and, in addition, the concrete work so affected.
- H. Bolts, rods, or other approved devices shall be used for internal form ties and shall be of sufficient quantities to prevent spreading of the forms. The ties shall be placed at least 1 inch away from the finished surface of the concrete. Bolts and rods that are to be completely withdrawn shall be coated with grease.
- I. Boards or other form materials that have been damaged or checked or warped prior to placing of concrete shall be removed from the forms and replaced with approved materials or otherwise corrected to the satisfaction of the engineer.
- J. Assign a sufficient number of men to keep watch on and maintain the forms during placing of concrete. Satisfactorily remedy any displacement or looseness of forms or reinforcement before placing of concrete. No form shall be moved or altered except as may be specifically directed.

3.03 APPLICATION - FORM RELEASE AGENT

- A. Cover surfaces of formwork with an acceptable material that will prevent bond with the concrete. A field-applied formwork release agent or a factory-applied liner may be used. If a formwork release agent is used, apply to the surfaces of the formwork in accordance with the manufacturer's recommendations before placing reinforcing steel. Do not allow formwork release agent to puddle in the forms. Do not allow formwork release agent to contact reinforcing steel or hardened concrete against which fresh concrete is to be placed.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Position and support expansion joint materials, waterstops, and other embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent entry of concrete into voids.
- B. Place sleeves, inserts, anchors, and embedded items required for adjoining work or for support of adjoining work before concrete placement.

3.05 FORM CLEANING

- A. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign materials before concrete is placed.

3.06 FORMWORK TOLERANCES

- A. Unless otherwise specified in the Contract Documents, construct formwork so concrete surfaces conform to the tolerance limits of ACI 117. The class of surface shall conform to Article 2.02 herein.
- B. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork during concrete placement. Set formwork and intermediate screed strips for slabs accurately to produce designated elevations and contours of the finished surface before removal of formwork. Ensure that edge forms and screed strips are strong enough to support vibrating screeds or roller pipe screeds when the finish specified requires the use of such equipment.
- C. When formwork is cambered, set screeds to the same camber to maintain specified concrete thickness.

3.07 FIELD QUALITY CONTROL

- A. The Contractor shall verify accuracy of items, furnished under other sections of these specifications and installed under this section.

3.08 FORM REMOVAL

- A. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform needed repairs or treatment required at once and follow immediately with specified curing.
- B. Do not damage concrete during removal of formwork for columns, walls, slabs, sides of beams, and other parts not supporting the weight of the concrete. Perform needed repair and treatment required on vertical surfaces at once and follow immediately with specified curing.
- C. Vertical forms shall remain on columns, walls, pilasters for at least seven 7 days after the last concrete and until concrete has attained 3000 psi minimum per Article 3.08D and the Engineer responsible for design of the formwork has approved removal.
- D. Contractor shall request to have field cured compression test specimen taken where it is planned to remove formwork and shoring sooner than indicated above and submit detailed plans for review and acceptance. Mold cylinders in accordance with ASTM

C31, and cure them under the same conditions for moisture and temperature as used for the concrete they represent. Test cylinders in accordance with ASTM C39.

- E. In removing plywood forms, no metal pinch bars shall be used and special care to be taken in stripping. Start at top edge or vertical corner where it is possible to insert wooden wedges. Wedging shall be done gradually and shall be accompanied by light tapping of the plywood panels to crack them loose. Do not remove forms with a single jerk after it has been started at one end.
- F. Nothing herein shall be construed as relieving the Contractor of any responsibility of the safety of the structure.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Reinforcing steel for concrete and masonry.
 - 2. Supports and accessories for steel reinforcement.
- B. Related Sections:
 - 1. Section 03 10 00 - Concrete Forms and Accessories
 - 2. Section 03 30 00 - Cast-in-Place Concrete

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301 - Specifications for Structural Concrete for Buildings.
 - 3. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
 - 4. ACI SP-66 - ACI Detailing Manual.
- B. ASTM International (ASTM):
 - 1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - 2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 3. ASTM A184 - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
 - 4. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 5. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 6. ASTM A 641 - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - 7. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
 - 8. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
 - 9. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 10. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

11. ASTM A884 - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
 12. ASTM A934 - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
 13. ASTM D3963 - Standard Specification for Fabrication and Jobsite Handling of Epoxy Coated Reinforcing Steel Bars.
 14. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
- C. American Welding Society (AWS):
1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.
- D. Concrete Reinforcing Steel Institute (CRSI):
1. CRSI (DA4) - Manual of Standard Practice.

1.03 SUBMITTALS

- A. See Section 01 30 00 – Contractor Submittals, for submittal procedures.
- B. Shop Drawings (Placing drawings)
1. Comply with requirements of ACI SP-66. Shop drawings shall also show details for congested areas and connections. Shop drawings used in field must be reviewed copies.
- C. Product Data
1. Manufacturer's catalog sheets including instructions for use and description of application and ICC/IAPMO evaluation report shall be provided on each of the following items intended for use on project:
 - a. Mechanical anchorage devices for splices.
- D. Mill Certificates
1. The Contractor shall provide Mill Certificates for each size of bar for each heat to be used on project and certify that reinforcing steel supplied for this project meet or exceed specified requirements.
 2. Mill Certificates shall include name of mill, date of rolling, date of shipping to fabricator and shall be signed by fabricator certifying that each material complies with or exceeds the specified requirements. A Mill Certificate shall be furnished with each lot of material delivered to the project and the lot shall be clearly identified in the Certificate.
 3. When Mill Certificates cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance and provide laboratory test reports. The Contractor shall pay for the cost of testing.
- E. Laboratory Test Reports
1. Laboratory test reports shall be signed by a principal of the testing agency who is a registered Civil Engineer in the State of California.

2. When required by other portions of these specifications, laboratory test reports shall be submitted for each size of bar tested for each heat to show compliance with appropriate ASTM Standards and these specifications.
- F. Welder's Certificates and WPS: Submit description of reinforcement weld locations, welding procedures, and welder certification when welding is permitted.

1.04 QUALITY ASSURANCE

- A. Perform work of this section in accordance with the current governing edition of CBC, ACI 301, ACI SP-66, ACI 318, and AWS D1.4 except as modified by the contract documents.
- B. Sampling and Testing:
1. General
 - a. If the Owner's agent, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.
 - b. Testing agencies shall meet the requirements of ASTM E329. Testing agencies shall be accepted by the Architect/Engineer before performing any work.
 2. Testing responsibilities of Contractor:
 - a. Submit data on qualifications of proposed testing agency for acceptance. Use of testing services will not relieve the Contractor of the responsibility to furnish materials and construction in compliance with the Contract Documents.
 - b. Cooperate with and notify owner's agent at least 24 hours in advance of inspections required and shall provide samples, test pieces, and facilities for inspection at no cost to the owner.
 - c. Identify each lot of fabricated reinforcing steel to be shipped to the site by assigning an individual lot number that identifies steel by heat number and shall be tagged in such a manner that each such lot can be accurately identified at the job site.
 - d. Remove all unidentified reinforcing steel, anchorage assemblies and bar couplers received at the site.

1.05 STORAGE OF MATERIALS

- A. Store reinforcement during fabrication and at site to avoid excessive rusting or coating with grease, oil, soil, or other objectionable materials. Epoxy-coated and galvanized reinforcement shall be handled and stored by methods that will not damage the coating. Bundles shall not be dropped or dragged. Reinforcing steel shall be transported and stored in a manner that will not damage any applied coating. Since the epoxy coating is flammable, the coated reinforcement shall not be exposed to any fire or flame.

1.06 SEQUENCING AND SCHEDULING

- A. Coordinate work with all trades so as not to interfere with the work of other trades. Bring interferences between trades to Architect's/Engineer's attention and resolve before any concrete is placed.

PART 2 - PRODUCTS

2.01 REINFORCING BARS

A. Reinforcing Steel:

1. Bars for reinforcement shall conform to the requirements of ASTM A706.
2. ASTM A615, Grade 60 bars may be substituted if the actual yield strength based on mill tests does not exceed the specified yield strength by more than 18,000 psi (retest shall not exceed this value by more than an additional 3,000 psi) and the ratio of the actual ultimate tensile stress to the actual tensile yield strength is not less than 1.25.
3. Uncoated steel unless noted otherwise.

2.02 WELDING ELECTRODES

- #### **A. Welding electrodes shall be per Table 5-1 of AWS D1.4.**

2.03 MECHANICAL COUPLING DEVICES

- #### **A. Mechanical coupling devices shall develop 125 percent of the minimum yield strength of the bars spliced.**

2.04 REINFORCEMENT ACCESSORIES

- #### **A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement. Reinforcement supports shall conform to the requirements of ACI 301.**

2.05 OTHER MATERIALS

- #### **A. All other materials, not specifically described by these specifications but required for complete and proper placement of reinforcement shall be new, first quality of their respective kinds, and subject to the approval of the Architect/Engineer.**

2.06 FABRICATION

- #### **A. Welding of reinforcement is permitted only with the specific approval of Engineer. Perform welding in accordance with AWS D1.4. Do not weld crossing bars (tack welds) for assembly of reinforcement, supports, or embedded items.**

PART 3 - EXECUTION

3.01 EXISTING CONDITIONS

- #### **A. Prior to all work of the section, carefully inspect the installed work of other trades and verify that all work is sufficiently complete to permit the start of work under this section and that the completed work of this section will be in complete accordance with the original design and the reviewed shop drawings. In the event of discrepancy, immediately notify the Architect/Engineer in writing.**

- B. In the event conduits, pipes, inserts, sleeves, or any other items interfere with placing the reinforcement as indicated on the drawings or approved shop drawings, or as otherwise required, immediately notify the Architect/Engineer and obtain approval on procedure before placement of reinforcement is started.

3.02 BENDING

- A. Bends for reinforcing steel shall be made in accordance with ACI 301 and ACI 318. Bend bar sizes No. 3 through 5 cold only one time, provided reinforcing bar temperature is above 32 degree F. Do not field bend reinforcing steel in a manner that will injure material, cause the bars to be bent on too tight a radius, or that is not indicated as allowed on drawings or permitted by Engineer. Do not straighten bent or kinked bars for use on project without permission of Engineer. Replace bars with kinks or bends not shown on the drawings.

3.03 PLACING

- A. All reinforcement shall be placed in strict conformance with the requirements of the Contract Drawings, both as to location, position and spacing of members. It shall be supported and secured against displacement by the use of adequate and proper wire supporting and spacing devices, tie wires, etc. so that it will remain in its proper position in the finished structure. Reinforcement may not be wet set in concrete pours.
- B. Tolerances: Do not exceed the placing tolerances specified in ACI 117 before concrete is placed. Placing tolerances shall not reduce cover requirements except as specified in ACI 117.
- C. Minimum concrete cover for reinforcement shall be as indicated in the Contract Drawings. Where less than 3" cover is noted and concrete will be placed against soil, increase the section thickness to attain 3" cover.
- D. Preserve clear space between parallel bars of not less than 1 1/2 times the nominal diameter of round bars and in no case let the clear distance be less than 1 1/2 inches nor less than 1-1/3 times the maximum size of aggregate for concrete. Lap splices shall be contact lap splices in accordance with ACI 318 unless noted otherwise on the Contract Drawings. Bars shall be wired together at laps. Wherever possible, stagger splices in adjacent bars. Butt splices shall be accomplished by mechanical anchorage devices. Stagger these devices 2', unless noted otherwise on the Contract Documents.
- E. Bars shall not be cut by gas torch.

3.04 CLEANING REINFORCEMENT

- A. Take all means necessary to ensure that steel reinforcement, at the time concrete is placed around it, is completely free from rust, soil, loose mill scale, oil, paint and all coatings which will destroy or reduce the bond between steel and concrete.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Cast-in-place structural concrete.
 - 2. Grouting under base plates.
- B. Related Sections
 - 1. Section 03 10 00 - Concrete Forms and Accessories
 - 2. Section 03 20 00 - Concrete Reinforcement
 - 3. Section 31 23 23 - Structural Excavation

1.02 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
 - 3. ACI 301 - Specifications for Structural Concrete for Buildings.
 - 4. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
 - 5. ACI 306.1 - Cold Weather Concreting.
 - 6. ACI 308R - Guide to Curing Concrete.
 - 7. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- B. ASTM International (ASTM):
 - 1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - 2. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 - 4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - 5. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
 - 6. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
 - 7. ASTM C150 - Standard Specification for Portland Cement.
 - 8. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
 - 9. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

10. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
11. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
12. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
13. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
14. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
15. ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete
16. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
17. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
18. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.
19. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
20. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
21. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete.
22. ASTM C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
23. ASTM C1602 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
24. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
25. ASTM D4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
26. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
27. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
28. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.03 SUBMITTALS

- A. See Section 01 30 00 – Contractor Submittals, for submittal procedures.
- B. Product Data
 1. Manufacturer's catalog sheets including instructions for use and description of application shall be provided on each of the following materials:
 - a. Epoxies
 - b. Grout
 - c. Admixtures

- d. Curing Compounds
- e. Chemical Hardener
- f. Adhesive Anchoring System

C. Mix Designs

- 1. Mix designs shall be submitted for each class of concrete on the job and shall show names and brands of all materials, proportions, slump, strength, gradation of coarse and fine aggregates, and location to be used on job. Field test records or test data that is used to establish the average compressive strength of the mixture shall be submitted.

D. Concrete Placement Schedule: The Contractor shall submit a concrete placement schedule which shall show all proposed construction joint locations, limits of each placement sequence, order of placement and type of joint proposed at each joint location.

E. Samples: Submit to testing agency of Owner's choice sample of materials as specified and as otherwise required by Architect/Engineer, including names, sources and descriptions. Select samples to fairly represent average quality and grading of aggregates proposed for the work.

F. Certificates of Compliance

- 1. The Contractor shall provide Certificate of Compliance for each type of aggregate, cementitious material and admixture to be used in each class of concrete or a Certificate of Compliance for each class of concrete.
- 2. Certificates of Compliance for cementitious materials shall include type, manufacturing location, shipping location ; for aggregates: type, pit or quarry location, producers' name, grading, specific gravities and certification evidence not more than 90 days old; for admixtures: type, brand name, producer, manufacturer's technical data sheet, and certification data; and for water: source of supply that are used in each class of concrete and shall be signed by the concrete supplier certifying that each material item complies with, or exceeds the specified requirements. Certificates of Compliance shall be furnished 60 days in advance of any concrete pours.
- 3. When Certificates of Compliance cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance of each type of material to be used in each Class of Concrete. The cost of testing shall be paid for by the Contractor.

G. Weight and Batch Tags:

- 1. The special inspector shall be provided with a weight and batch tag upon delivery of each load of concrete.

1.04 QUALITY ASSURANCE

A. Comply with the provisions of the current governing CBC, ACI 301, and ASTM C94 except where more stringent requirements are shown or specified.

B. Sampling, Testing and Inspection:

- 1. General:
 - a. If the Owner's agent, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.

- b. Testing agencies shall meet the requirements of ASTM C1077. Testing agencies shall be accepted by the Architect/Engineer before performing any work.
- 2. Contractor:
 - a. The Contractor shall cooperate with and notify Owner's agent at least 24 hours in advance of inspection required and shall provide samples and facilities for inspection without extra charge.
 - b. The Contractor shall provide and maintain adequate facilities on the project site for safe storage and initial curing of concrete test specimens as required by ASTM C31 for the sole use of the testing agency.
 - c. Each mix design shall be verified by trial batch tests or field test records and certified to by a principal of the laboratory who is a registered Civil Engineer in the State of California and submitted to the Architect/Engineer for review. Agency field test records, in order to be acceptable, must satisfy the requirement of ACI 318 section 5.3 otherwise trial mixture meeting the requirements of ACI 318 Section 5.3 shall be made. The Contractor shall submit data on qualifications of proposed testing agency for acceptance and hire the accepted testing agency to provide trial mixture test data for each type of concrete on the job.
 - d. Prior to placing any concrete, a trial batch of each Class of concrete shall be prepared using the design mix proposed for the project. From the trial batch, specimens for determining the "Drying Shrinkage" shall be prepared by the Owner's agent.

1.05 SEQUENCING AND SCHEDULING

- A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be embedded in concrete so provision for their work can be made without delaying the project.
- B. Perform any coring and infill of cored holes that were required by failed test results from test panels, failure or delay in complying with these requirements, at no cost to Owner.

PART 2 - PRODUCTS

2.01 FORMWORK

- A. Comply with requirements of Section 03 10 00.

2.02 REINFORCEMENT

- A. Comply with requirements of Section 03 20 00.

2.03 CEMENTITIOUS MATERIALS

- A. Cement: ASTM C 150, Type II portland type.
- B. Fly Ash: ASTM C618, Class C.
 - 1. Fly ash may substitute for portland cement up to a maximum of 25% of total cementitious materials by weight (if used, a minimum of 15% of the total cementitious materials by weight.)

- a. Substitutions that combine fly ash and ground granulated blast-furnace slag are limited to a combined total of 50% of the total cementitious material by weight with fly ash no more than 25% of the total cementitious materials by weight.
 - b. Reduce slag and fly ash substitution rates by at least 50% for cold weather concreting as defined in ACI 306.1.
- C. Ground-granulated Blast-furnace Slag: ASTM C989 grades 100 or 120
- 1. Ground-granulated Blast-furnace Slag may substitute for portland cement up to a maximum of 50% of the total cementitious material by weight.
- D. Use cementitious materials that are of the same brand and type and from the same plant of manufacture as the cementitious materials used in the concrete represented by the submitted field test records or used in the trial mixtures.
- E. Color Additives: ASTM C 979, synthetic or natural mineral-oxide pigments or liquid coloring admixtures, temperature stable and nonfading.

2.04 AGGREGATES

- A. Aggregates for hardrock concrete shall conform to ASTM C33.
- B. Aggregates used for entire project shall be obtained from the same sources and have the same size ranges as the aggregates used in the concrete represented by submitted historical data or used in trial mixtures.

2.05 WATER

- A. Mixing Water for concrete shall be clean and free from deleterious amounts of acids, alkalis or organic materials.

2.06 CHEMICAL ADMIXTURES

- A. Do not use chemicals that contain calcium chloride or will result in total soluble chloride ions in hardened concrete at ages from 28 to 42 days contributed from water, aggregates, cementitious materials, and admixtures in excess of 0.15 percent by weight of cement. Measure water-soluble chloride-ion content in accordance with ASTM C1218. Admixtures containing chloride salts shall not be used where concrete is poured on top of the metal deck. Calcium chloride or any admixture containing chloride ions shall not be used in drilled piers.
- B. Air Entrainment Admixture: ASTM C260.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Sika Aer; Sika Corporation.
 - b. MB-VR or MB-AE; Master Builders.
 - c. Darex AEA; W.R. Grace.
- C. High Range Water Reducing and Retarding Admixture: ASTM C 494 Type G.
- D. High Range Water Reducing Admixture (Super Plasticizer): ASTM C494 Type F.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. WRDA19; W.R. Grace..

- b. Sikament; Sika Chemical Corporation..
 - c. Pozzoloth 400; Master Builders..
- E. Water Reducing and Retarding Admixture: ASTM C494 Type D.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Pozzoloth 300-R; Master Builders.
 - b. Daratard; W.R. Grace.
 - c. Plastiment; Sika Chemical Corporation.
- F. Water Reducing Admixture: ASTM C494 Type A.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Eucon WR-75; Euclid Chemical Company.
 - b. Pozzoloth 344; Master Builders.
 - c. Plastocrete 160; Sika Chemical Corporation.
- G. Admixtures used in concrete shall be the same as those used in the concrete represented by the submitted field test records or used in the trial mixtures.

2.07 ACCESSORY MATERIALS

- A. Non-Shrink Grout:
 - 1. ASTM C1107 Grade B or C, pre-mixed, high strength, Metallic or non-metallic flowable grout, which does not shrink as it cures. Water-soluble chloride ion content of grout less than 0.06 percent chloride ion by weight of cement when tested in accordance with ATM C1218.
 - a. Minimum Compressive Strength at 7 Days: 5000 psi.
 - b. Subject to compliance with requirements provide one of the following:
 - 1) Metallic:
 - a) Embecco 636; Master Builders.
 - b) Sikagrout 212; Sika Chemical Company.
 - c) Metallic Spec. Grout; The Burke Company.
 - 2) Non-Metallic:
 - a) Masterflow 928; Master Builders.
 - b) Sonogrout 10K; Sonneborn-Contech.
 - c) Sure-Grip High Performance Grout; Dayton Superior Corporation.
- B. Waterproofing Paper: ASTM C171.
- C. Liquid Membrane Curing Compound: ASTM C309 or ASTM C1315.
- D. Post-installed anchoring systems:
 - 1. Adhesive anchoring system
 - a. Adhesive anchoring system shall be HILTI-HY 150 MAX-SD (ESR-3013) or approved equal with a current ICC/IAPMO evaluation report.
 - 2. Expansion anchors and screw anchors
 - a. Expansion anchors shall be HILTI KWIK BOLT TZ (ESR-1917), or approved equal with a current ICC/IAPMO evaluation report. Screw anchors shall be Simpson Titen HD (ESR-2713) or approved equal with a current ICC/IAPMO evaluation report.

2.08 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System: Epoxies shall be a two component material for use on dry or damp surfaces and shall conform to the requirements of ASTM C881. Epoxy bonding agents and adhesives shall be used in strict accordance with manufacturer's recommendations.
 - 1. Acceptable Products subjected to compliance with requirements:
 - a. Sikadur Armatec 110; Sika Chemical Corporation or equal.
- B. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, and width/depth as indicated.

2.09 CONCRETE MIX DESIGN

- A. Admixtures: Where admixtures are used they shall be added as recommended in ACI 211.1 for normal weight concrete and at rates recommended by manufacturer. Admixtures are subject to the engineer's review.
- B. Normal Weight Concrete Mix Requirements:
 - 1. Shall be made with aggregates for hardrock concrete.
 - 2. Minimum Compressive Strength, f'c, when tested in accordance with ASTM C39 at 28 days: As scheduled below.
 - 3. Minimum Cementitious Material Content:
 - a. For concrete used in floors and slab-on-grades, cementitious material content shall not be less than indicated in following table:

Nominal maximum size of aggregate, in	Minimum cementitious material content, sacks
1-1/2	6
1	6
3/4	6
1/2	6.5
 - 4. Maximum Water-Cement Ratio: As scheduled below. Significant volume of liquid admixtures should be considered as part of the mixing water.
 - 5. Maximum Aggregate Size: Nominal maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

Concrete Class	Minimum 28-day Compressive Strength f'c	Maximum Water/ Cementitious Material Ratio	
		Non-Air Entrained	Air Entrained
Class A	3000 psi	0.55	0.55
Lean Concrete (CLSM)/(CDF)	300 psi		

- C. Controlled Low Strength Material (CLSM)/Controlled Density Fill (CDF) Mix Requirements:

1. Shall be made with aggregates conforming to ASTM C33.
2. Minimum Compressive Strength, f'c, when tested in accordance with ASTM D4832 at 28 days: As scheduled above.
3. Minimum Cementitious Material Content: 2 sacks.
4. Maximum Water-Cement Ratio: Sufficient to produce a fluid workable mixture without segregation of the aggregate when placed.

D. Concrete Mix Designs: The following table presents a schedule of classes of concrete, maximum aggregate, maximum slump and air content for each type of concrete, which shall be as follows:

Concrete Element	Class of Concrete	Max. Size Aggregate	Max./Min Slump (inch) at point of discharge
Foundation Walls and footings	A	1-1/2	3/1
Slabs on Grade and Mat Slab	A	1	4/1
Structural Backfill	Lean	1-1/2	6/1
Yard Concrete Walks & Curbs	F	3/4	4/1

E. Determine the slump by ASTM C143. Slump shall not exceed 3" for any concrete placement where top of surface slopes more than 2%. When use of a Type I or II plasticizing admixture conforming to ASTM C1017 or when a Type F or G high-range water-reducing admixture conforming to ASTM C494 is permitted to increase the slump of concrete, concrete shall have a slump of 2 to 4 in. before the admixture is added and a maximum slump of 8 in. at the point of delivery after the admixture is added unless otherwise specified.

F. Add an air entraining agent to the concrete to provide specified amounts of entrained air per table below unless noted otherwise. Measure air content at the point of delivery in accordance with ASTM C173. Tolerance is plus/minus 1.5% . For specified compressive strengths above 5000 psi, the air contents indicated in the following table may be reduced by 1%.

Nominal maximum aggregate size, in	Air content, Percent
1/2	7
3/4	6
1	6
1-1/2	5.5

2.10 MIXING

- A. Use ready-mixing concrete complying with ASTM C94 and with the requirements of Contract Documents. Mix for a period of not less than ten (10) minutes; at least three (3) minutes of mixing period shall be immediately prior to discharging at the job.
- B. CLSM shall be placed in the work within 3 hours after introduction of the cement to the aggregates.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 WEATHER REQUIREMENTS

- A. Reinforcement, forms and ground which concrete will contact shall be completely free of frost.
- B. When the average of the highest and lowest temperature during the period from midnight to midnight is expected to drop below 40 °F for more than three successive days, deliver concrete to meet the following minimum temperatures immediately after placement:
 - 1. 55 °F for sections less than 12 in. in the least dimension;
 - 2. 50 °F for sections 12 to 36 in. in the least dimension;
 - 3. 45 °F for sections 36 to 72 in. in the least dimension; and
 - 4. 40 °F for sections greater than 72 in. in the least dimension.
- C. The temperature of concrete as placed shall not exceed these values by more than 20 °F. These minimum requirements may be terminated when temperatures above 50 °F occur during more than half of any 24 h duration.
- D. The temperature of concrete as placed shall not exceed 90 °F .When temperature of steel reinforcement, Embedments, or forms is greater than 120 °F, fog steel reinforcement, Embedments, and forms with water immediately before placing concrete. Remove standing water before placing concrete.
- E. Do not begin to place or continue to place concrete while rain, sleet, or snow is falling unless adequate protection is provided and, when required, acceptance of protection is obtained. Do not allow rain water to increase mixing water or to damage the surface of the concrete.

3.03 CONVEYING AND PLACING CONCRETE

- A. All concrete shall be mixed, delivered and discharged in accordance with the requirements of ASTM C94. All concrete shall be placed, finished and cured and all other pertinent construction practices shall be in accordance with the requirements of ACI 301.
- B. Notify Architect/Engineer not less than 48 hours prior to commencement of placement operations.
- C. Before placing, clean mixing and conveying equipment, clean forms and space to be occupied by concrete and wet forms. Remove ground water until completion of work.
- D. Place no concrete in any unit of work until all formwork has been completely constructed, all reinforcements secured in place, all items to be built into concrete are in place, and form ties at constructions joints tightened.
- E. Slabs and beams shall not be subjected to occupant or storage loads exceeding 20 psf until specified strength is reached (28 days minimum).

- F. Concrete shall be placed so that a uniform appearance of surfaces will be obtained. The concrete will be free of all rock pockets, honeycombs and voids.
- G. The subgrade must be moist when the concrete is placed for floor slab to prevent excessive loss of water from the concrete mix.
- H. Pumping of concrete may require admixtures to increase slump beyond the maximum slump listed. Admixtures are subject to the engineer's review.
- I. Carry on concreting, once started, as a continuous operation until the section of approved size and shape is completed. Make pour cut-offs of approved detail and location.
- J. Handle concrete as rapidly as practicable from mixer to place of deposit by methods which prevent separation or loss of ingredients. Deposit as nearly as practicable in final position to avoid rehandling or flowing. Do not drop concrete freely where reinforcing bars will cause segregation, impact the soil face of excavations nor drop freely more than eight feet. Use hoppers, chutes or trunks of varying length so that the free unconfined fall of concrete shall not exceed eight feet. Deposit to maintain a plastic surface approximately horizontal. In walls, deposit in horizontal layers not over eighteen inches deep. In pouring columns, walls or thin sections of considerable heights, use openings in forms, elephant trunks, tremies or other approved devices which permit concrete to be placed without segregation or accumulation of hardened concrete on forms or metal reinforcement above the level of the concrete. Install so concrete will be dropped vertically.
- K. Consolidating: All concrete shall be placed with mechanical vibration unless noted otherwise. Employ as many vibrators and tampers as necessary to secure the desired results. Minimum: one per each 20 cubic yards of concrete placed per hour. Eliminate the following practices: Pushing of concrete with vibrator; external vibration of forms; allowing vibrator to vibrate against reinforcing steel where steel projects into green concrete; allowing vibrator to vibrate contact faces of forms. Vibrators shall function at a minimum frequency of 3600 cycles per minute when submerged in concrete. Supplement vibration by forking and spading along the surfaces of the forms and between reinforcing whenever flow is restricted. Drilled piers shall be vibrated only to a depth of 3 times the pier diameter measured from the top of pier.

3.04 CONSTRUCTION JOINTS

- A. Location and details of construction joints shall be as indicated on drawings, specified, or as approved by the Architect/Engineer. Locate so as not to impair the strength of the structure.
- B. Sandblast all construction joints using coarse sand or waterblast to clean and roughen entire surface of joint, exposing coarse aggregate solidly embedded in mortar matrix uniformly. Clean forms and reinforcing of drippings. Clear away debris by compressed air.

3.05 CONCRETE FINISHING

- A. Finishing Formed Surfaces: Finish per requirements of ACI 301.

1. Use grout-cleaned finish for permanently exposed formed surfaces except foundation surfaces and smooth-rubbed finish for exposed foundation surfaces.
 2. Use medium broom finish for the surface finish of all slabs.
- B. Finishing Unformed Surfaces: Finish per requirements of ACI 301. Start finishing after bleeding of concrete is finished. The presence of bleed water is detected visually but when concrete surface is getting dry fast and rate of evaporation is so high, place a clear plastic sheet over a section of the concrete to block evaporation and to allow observation of bleeding.
- C. Measure slabs for slabs-on-ground to verify compliance with the tolerance requirements of ACI 117 as specified below:
1. 1/4 inch in 10 ft in accordance with the "10-ft straight edge method" in ACI 117.

3.06 CONTROL JOINTS

- A. Control joints shall be made by sawcutting slab with the Soff-Cut system or approved equal as soon as the surface is firm enough so that it will not be damaged by the blade, usually within 2 to 4 hours after final finishing (no later than 8 hours after placement). Cut 1/4 depth of slab thickness not less than 1 inch.

3.07 CURING AND PROTECTION

- A. Comply with requirements of ACI 301. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at above 50 F for the period of time necessary for hydration of cement and hardening of concrete.
1. Normal concrete: At least the first 7 days after placement.
 2. High early strength concrete: At least the first 3 days after placement.
- C. Curing methods shall comply with ACI 308R.
- D. Curing compounds conforming to ASTM C309 or ASTM C1315 shall be applied in accordance with the recommendations of the manufacturer and shall not be used on any surface against which additional concrete or other cementitious finishing materials are to be bonded, where epoxy flooring is called for, where concrete topping is to receive waterproofing membrane, where not recommended by integral color maker, nor on surfaces where such curing is prohibited by the project specifications.
- E. Unformed concrete surfaces: Start curing as soon as the bleed water sheen has disappeared and before surface is dry.
1. Initial Curing: If surface drying starts before initial set of concrete, keep concrete continuously moist up to final set of concrete by fog spray. Time of initial set is also known as the vibration limit where concrete cannot be properly consolidated after reaching initial set. Before initial set, the concrete is not stiff enough to support the weight of a finisher or finishing machine. Water from fogging should be removed or allowed to evaporate before finishing.
 2. Final Curing: Begin immediately after finishing. If finishing is completed but concrete has not reached final set, keep concrete continuously moist by fog spray, a liquid-

applied evaporation reducer spray, or liquid membrane-forming curing compound spray. Water from fogging should be removed or allowed to evaporate before finishing. After final set of concrete, curing shall be accomplished by one of the following materials or method:

- a. Ponding, continuous fogging, or continuous sprinkling;
 - b. Application of a curing compound.
 - c. Application of mats or fabric kept continuously wet.
 - d. Application of sheet materials conforming to ASTM C171.
 - e. Other moisture-retaining covering as reviewed by Architect/Engineer.
- F. Formed concrete surfaces: Steel forms and all wood forms in contact with the concrete shall be kept wet until they are removed. After formwork removal cure concrete by one of the method in final curing.
- G. Remove protection in such a manner that the maximum decrease in temperature measured at the surface of the concrete in a 24 hr period shall not exceed the following:
1. 50 °F for sections less than 12 in. in the least dimension;
 2. 40 °F for sections from 12 to 36 in. in the least dimension;
 3. 30 °F for sections 36 to 72 in. in the least dimension; or
 4. 20 °F for sections greater than 72 in. in the least dimension.
- H. Measure concrete temperature using a method acceptable to the Architect/Engineer, and record the concrete temperature. When the surface temperature of the concrete is within 20 °F of the ambient or surrounding temperature, protection measures may be removed.

3.08 PATCHING AND CLEANING

- A. After forms are removed, remove projecting fins, form ties, nails, etc. not necessary for the work or cut back one inch from the surface. Joint marks and fins in exposed work shall be smoothed off and cleaned as directed by the Architect/Engineer.
- B. Repair defects in concrete work as directed by the Engineer and per ACI 301. Chip voids and stone pockets to a depth of one inch or more as required to remove all unsound material. Voids, surface irregularities, chipped areas, etc., shall be filled by patching, gunite or rubbing, as directed by the Architect/Engineer. Repaired surfaces shall duplicate appearance of unpatched work.
- C. Clean exposed concrete surfaces and adjoining work stained by leakage of concrete to approval of Architect/Engineer.

3.09 CLEANUP

- A. Clean up all concrete and cement work on completion of this portion of the work, except protective coatings or building papers shall remain until floors have completely cured or until interior partitions are to be installed.

3.10 GROUTING

- A. Bearing plates and channels: The space between plates and channels bearing against masonry or concrete shall be filled with grout when required by the Engineer. The grout

shall be mixed and placed in strict accordance with manufacturer's instructions. Care shall be taken in the grouting to ensure that there are no voids or air pockets, and that there is full bearing between the bearing plates and channels and the grout.

3.11 POST INSTALLED ANCHORS

- A. Installation of anchors and adhesive including drilling, cleaning of holes and torque shall be in accordance with the current ICC/IAPMO evaluation report. Post installed anchors shall be used only in applications permitted by the Evaluation Report. Anchors shall use washer sized to prevent crushing of the attached member at installation torque.

3.12 FIELD QUALITY CONTROL

- A. Engineer Review: The Engineer or Owner's Inspector shall inspect the surfaces between plates and channels, bearing on masonry and concrete to determine if grouting of space is necessary. If grouting of space is necessary, the Owner's Inspector shall inspect the grouting procedure.
- B. Acceptance of concrete strength:
 - 1. Standard molded and cured strength specimens: Test results from standard molded and cured test cylinders shall be evaluated separately for each specified concrete mixture. For evaluation, each specified mixture shall be represented by at least five tests. The strength level of concrete will be considered satisfactory when the averages of all sets of three consecutive compressive strength test results molded and cured in accordance with the requirements of ASTM C31 equal or exceed f'_c and no individual strength test result falls below f'_c by more than 500 psi when f'_c is 5000 psi or less, or by more than $0.10f'_c$ when f'_c is more than 5000 psi.
 - 2. Core tests: Where required by the Engineer, cores shall be obtained in accordance with ASTM C42. The location of cores shall be determined by the Engineer. If, before testing, cores show evidence of having been damaged subsequent to or during removal from the structure, replacement cores shall be taken. Strength level of concrete in the area represented by core tests will be considered adequate when the average compressive strength of the cores is equal to at least 85% of f'_c , and if no single core is less than 75% of the specified compressive strength f'_c .
- C. When the strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
- D. Field Acceptance of concrete: Concrete within the specified limits of air-entrainment, slump and temperature shall not be used in the work.
- E. Additional Tests: The Owner's agent will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure or deficiencies in protection and curing has occurred, as directed by Engineer. Owner's agent may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, other additional testing as may be required, and cost of repairing areas of structure tested when unacceptable concrete is verified.

3.13 DEFECTIVE CONCRETE

- A. General: Work considered to be defective may be ordered by the Architect/Engineer to be replaced in which case the Contractor shall remove the defective work at his expense. Work considered to be defective shall include, but not be limited to, the following:
 - 1. Concrete in which defective or inadequate reinforcing steel has been placed.
 - 2. Concrete in incorrectly formed, or not conforming to details and dimensions on the drawings or with the intent of these documents, or concrete the surfaces of which are out of plumb or level.
 - 3. Concrete below specified strength.
 - 4. Concrete not meeting the maximum allowable drying shrinkage requirements.
 - 5. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings.

3.14 CORRECTION OF DEFECTIVE WORK

- A. The Contractor shall, at his expense, make all such corrections and alleviation measures as directed by the Engineer.
- B. Concrete work containing rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings, shall be chipped out until all unconsolidated material is removed.
- C. Secure approval of chipped-out areas before patching. Patch per ACI 301-latest governing edition.

END OF SECTION

SECTION 03 60 00

GROUTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Concrete mortar.
 - 2. Grout.
 - 3. Drypack mortar.
 - 4. Nonshrink grout.
 - 5. Epoxy grout.
 - 6. Non-shrink epoxy grout.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. C 109 - Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2 inch or 50 millimeter cube specimens).
 - 2. C 531 - Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - 3. C 579 - Test Method for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfacing.
 - 4. C 827 - Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures.
 - 5. C 939 - Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
 - 6. C 1090 - Test Method for Measuring Change in Height of Cylindrical Specimens from Hydraulic-Cement Grout.
 - 7. C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
 - 8. C 1181 - Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.

1.03 SUBMITTALS

- A. Nonshrink Grout and Non-shrink Epoxy Grout: Submit manufacturer's literature and certified test data prior to installation.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. All materials shall be delivered to the jobsite in their original, unopened packages or containers, clearly labeled with the manufacturer's product identification and printed instructions.

- B. All materials shall be stored in a cool dry place and in accordance with the manufacturer's recommendations.
- C. All materials shall be handled in accordance with the manufacturer's instructions.

1.05 PROJECT/SITE CONDITIONS

- A. Refer to manufacturer's literature or contact the manufacturer for any special physical or environmental limitations that may be required for use of products.

1.06 WARRANTIES

- A. Non-shrink Grout: The manufacturer shall warranty that the non-shrink grout will never go below its initial placement volume when tested in accordance with ASTM C 1107.
- B. Non-shrink Epoxy Grout: The manufacturer shall warranty that non-shrink epoxy grout will show negligible shrinkage or expansion when tested in accordance with ASTM C 531.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete Mortar:
 - 1. General: Consist of concrete mixture with coarse aggregate removed and water quantity adjusted as required.
 - 2. At Exposed Concrete Surfaces Not to Be Painted or Submerged in Water: White cement.
- B. Grout:
 - 1. Consist of mixture of Portland cement and sand.
- C. Dry-pack Mortar:
 - 1. Consist of mixture of Portland cement and sand.
- D. Non-shrink Grout:
 - 1. Non-shrink grout shall be a preportioned and prepackaged cement-based mixture. It shall contain no metallic particles such as aluminum powder and no metallic aggregate such as iron filings. It shall require only the addition of potable water.
 - 2. Potable water for pre-soaking, mixing, and curing shall be clean and free of oils, acids, alkalies, organics, and any other deleterious matter.
 - 3. Bleeding: Non-shrink grout shall be free from the emergence of mixing water from within or the presence of water on its surface.
 - 4. Non-shrink grout shall be in accordance with ASTM C 1107.
 - 5. Consistency: Non-shrink grout shall remain at a minimum flowable consistency for at least 45 minutes after mixing at 45 degrees Fahrenheit to 90 degrees Fahrenheit when tested in accordance with ASTM C 230. If at a fluid consistency, it shall be verified in accordance with ASTM C 939.

6. Dimensional Stability (height change): Non-shrink grout shall be in accordance with ASTM C 1107, volume-adjusting Grade B or C at 45 degrees to 90 degrees. It shall show 90 percent or greater bearing area under bases or baseplates.
 7. Compressive Strength: Non-shrink grout shall show minimum compressive strengths at 45 degrees Fahrenheit to 90 degrees Fahrenheit in accordance with ASTM C 1107 for various periods from the time of placement, including 5,000 pounds per square inch at 28 days when tested in accordance with ASTM C 109 as modified by C 1107.
 8. Manufacturers: One of the following or equal:
 - a. Five Star Products, Inc., Fairfield, CT, Five Star Grout.
 - b. Master Builders, Inc., Cleveland, OH, Masterflow 928.
 - c. L&M Construction Chemicals, Inc., Omaha, NE, CRYSTEX.
- E. Epoxy Grout:
1. Consist of mixture of epoxy and sand.
 2. Sand: Clean, bagged, graded, and kiln dried silica sand.
- F. Non-shrink Epoxy Grout:
1. Non-shrink epoxy grout shall be a 100 percent solids, premeasured, prepackaged system containing a two-component thermosetting epoxy resin and inert aggregate.
 2. Consistency: Non-shrink epoxy grout shall maintain a flowable consistency for at least 45 minutes at 70 degrees Fahrenheit.
 3. Dimensional Stability (height change):
 - a. Non-shrink epoxy grout shall have negligible shrinkage or expansion (less than 0.0006 in/in) when tested in accordance with ASTM C 531.
 4. Compressive Strength: Non-shrink epoxy grout shall show a minimum compressive strength of 10,000 pounds per square inch at 24 hours and 14,000 pounds per square inch at 7 days when tested in accordance with ASTM C 579, Method B.
 5. Compressive Creep: The compressive creep for non-shrink epoxy grout shall not exceed 0.0027 in/in when tested under a 400 pounds per square inch constant load at 140 degrees Fahrenheit in accordance with ASTM C 1181.
 6. Thermal Capability: The coefficient of thermal expansion for non-shrink epoxy grout shall not exceed 0.000018 inches per inch per degree Fahrenheit when tested under ASTM C 531, Method B.
 7. Manufacturers: One of the following or equal:
 - a. Five Star Products, Inc., Fairfield, CT, Five Star Epoxy Grout.
 - b. Master Builders, Inc., Cleveland, OH, Masterflow 648 CP Plus.
 - c. L&M Construction Chemicals, Inc., EPOGROUT.

2.02 MIXES

- A. Concrete Mortar Mix:
1. Use water-cement ratio that is no more than that specified for concrete being repaired.
 2. At Exposed Concrete Surfaces Not to Be Painted or Submerged in Water: Use sufficient white cement to make color of finished patch match that of surrounding concrete.
- B. Grout Mix:

1. For Concrete Repair: Mix in same proportions used for concrete being repaired, with only sufficient water to give required consistency for spreading.
 2. For Spreading over the Surfaces of Construction or Cold Joints: Mix with no more water used than allowed by water-cement ratio specified for concrete.
 3. For Other Applications: Mix in proportions by weight of one part cement to four parts of concrete sand.
- C. Dry-pack Mortar Mix: Use only enough water so that resulting mortar will crumble to touch after being formed into ball by hand.
- D. Non-shrink Grout: Mix in accordance with manufacturer's installation instructions such that resulting mix has fluid or flowable consistency and is suitable for placing by pouring.
- E. Epoxy Grout:
1. Mix in accordance with manufacturer's installation instructions for mixing.
 2. Proportioning:
 - a. For horizontal work, consist of mixture of one part epoxy as specified in Section 03 63 00 with not more than 2 parts sand.
 - b. For vertical or overhead work, consist of 1 part epoxy gel as specified in Section 03 63 00 with not more than 2 parts sand.
- F. Non-shrink Epoxy Grout: Mix in accordance with manufacturer's installation instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Inspect concrete surfaces to receive grout or mortar and verify that they are free of ice, frost, dirt, grease, oil, curing compounds, paints, impregnations and all loose material or foreign matter likely to affect the bond or performance of grout or mortar.
- B. Inspect baseplate and anchor systems for rust, oil, and other deleterious substances that may affect the bond or performance of grout.
- C. Confirm that newly placed concrete has been cured sufficiently to attain its design strength and limit further shrinkage.
- D. Verify that temperature of cementitious or epoxy grout does not exceed manufacturer's recommendations.

3.02 PREPARATION

- A. Surface Preparation:
1. Roughen all concrete surfaces by heavy sandblasting, chipping, or other mechanical means to assure bond. Loose or broken concrete shall be removed.
 2. All grease, oil, dirt, curing compounds, laitance, and other deleterious materials that may affect bond that were identified in the inspection process shall be completely

removed from concrete and bottoms of baseplates. All metal surfaces should have a 2 to 3 mil peak-to-valley profile for epoxy grouts.

3. For cementitious mortars and grouts, concrete surfaces shall be saturated surface dry. Any standing water shall be removed prior to placing grouts.
4. For epoxy grouts, do not wet concrete surfaces with water. Instead, where required, wet surfaces with epoxy for horizontal work or epoxy gel for vertical or overhead work prior to placing epoxy grouts.

B. Forms and Headboxes for Grouts (Cementitious or Epoxy):

1. Forms for grouts shall be built of material with adequate strength to withstand the placement of grouts.
2. Forms must be rigid and liquid tight. All cracks and joints shall be caulked with an elastomeric sealant. All forms shall be lined with polyethylene for easy grout release. Forms carefully waxed with two coats of heavy-duty paste wax shall also be acceptable.
3. Forms shall be 4 to 6 inches higher than the baseplate on one side of the baseplate configuration when using head pressure for placement.
4. A sufficient number of headboxes shall be built to facilitate placement of grouts.
5. Air relief holes a minimum 1/8 inch in diameter shall be provided when required by a baseplate configuration to avoid entrapping air underneath.

3.03 APPLICATION

A. Cement Mortar and Grout:

1. For Defective Concrete Repair:
 - a. Filling: Filling of voids around items through the concrete.
 - b. Grout Spreading: Spread over construction joints, cold joints, and similar type items.
2. Concrete Surfaces:
 - a. Apply epoxy bonding agent to clean, roughened, and dry surfaces before placing mortar or grout.
3. Placing:
 - a. Exercise particular care in placing Portland cement mortar or grout since they are required to furnish structural strength or impermeable water seal or both.
 - b. Do not use cement mortar or grout that has not been placed within 30 minutes after mixing.

B. Epoxy Grout:

1. Apply in accordance with manufacturer's installation instructions.
2. Use where specified herein or where indicated on the Drawings.

3.04 PLACEMENT

- A. The CONTRACTOR shall make arrangements to have a grout manufacturer's representative present for a preconstruction meeting and during initial grout placement. Grout shall only be installed after the final equipment alignment is correct and accepted by the ENGINEER.

1. Grouts shall be mixed in accordance with the manufacturer's recommendations.

2. A mortar mixer with moving paddles shall be used for mixing grouts. For cementitious grouts, pre-wet the mixer and empty out excess water before beginning mixing.
3. Cementitious Grouts:
 - a. Non-shrink cementitious grout shall be added to a premeasured amount of water that does not exceed the manufacturer's maximum recommended water content.
 - b. Mix cementitious grouts per manufacturer's instructions for uniform consistency.
 - c. Grouts may be drypacked, flowed, or pumped into place. All baseplate grouting shall take place from one side of a baseplate to the other to avoid trapping air. Do not overwork grouts.
 - d. Do not retemper grout by adding more water after stiffening.
 - e. Hydrostatic head pressure shall be maintained by keeping the level of the grout in the headbox above the bottom of the baseplate. The headbox should be filled to the maximum level and the grout worked down to top of baseplate.
4. Epoxy Grouts:
 - a. Epoxy grouts shall be mixed in complete units. Do not vary the ratio of components or add solvent to change the consistency of the mix.
 - b. Pour the hardener into the resin and mix for at least one minute and until each mixture is uniform in color. Pour the chemical components into the mortar mixer wheelbarrow and add the aggregate. Mix until aggregate is uniformly wetted. Overmixing will cause air entrapment in the mix.
 - c. All epoxy grout shall be flowed into place using a headbox. All grouting shall take place from one side of a baseplate to the other in a continuous flow to avoid trapping air.
 - d. Hydrostatic head pressure shall be maintained by keeping the level of grout in headboxes above the bottom of baseplates. Headboxes shall be filled to the maximum level and grout worked down to the bottom of baseplates.
 - e. Epoxy grouts shall not be cut back after setting. The final level of grout will be as installed with all chamfer edges built into the formwork.

3.05 CURING

A. Cementitious Grouts:

1. Grouts must be cut back to the lower edge of baseplates after reaching initial set. Provide a 45 degree angle cut back.
2. Clean equipment and tools as recommended by the grout manufacturer.
3. Cure Grouts in accordance with manufacturer's specifications and recommendations. Keep grout moist for a minimum of 3 days. The method needed to protect grouts will depend on temperature, humidity, and wind. Wet burlap, a soaker hose, sun shading, ponding and, in extreme conditions, a combination of methods shall be employed.
4. Grouts shall be maintained above 40 degrees Fahrenheit until they have attained a compressive strength of 3,000 pounds per square inch or above 70 degrees Fahrenheit for a minimum of 24 hours to avoid damage from subsequent freezing.

B. Epoxy Grouts:

1. Cure grouts in accordance with manufacturers' specifications and recommendations. Do not wet cure epoxy grouts.
2. Consult the manufacturer for appropriate cure schedule. In no case should any surface in contact with grout be allowed to fall below 50 degrees Fahrenheit for a minimum of 48 hours after placement.

3. Equipment and tools shall be cleaned immediately with a strong liquid detergent and water solution before grout hardens.

3.06 FIELD QUALITY CONTROL

- A. Non-shrink cementitious grouts shall be tested for 24 hour compressive strength in accordance with ASTM C 109.
- B. Non-shrink grouts shall be tested for 24 hour compressive strength in accordance with ASTM C 579 (Method B).

END OF SECTION

SECTION 03 63 00

EPOXIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Epoxy.
 - 2. Epoxy gel.
 - 3. Epoxy bonding agent.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
- B. D 638 - Test Method for Tensile Properties of Plastics.
- C. D 695 - Test Method for Compressive Properties of Rigid Plastics.
- D. D 790 - Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements:
- B. Provide epoxy materials that are new and use them within shelf life limitations set forth by manufacturer.
- C. Perform and conduct work of this Section in neat orderly manner.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's data completely describing epoxy materials.
- B. Quality Control Submittals:
 - 1. Manufacturer's installation instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Epoxy: Water-insensitive two-part type low viscosity epoxy adhesive material containing 100 percent solids and meeting or exceeding following characteristics when tested in accordance with standards specified: Manufacturers: One of the following or equal:
 - 1. Master Builders, Inc., Concessive Standard LVI.

2. Sika Chemical Corp., Sikadur 35 Hi-Mod LV.

Physical Characteristic	Test Method	Required Results
Tensile Strength	ASTM D 638	8,000 pounds per square inch at 14 days and 77 degrees Fahrenheit cure.
Flexure Strength	ASTM D 790	11,000 pounds per square inch at 14 days and 77 degrees Fahrenheit cure.
Compressive Strength	ASTM D 695	16,000 pounds per square inch at 24 hours and 77 degrees Fahrenheit cure.
Bond Strength	---	Concrete shall fail before failure of epoxy.
Gel Time In 5-Mil Film	---	Four hours maximum at 77 degrees Fahrenheit.
Elongation	ASTM D 638	1 percent minimum at 14 days and 77 degrees Fahrenheit.

- B. Epoxy Gel: Manufacturers: One of the following or equal:

1. Sika Chemical Corp.'s, Sikadur 31, Hi-Mod Gel.

- C. Epoxy Bonding Agent: Manufacturers: One of the following or equal:

1. Master Builders, Inc., Concessive 1001 Liquid LPL.
2. Sika Chemical Corp.'s, Sikadur 32, Hi-Mod.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install and cure epoxy materials in accordance with manufacturer's installation instructions.
- B. Epoxy:
1. Apply in accordance with manufacturer's installation instructions.
- C. Epoxy Gel:
1. Apply in accordance with manufacturer's installation instructions.
 2. Use for vertical or overhead work, or where high viscosity epoxy is required.
 3. Epoxy gel used for vertical or overhead work may be used for horizontal work.
- D. Epoxy Bonding Agent:
1. Apply in accordance with manufacturer's installation instructions.
 2. Bonding agent will not be required for filling form tie holes or for normal finishing and patching of similar sized small defects.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Miscellaneous metal fabrications including:
 - 1. Handrails and Guardrails.
 - 2. Manhole Frames and Covers.
 - 3. Gratings and Covers.
 - 4. Splash Guards.
 - 5. Miscellaneous Metals: Includes aluminum, stainless steel, structural steel.
 - 6. Associated accessories to the above items.

- B. Related Sections:
 - 1. Section 09 90 00 – Painting and Coating.

1.02 REFERENCES

- A. Aluminum Association (AA):
 - 1. Specification M32-C22-A41 - Aluminum Finishes.

- B. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. Standard Specifications for Highway Bridges.

- C. American Society for Testing and Materials (ASTM):
 - 1. A 36/A 36M - Specification for Carbon Structural Steel.
 - 2. A 48 - Specification for Grey Iron Castings.
 - 3. A 53 - Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 4. A 123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 5. A 167 - Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - 6. A 240 - Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
 - 7. A 269 - Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - 8. A 276 - Specification for Stainless Steel Bars and Shapes.
 - 9. A 307 - Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - 10. A 320 - Specification for Alloys - Steel Bolting Materials for Low-Temperature Service

11. A 325 - Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
12. A 489 - Specification for Carbon Steel Lifting Eyes.
13. A 490 - Specification for Steel Structural Bolts, Alloy Steel, Heat-Treated, 150 ksi Minimum Tensile Strength.
14. A 500 - Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
15. A 501 - Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
16. A 568 - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled
17. A 570/A 570M - Specification for Steel, Sheet and Strip, Carbon. Hot-Rolled, Structural Quality.
18. A 635/A 635M - Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot-Rolled.
19. A 653/A 653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process.
20. B 209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
21. B 221 – Aluminum Alloy, Extruded Bars, Rods, Wire, Profiles and Tubes.
22. B 429 - Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

D. American National Standards Institute (ANSI):

1. A14.3 - Ladders-Fixed: Safety Requirements.
2. 531 Metal Bar Grating Manual

E. American Welding Society (AWS).

F. International Conference of Building Officials (ICBO):

1. Uniform Building Code (UBC), latest edition.

G. Occupational Safety and Health Administration (OSHA).

1.03 QUALITY ASSURANCE

- A. Hand railing and Walkways shall comply with SAA Code for fixed platforms, walkways, stairways and ladders, AS1657.
- B. Regulatory Requirements: Except as modified by the requirements specified herein and detailed on the plans, the installation of fabricated metal work shall conform to the "Uniform Building Code" (UBC).

1.04 SUBMITTALS

- A. Shop Drawings: Submit for handrails and guardrails, including details on connection attachments, gates, kickplates, ladders, and angles.
 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.

2. Include erection drawings, elevations, and details where applicable.
 3. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
- B. Quality Control Submittals:
1. Design Data.
 2. Test Reports:
 - a. Manufacturers' calculations showing that gratings and covers will meet specified load-bearing and deflection requirements for each size grating or cover for each type of installation.
 - b. Reports of tests performed.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Materials: Unless otherwise specified or indicated on the Drawings, structural and miscellaneous metals shall conform with the standards of the ASTM, including the following:

Item	ASTM Standard No.	Class, Grade Type or Alloy No.
Cast Iron		
Cast Iron	A 48	Class 40B
Steel		
Galvanized sheet iron or steel	A 653	Coating G90
Black steel, sheet or strip	A 569	--
	A 570	--
Coil (plate)	A 635	--
Structural plate, bars, rolled shapes, and miscellaneous items	A 36	--
Standard bolts, nuts, and washers	A 307	--
High strength bolts, nuts, and hardened flat washers	A 325	--
	A 490	--
Eyebolts	A 489	Type 1
Tubing, cold-formed	A 500	--
Tubing, hot-formed	A 501	--
Steel pipe	A 53	Grade B
Stainless steel		
Plate, sheet and strip	A 167	Type 304 or 316*

Item	ASTM Standard No.	Class, Grade Type or Alloy No.
Bars and shapes	A 276	Type 304 or 316*
Bolts and threaded rods	A 320	Type 304 or 316*
Aluminum		
Sheet aluminum-flashing	B 209	Alloy 5005-H14, 0.032 inches minimum thickness
Sheet aluminum-structural	B 209	Alloy 6061-T6
Structural aluminum	B 308 B 209	Alloy 6061-T6
Extruded aluminum	B 221	Alloy 6063-T42
* Use Type 304L or Type 316L if material will be welded.		

1. Stainless steels are designated by type or series defined by ASTM.
2. Where stainless steel is welded, use low-carbon stainless steel.

2.02 MANHOLE FRAMES AND COVERS

A. Material:

1. Gray iron castings, ASTM A 48, Class 30-B.
2. Stainless steel, ASTM A 276.

B. Type: Heavy-duty traffic type, with combined set weight of minimum 265 pounds.

1. Machine horizontal and vertical bearing surfaces to fit neatly, with easily removable cover bearing firmly in frame without rocking.

C. Frame:

1. Bottom flange type.
2. Approximately 4-1/2 inches frame height.
3. 24-inch diameter clear inside dimension, unless otherwise indicated on the Drawings.
4. Approximately 32 inches bottom flange outside diameter.

D. Cover:

1. Skid-resistant grid pattern design stamped with name of utility service provided by manhole, such as "ELECTRICAL," "STORM", "SEWER," "TELEPHONE," or "WATER."
2. Solid type without ventilation holes.

E. Finish: Unpainted.

2.03 MISCELLANEOUS METAL

- A. Miscellaneous Aluminum: Fabricate aluminum products, not covered separately herein, in accordance with the best practices of the trade and field assemble by riveting or bolting. Do not weld or flame cut.
- B. Miscellaneous Cast Iron:
 - 1. General:
 - a. Tough, gray iron, free from cracks, holes, swells, and cold shuts.
 - b. Quality such that hammer blow will produce indentation on rectangular edge of casting without flaking metal.
 - c. Before leaving the foundry, clean castings and apply 16 mil dry film thickness coating of coal-tar epoxy, unless otherwise specified or indicated on the Drawings.
- C. Miscellaneous Stainless Steel:
 - 1. Provide miscellaneous stainless steel items not specified herein as indicated on the Drawings or specified elsewhere. Fabricate and install in accordance with the best practices of the trade.
- D. Miscellaneous Structural Steel:
 - 1. Provide miscellaneous steel items not specified herein as indicated on the Drawings or specified elsewhere. Fabricate and install in accordance with the best practices of the trade.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Contractor shall examine work in place to verify that it is satisfactory to receive the work of this Section. If unsatisfactory conditions exist, do not begin this work until such conditions have been corrected.

3.02 INSTALLATION

- A. General: Install products as indicated on the Drawings, and in accordance with shop drawings and manufacturer's printed instructions, as applicable except where specified otherwise.
- B. Installation: As specified in Section 33 05 61, Precast Concrete Manholes.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes the materials and application of painting and coating systems for buried and exposed surfaces.
- B. All articles to be painted or coated will be painted or coated in the place of manufacture, unless field painting and coating is absolutely necessary. The Engineer will make the determination. In the event that the paint or coating is damaged in the field, it will be touched up in the same manner as the original paint or coating applied in the place of manufacture.

1.02 RELATED WORK DESCRIBED ELSEWHERE

- A. All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).
- B. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
 - 1. Ductile-Iron Pipe and Fittings: 33 11 13.15
 - 2. Manual Valves 33 12 16
 - 3. Underground Facilities Identification: 33 05 26
 - 4. Automatic Valves 40 92 13

1.03 SUBMITTALS

- A. Submit a Paint Plan for all proposed surfaces. The plan shall identify all materials and procedures, including proposed paint systems, names and experience of personnel to perform the work, proposed surface preparation specifications, required physical and environmental conditions to perform the work and proposed test methods and reporting for both factory and field applications. The plan shall also include proposed maintenance requirements for all surfaces. Samples of field applied paint and coating finishes, colors, and covering shall also be provided. The paint plan and all samples shall be provided at least 60 days prior to start of such finishing operations.

1.04 APPROVED MANUFACTURERS

- A. All materials shall be as manufactured by the companies listed herein or approved equal.
 - 1. Tnemec,
 - 2. Carboline,
 - 3. Dunn-Edwards,

4. International Protective Coatings,
5. Rust-Oleum Corporation,
6. 3M Minnesota Mining and Manufacturer

1.05 COATINGS

- A. All specified materials must meet and comply with National Sanitation Foundation (NSF) and California current air quality regulations governing architectural and industrial coatings.
- B. Organic Zinc Primer
 1. Tnemec 90-97
 2. Carboline 621
 3. Rust-Oleum 7400 System Zinc Chromate Primer Devoe CC 302V
 4. International Protective Coatings – Interzinc 52
- C. Epoxy Coating
 1. Field Applied
 - a. Tnemec Series N69 Epoxoline II
 - b. Carboline 187
 - c. Rust-Oleum 9100 High Performance Epoxy Devoe BR235H
 - d. International Protective Coatings – Interguard 475HS
 2. Field or Factory Applied
 - a. Tnemec Series 140 NSF 61
 - b. International Protective Coatings – Interline 850 or 925
 - c. Devoe BR235H
 3. Factory Applied
 - a. 3M Scotchkote 206N Fusion Bonded Epoxy
 4. Manholes and Lift Stations, Field Applied
 - a. Raven 405
 - b. Hydro-Pox GL 212
 - c. Elastuff 120 Hydrophobic Polyurethane Elastomer with Uni-Tile Sealer
- D. Polyurethane
 1. Tnemec Series 1075
 2. Carboline 134 HS VOC
 3. Devoe 379H
- E. Bituminous Mastic Epoxy
 1. Carboline 300M
 2. Tnemec Series 46H413
 3. Rust-Oleum Devoe Devtar SA
- F. Acrylic Primer

1. International Intercryl 520
2. Tnemec Series 26 TyCRYL
3. Rust-Oleum Devoe Devflex 4020

G. Acrylic Polymer

1. Tnemec Series 1029

1.06 PAINT SCHEDULE

A. Aboveground or exposed facilities shall be color-coded per APWA Uniform Color Code for domestic water, recycled water facilities, or wastewater facilities.

B. Domestic Water System

1. Piping and Equipment: Safety Blue
2. Public Fire Hydrants: Safety Yellow, unless different color is required by local fire jurisdiction. Comply with fire jurisdiction.
3. Private Fire System: Safety Red
4. Guard Posts / Bollards: Safety Yellow

C. Sewer System

1. Lift Station Piping and Equipment: Safety Green

D. Recycled Water Facilities: Safety Purple

1.07 PERMITS

A. All work shall conform to the specifications and requirements of the State of California Department of Transportation, the County, the city having jurisdiction, or and other agencies involved. The contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits.

PART 2 - MATERIALS

2.01 ZINC PRIMER

A. All primer shall contain not less than 79.60% zinc in dry film.

B. Primer shall be of a different color than the outer coating.

2.02 BITUMINOUS MASTIC

A. Bituminous mastic shall be coal-tar pitch based.

B. Bituminous mastic shall have a minimum of 68% solids by volume.

2.03 EPOXY COATING FOR WATER SYSTEM

A. Epoxy shall meet current local air quality standards and shall not be less than 65% solids.

- B. All coatings and pigments to be used on domestic water services shall have NSF approval for use with domestic water.

2.04 EPOXY COATING FOR WASTEWATER SYSTEM

- A. Epoxy shall meet current local air quality standards and shall be 100% solids.
- B. All coatings and pigments to be used on wastewater services shall be designed for prolonged exposure to hydrogen sulfides.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. Do not sandblast or prepare more surface area than can be coated in one day. Remove all sharp edges, burrs, and weld spatter. Do not sandblast epoxy-coated pipe that has already been factory coated.
- B. Surface preparation shall conform with the SSPC specifications as described below:

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

- C. Wherever the words “solvent cleaning,” “hand tool cleaning,” “wire brushing,” or “blast cleaning” or similar words are used in these specifications or in paint manufacturer’s specifications, they shall be understood to refer to the applicable SSPC (Steel Structure Painting Council, Surface Preparation Specifications, ANSI A159.1) specifications listed above.

3.02 PAINTING SYSTEMS

- A. All materials of a specified painting system, including primer, intermediate, and finish coats, shall be produced by the same manufacturer. Thinners, cleaners, driers, and other additives shall be as recommended by the paint manufacturer for the particular coating system.
- B. Deliver all paints to the job site in the original, unopened containers.

3.03 SURFACES NOT TO BE COATED

- A. The following surfaces shall not be painted and shall be protected during the painting of adjacent areas:
 - 1. Mortar-coated pipe and fittings
 - 2. Stainless steel

3. Metal letters
4. Nameplates
5. Grease fittings
6. Brass and copper, submerged
7. Buried pipe, unless specifically required in the piping specifications
8. Bronze meters and strainers

3.04 PROTECTION OF SURFACES NOT TO BE PAINTED

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

3.05 FIELD TOUCH UP OF MANUFACTURER-APPLIED PRIME COATS

- A. Surfaces that are primed at the place of manufacture shall receive a field touch-up of organic zinc primer to cover all scratches or abraded areas.

3.06 BITUMINOUS MASTIC

- A. Buried metal (flanges, non-stainless steel nuts and bolts, flexible couplings, exposed reinforcing steel, etc.) shall be coated with a minimum of 20 mils of bituminous mastic.
- B. All surfaces coated with bituminous mastic shall be covered with 8 mil polyethylene wrap per Section 33 11 13.15, after applying the bitumastic.

3.07 EPOXY COATING OF METAL

- A. Only those metal surfaces specifically called out shall be epoxy coated.
- B. Epoxy lining and coating of valves shall be per AWWA C550 and Section 33 12 16 Manual Valves. All valves shall be lined and coated by manufacturer.
- C. Surfaces to be epoxy coated shall follow the surface preparation requirements as recommended by the manufacturer.
- D. Surfaces shall be coated with organic zinc primer to a dry film thickness of 3 mils.
- E. Apply two coats of epoxy paint (4 mils each) to the primed surface. The manufacturer's recommended drying time between coats shall be followed.
- F. Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch up painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix

additional components for reasons of color or otherwise, even within the same generic type of coating.

3.08 EPOXY COATING OF CONCRETE

- A. Only those metal surfaces specifically called out shall be epoxy coated.
- B. Surfaces to be epoxy coated shall follow the surface preparation requirements as recommended by the manufacturer.
- C. Apply one or more coats of epoxy paint as needed to achieve a uniform coating thickness of 70 mils, minimum. The manufacturer's recommended drying time between coats shall be followed.
- D. Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch up painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

3.09 DRY-FILM THICKNESS TESTING

- A. Measure coating thickness specified for metal surfaces with a majestic-type dry-film thickness gage. Test the finish coat (except zinc primer and galvanizing) for holidays and discontinuities with an electrical holiday detector, low-voltage, wet-sponge type. Measuring equipment shall be provided by the contractor. Provide detector as manufactured by Tinker and Rasor or K-D Bird Dog. Provide dry-film thickness gage as manufactured by Mikrotest or Elcometer. Check each coat for the correct dry-film thickness. Do not measure within eight hours after application of the coating.
- B. If the item has an improper finish color or insufficient film thickness, the surface shall be cleaned and topcoated with the specified paint material to obtain the specified color and coverage. Visible areas of chipped, peeled, or abraded paint shall then be primed and finish coated in accordance with the specifications. Work shall be free of runs, bridges, shiners, laps, or other imperfections.

3.10 WARRANTY INSPECTION

- A. Warranty inspections shall be conducted during the eleventh (11th) month following completion of all coating work. Personnel present during the pre-construction meeting shall be present at this inspection. All defective work shall be repaired per the approved work plan as submitted by the contractor.

END OF SECTION

SECTION 22 11 13

COPPER, BRASS, AND BRONZE PIPE FITTINGS AND APPURTENANCES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes materials and installation of copper, brass, and bronze pipe, fittings and appurtenances.

1.02 APPROVED MANUFACTURERS

- A. All materials shall be the appropriate model number specified as manufactured by the companies listed herein or approved equal.
- B. Copper Tubing
 - 1. Cambridge Lee
- C. Service Saddle
 - 1. Jones
 - 2. Mueller
 - 3. Ford
 - 4. A.Y. McDonald
- D. Corporation Stop
 - 1. Jones
 - 2. Mueller
 - 3. Ford
 - 4. A.Y. McDonald
- E. Insulating Pipe Bushings, Unions, or Couplings
 - 1. Pipeline Coating and Engineering Co.
 - 2. 1566 East Slauson Avenue, Los Angeles
 - 3. Smith Blair
 - 4. Pipe Seal and Insulator Company

PART 2 - MATERIALS

2.01 COPPER TUBING

- A. Copper tubing shall conform to the requirements of ASTM B 88 for seamless copper water tube. Piping located aboveground or suspended within vaults shall be Type L. Buried piping shall be Type K. Copper pipe shall be of domestic manufacture. Compression joints for connections are allowed if approved by the Engineer.

- B. If indicated in soils report, all copper lines shall be encased within a 8-mil polyethylene sleeve. Sleeves shall be color coded per Section 33 05 26.

2.02 BRASS PIPE, NIPPLES, AND FITTINGS

Short threaded nipples, brass pipe and fittings shall conform to ASTM B 43, regular wall thickness, except that nipples and pipe of sizes 1-inch and smaller shall be extra strong. Threads shall conform to ANSI B2.1.

2.03 BRONZE APPURTENANCES

- A. All items specified herein shall be manufactured of bronze conforming to ASTM B 62, "Composition Brass or Ounce Metal Castings."
- B. All size service saddles shall be of the double-strap type for any type of pipe. The straps (or bails) shall be flat and shall be manufactured of bronze for ACP and of stainless steel for C900 PVC and ductile iron pipe. The body shall be manufactured of bronze and shall be tapped for an iron pipe thread. The seal with the pipe shall be affected with either a rubber gasket or an O-ring.
- C. Corporation stops shall be ball valve type and shall be manufactured of bronze. The inlet fitting shall be a male iron pipe thread when used with saddle and the outlet connection shall be a compression type.
- D. Copper setters shall be for 1-inch and 2-inch meter sizes or as approved by the Engineer and using lead free solder. The inlet and outlet service line connections shall be for 1-inch services and for horizontal connections using compression type connections. A dual purpose type connection may be used for the outlet service line connection. The meter connection shall have a key type inlet and outlet valve. When using a copper setter that is sized larger than the meter, use appropriate adaptors as approved by the Engineer. Copper setters shall be 15-inches in height with a lock wing.

PART 3 - EXECUTION

3.01 COPPER TUBING AND FITTINGS

- A. Cut tubing square using a cutter designed for cutting copper tubing and remove burrs. Clean both the inside and outside of fitting and pipe ends with steel wool and muriatic acid. Prevent annealing of fittings and tubing when making connections. Do not miter joints for elbows or notch straight runs of pipe for tees.
- B. Threads of fittings shall receive a liberal coating of pipe thread compound conforming with the requirements of ASTM B88, Type K.
- C. Any damage to the fitting including but not limited to evidence of overtightening, misaligned threads, burring or scarring of machined faces, or any evidence of leakage shall be cause for rejection. If a leak is found to be caused by debris, the debris shall be cleared and the fitting visually inspected for damage before being charged. If the leak recurs upon charging of the line, the fitting shall be removed and replaced whether or not the cause can be determined.

- D. Bends in soft copper tubing shall be long sweep. Shape bends with shaping tools. Form bends without flattening, buckling, or thinning the tubing wall at any point.
- E. Buried piping shall be installed with some slack to provide flexibility in the event of a load due to settlement, expansion or contraction. A MINIMUM COVER OF 24 INCHES BELOW THE FINISHED STREET GRADE SHALL BE ADHERED TO. The tubing is to be bedded and covered with sand or select material as determined by the Engineer.
- F. All domestic service laterals shall be 1-inch minimum size copper tubing. End connections shall be compression type.
- G. All 2-inch size services shall be installed with straight lengths of soft copper water tube Type K. End connections shall be compression type.
- H. The service line shall extend perpendicular to the centerline of the street from the water main to the meter stop or structure, except in a cul-de-sac, where the service shall run in a straight line from the water main to the meter stop.
- I. The service line shall be placed within an 8-mil polyethylene sleeve, color-coded for the type of service. The ends and splices in the sleeve shall be sealed with 20-mil tape.

3.02 SERVICE SADDLE

- A. The service saddle shall be no closer than 18 inches to a valve, coupling, joint, or fitting.
- B. The surface of the pipe shall be filed to remove all loose material and to provide a hard, clean surface before placing the service saddle.
- C. The service saddle shall be tightened per manufacturer's recommendation. Care shall be used to prevent damage or distortion of either the corporation stop or service saddle by over tightening.
- D. The tap into the pipe shall be made in accordance with the pipe manufacturer's recommendation.

3.03 INSTALLING FLANGE BOLTS AND NUTS

- A. Lubricate bolt threads with anti-seize compound prior to installation.
- B. Set flanged pipe with the flange bolt holes straddling the pipe horizontal and vertical centerlines.

3.04 INSULATING BUSHINGS AND UNIONS

- A. Pipe or fittings made of nonferrous metals shall be isolated from ferrous metals by nylon insulating pipe bushings, union, or couplings.

3.05 BACKFILL MATERIAL

- A. The pipe zone material for all service laterals shall be compacted sand per Section 31 23 00.

END OF SECTION

SECTION 26 00 00

ELECTRICAL GENERAL REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. General requirements for products and work related to electrical power and signal.
- B. Related Documents
 - 1. Contract General Conditions, Supplementary General Conditions and Division 1.
 - 2. Contract Drawings which accompany the Specifications.
- C. Intent
 - 1. It is the intent that the provisions of this Section apply to all Division 26 Sections of the Specifications whether or not specifically referenced in those Sections.

1.02 SCOPE

- A. Provide all labor, materials, tools, transportation, equipment, services and facilities necessary for, required in connection with, or properly incidental to the complete and proper installation of all electrical work described in these Specifications, shown on the Drawings, or reasonably implied there from, except as specifically indicated to be excluded.
- B. Work shall include:
 - 1. All cutting and patching necessary for the proper installation of electrical work and coordinating this work with that of the other crafts. Holes shall be held to the minimum required for the work to be installed. Patch all openings to match adjacent area using the materials and methods specified in the Sections of these Specifications covering the applicable material conditions encountered. All joints shall be tight, even and smooth.
 - 2. Provision for all excavating and backfilling for electrical work. Include all cutting of existing paving and concrete surfaces and removal and off-site disposal of spoil. Backfill materials shall be as shown on the Electrical Drawings. Backfill in approximately 6-inch layers, water tamped for each layer. Provide minimum 95 percent relative compaction unless lower levels are called out on the Drawings. Restore all disturbed surfaces to original condition, properly installed to eliminate settlement. Replace paving and concrete, including sub-base

materials, removed for trenching in accordance with the Cutting and Patching requirements of Section 26 05 00 Basic Electrical Materials and Methods.

3. Locating all existing underground utility within areas of project work including but not limited to power, telephone, c.a.t.v., gas, water, storm and sanitary sewer lines. Locating shall be accomplished by qualified locating services.
- C. Contractor shall be held to have examined the site and compared it with the Specifications and Drawings and to have become familiar with the conditions under which the work is to be performed. Contractor shall be held responsible for knowledge of all existing conditions whether or not accurately described. No subsequent allowance shall be made for any extra expense due to failure to make such examination.

1.03 CODES, RULES AND REGULATIONS

- A. All electrical work and materials shall be in full accordance with all applicable provisions of the following:
1. 2019 California Electrical Code (CEC).
 2. California Building Code (CBC), latest adopted edition.
 3. California Fire Code (CFC), latest adopted edition.
 4. California Mechanical Code (CMC), latest adopted edition.
 5. Local codes, rules and regulations.
- B. When the Specifications or Drawings call for materials or construction of larger size, better quality or stricter requirements than required by applicable codes, rules or regulations, the Specifications and Drawings shall take precedence.
- C. Nothing in these Specifications or on the Drawings shall be construed as to permit any work or material which is not, as a minimum, in conformance with all applicable codes, rules and regulations.
- D. Furnish without additional charge any additional material and labor as may be required for compliance with applicable codes, rules and regulations even though such work is not specifically mentioned in these Specifications or shown on the Drawings.

1.04 LICENSES, PERMITS, FEES AND UTILITY CHARGES

- A. Contractor or subcontractor performing electrical work shall possess a C-10 license and all other licenses as may be required, and may be referenced as Electrical Contractor in the Contract Documents. Licenses shall be in effect at the commencement of this Contract and shall be maintained in a valid state throughout the execution of this Contract.
- B. Contractor shall pay all inspection and other applicable fees and procure all permits necessary to the prosecution and completion of his work.

1.05 TEMPORARY CONSTRUCTION POWER

- A. Make all arrangements and provide all necessary facilities for temporary construction power. Energy costs for construction power shall be paid for by the Contractor and shall be included in related bid item.

1.06 PROTECTION

- A. Protect all work, materials and equipment from damage from any cause whatsoever and provide adequate and proper storage facilities during the progress of the work.
- B. Provide for the safety and good condition of all work until final acceptance of the work by Owner. Replace all damaged or defective work, materials and equipment before requesting final acceptance.

1.07 SAFETY PRECAUTIONS

- A. Provide and maintain throughout the work adequate safeguards, including barriers, warning signs, enclosures and lights to prevent accidental injury to persons and damage to property.

1.08 DRAWINGS

- A. The general arrangement of electrical work, as shown on the Drawings, is diagrammatic and approximately correct as to locations. Where minor changes are required because of structural conditions or for the convenience of the Owner, such changes shall be made without additional expense to the Owner.
- B. The Contractor shall be responsible for the accurate location of all electrical installations with respect to the work of the other trades. No extras will be allowed for moving Division 26 work to avoid interference with work of the other trades.
- C. Verify all measurements in field, be responsible for correctness of same. No extra compensation will be allowed because of difference between work shown on Drawings and field measurements.
- D. Data given herein and on the Drawings are as exact as could be secured, but their absolute accuracy cannot be guaranteed. Drawings and Specifications are for assistance and guidance only; exact locations, distances, levels, etc., shall be governed by field conditions. Contractor shall use same with this understanding.

1.09 RECORD DRAWINGS

- A. Provide in accordance with Division 1 Closeout Procedures and all of the following.
- B. Throughout the course of construction, the Contractor shall maintain a complete set of the Electrical Drawings which shall be identified as the "RECORD DRAWINGS". These

Drawings shall be kept at the job-site, and the construction conditions shall be clearly annotated regularly thereon.

- C. The recorded data shall include:
 - 1. Sizes of all conduit runs larger than ½ inch when not shown on the Drawings or when revised by Change Order or field directive.
 - 2. Routes, and depths of all underground conduit runs. Show location of conduit stub out ends using two dimensions from fixed (permanent) reference points located approximately 90 degrees apart in azimuth.
 - 3. Homerun points of all branch circuits.
 - 4. Locations of all electrical equipment including switchgear, transformers, panel boards, control equipment, disconnect switches, pull cans and pull boxes.
 - 5. Additions or deletions which are the result of approved Change Orders or approved in-field revisions.
 - 6. All other items as may be required to make the Drawings reflect the actual job conditions at the completion of construction.
- D. Upon completion of construction, Contractor shall review the Record Drawings for accuracy, sign the drawings certifying their accuracy, and deliver the drawings to the Engineer within 15 days after completion of construction.

1.10 MATERIALS

- A. All materials and equipment shall be furnished as specified in strict accordance with these Specifications and the Drawings, and shall be new and free from defects. Reuse of existing is permitted only where specifically directed or indicated on the drawings.
- B. Materials and equipment shall be UL listed, labeled and approved for the purpose for which they are to be used wherever standards have been established and label/listing service is regularly furnished by that agency.
- C. Materials and equipment shall be the standard products of reputable manufacturers regularly engaged in the production of such materials or equipment. All materials of a given type shall be of the same manufacturer and quality.

1.11 SUBSTITUTIONS

- A. In accordance with Division 1 Product Requirements and all of the following.
- B. Contractors shall base their bids on materials and equipment specified. After the award of the contract, substitutions may be submitted for Engineer's approval subject to the requirements listed hereafter.

- C. Prior approval of proposed electrical substitutions will not be given during bidding unless specifically noted on the drawings that a pre-approved equal may be submitted for approval. Consideration will be given to proposed substitutions only after award of the Contract.
- D. Only one submittal of a proposed substitution for each type of electrical equipment or material will be considered. To obtain consideration, each proposed substitution must be:
 - 1. Listed as a proposed substitution and submitted within ten (10) days following award of the Contract. After the ten day period consideration will be given only for cases of product non-availability or other conditions beyond control of the Contractor.
 - 2. Of similar size and appearance, and of same or better quality, capacity and ratings as the specified product.
 - 3. Accompanied by shop drawings and/or complete descriptive information.
 - 4. Proven to the Engineer to be equal or superior to the specified item in all respects. Engineer's decision is final.
- E. Any dimensional or electrical change, or change to the work of other trades which is required by, or is a result of, an accepted electrical substitution shall be the sole and complete responsibility of the Contractor and shall be made at no additional cost to the Owner or the other trades performing work on the project.
- F. If a proposed substitution is rejected by the Engineer, Contractor shall furnish the specified product at no increase in Contract price.
- G. Contractor shall make no substitutions of materials or equipment without the written approval of the Engineer.

1.12 APPROVAL OF MATERIALS

- A. Electrical materials and equipment provided under this Contract are subject to review and approval by the Engineer prior to purchase and installation. Submit for approval in accordance with Division 1 Submittal Procedures and all of the following.
- B. Submittals shall include manufacturer's names and catalog numbers, complete descriptive data, and shop drawings or other information where required.
- C. Descriptive data submittals shall be clearly annotated to indicate applicable features, ratings and catalog or part numbers.
- D. Shop drawings shall be included where specified and shall show all features including equipment dimensions and weights, component layouts and part numbers, electrical characteristics and wiring diagrams. Features not applicable to this Contract shall be neatly blacked out or otherwise deleted from the shop drawings.

- E. Install no equipment or materials without the Engineer's approval. Engineer may direct that any unapproved materials and/or equipment be removed and replaced with approved items without change in the Contract price.
- F. The review of submittals and any approval thereof by the Engineer shall not relieve the Contractor from responsibility for compliance with the requirements and intentions of these Specifications and the Drawings.

1.13 SUPERVISION AND WORKMANSHIP

- A. Contractor shall personally, or through an authorized and competent representative, constantly supervise the work covered by these Specifications and the Drawings and, insofar as possible, keep same foreman and workmen on the job from start to finish.
- B. All electrical equipment and material shall be installed in a neat and workmanlike manner in accordance with NECA National Electrical Installation Standards No. NECA 1-2000, Standard Practices for Good Workmanship in Electrical Contracting.

1.14 COOPERATION WITH OTHER TRADES

- A. Cooperate with the other trades as may be necessary for the proper execution of the work of the various trades employed in the construction of this project. Refer to Civil and other Contract Drawings for construction details, and coordinate work with that of the other trades.
- B. PROJECT COORDINATION
 - 1. See Specification section 26 05 00, paragraph 3.02.

1.15 STRUCTURAL CONDITIONS

- A. Cutting, boring, drilling or tapping of structural members and footings or the installation of chases there-in is not permitted without the prior written approval of the Structural Engineer. Lay out the work to clearly indicate the locations and extent of the required holes, notches, etc., including depths of penetrations and obtain the required approval before proceeding with the installation. Notches, holes, etc. shall be carefully held to the approved sizes.

1.16 INSPECTION

- A. All work and materials covered by the Drawings and these Specifications shall be subject to inspection at any and all times by the Owner's Representative.
- B. If inspector finds that any material does not conform to the Drawings or these Specifications, Contractor shall remove said material from the premises. If said material has been installed, entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by Contractor.

1.17 TESTS

- A. Test electrical systems in accordance with requirements of Section 26 05 00 Basic Electrical Materials and Methods and the specification sections covering specific types of electrical equipment and devices.

1.18 REPAIR OF DAMAGE

- A. All damage resulting from work done under the Division 26 Sections of these Specifications shall be repaired by the Contractor to the satisfaction of the Owner's Representative at no additional cost to the Owner.

1.19 CLEAN UP

- A. Perform clean-up in accordance with Section 26 05 00 Basic Electrical Materials and Methods.

1.20 GUARANTEE

- A. Contractor shall leave the entire electrical system in proper working order. Any item of material, apparatus, or workmanship supplied by the Contractor showing defects of design, construction, or quality within one (1) year of final acceptance by the Engineer shall be replaced by such new material, apparatus, or parts as may be found necessary to make such defective portion of the complete system conform to the true intent and meaning of the Drawings and Specifications. Changes, repairs and replacements made during the warranty period shall be made by the Contractor at no cost to the Owner.

1.21 HAZARDOUS MATERIALS

- A. As used hereafter, the term "hazardous materials" shall mean any toxic substance - or any material, appliance or equipment containing any toxic substance - where such substance is listed, regulated, and/or controlled by State of California, OSHA or EPA rules, laws or regulations. Hazardous materials shall include but not be limited to asbestos, asbestos products, mercury and polychlorinated biphenyls (PCB's).
- B. In the event hazardous materials or wastes are encountered or located on the job, the Contractor shall immediately notify the Engineer and Owner's Representative and immediately halt all work in the area affected by those materials. The Owner shall then retain the services of a competent, qualified abatement contractor licensed in the State of California to remove the hazardous materials as per State, OSHA and EPA regulations, recommendations and guidelines.
- C. The provision of, or installation of, any new or used electrical materials or equipment containing asbestos or PCB's is expressly prohibited.
- D. The Electrical Engineer shall not have any responsibility for the discovery, presence, handling, removal or disposal of, or exposure of persons to any hazardous materials in any form at the Project Site.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

END OF SECTION

SECTION 26 05 00

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Coordination.
- B. Electrical installation, general requirements.
- C. Cutting and patching.
- D. Electrical equipment bases and supports, including supplementary framing.
- E. Electrical work for equipment provided by other trades.
- F. Testing.
- G. Cleaning electrical work.

1.02 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements.
- B. Division 1 Cutting and Patching.

1.03 REFERENCES

- A. Reference Standards:
 - 1. ANS American National Standards Institute.
 - 2. ASTM American Society for Testing and Materials.
 - 3. CFR Code of Federal Regulations.
 - 4. ICEA Insulated Cable Engineers Association.
 - 5. IEEE Institute of Electrical and Electronics Engineers Inc.
 - 6. NBFU National Board of Fire Underwriters.
 - 7. CEC California Electrical Code.
 - 8. NEMA National Electric Manufacturers' Association.
 - 9. NFPA National Fire Protection Association.
 - 10. UL Underwriters' Laboratories, Inc.

1.04 QUALITY ASSURANCE

- A. Installers: Provide adequate number of skilled workmen, trained and experienced in necessary crafts, and completely familiar with specified requirements and methods needed for proper performance of Work.
- B. Materials and Equipment: Install in accordance with manufacturer's recommendations.
- C. Workmanship: Perform Work in accordance with good commercial practice. Workmanship includes electrical efficiency and finished appearance.
- D. Supervision: Coordinate work of all subcontractors performing work under Division 26.

PART 2 – PRODUCTS

2.01 MATERIAL AND EQUIPMENT

- A. General: Provide products which are new, and of same manufacture and type for similar uses, except as otherwise accepted.
- B. UL Listing and Labels: Provide products listed and labeled by UL and bearing UL Inspection Label where inspection standards have been established.
 - 1. Where UL testing standard is available for electrical products, Provide UL listed products.
- C. Industry or Trade Standards: Where industry or trade standards are in effect, provide products complying with applicable standards as a minimum criterion of quality and workmanship.

2.02 STRUCTURAL FITTINGS AND PENETRATION MATERIALS

- A. General: Provide necessary sleeves, inserts, hangers, anchor bolts, and related structural items.
- B. Anchor Bolts and Inserts: Galvanized, of adequate size and strength for installation of electrical Work.
 - 1. Expansion shields: Allowed only with specific acceptance of Structural Engineer. Wood and soft metal plugs are not acceptable.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Scheduling and Planning: Review construction schedules; plan work to permit completion within scheduled time frames.
 - 1. Insure adequate number of trained personnel available to perform work at required times.

2. Order materials with sufficient lead-time to insure on time delivery.
- B. Field Measurements: Base final installation of materials and equipment on field dimensions and conditions. Field dimensions shall take precedence over Drawing dimensions. Field measure critical dimensions and do not fabricate or cut materials to size until such measurements are made. Be responsible for accurate location of rough-ins as required for equipment being served.

3.02 COORDINATION

- A. Coordinate with other trades to allow for proper installation of electrical equipment, conduit and the like.
1. Electrical Contractor shall schedule and hold a coordination meeting at the beginning of the project. Meeting may be at the job site, Contractor's office or Engineer's office.
 2. As a minimum, Prime Contractor, Mechanical, Electrical, Plumbing and Civil sub-contractors shall be present. Electrical Engineer shall be notified of the meeting schedule.
 3. Minutes of the meeting shall be recorded by the Electrical Contractor and submitted to the Electrical Engineer for review and approval prior to beginning work.
 4. Meeting shall review:
 - a. Voltage and phasing available at this project
 - b. Power requirements for each piece of equipment furnished.
 - c. Control and starter requirements for each piece of equipment including a review of who is providing said piece of equipment.
 - d. Location of each piece of equipment, including switchboards, panels and other electrical utilization equipment and devices.
 5. The outcome of this meeting will be to identify deficiencies of the electrical plans and resolve said deficiencies prior to the start of construction.
- B. Coordinate with Mechanical and Plumbing Work.
1. Verify that power requirements for motorized equipment as shown on the Electrical Drawings are correct for actual equipment being installed. Report differences to Engineer for direction.
 2. Review electrical installations for conflicts with other work and piping. Immediately report all irresolvable conflicts to Engineer for direction.

3.03 INSTALLATION – GENERAL

- A. Seismic Design: Be responsible for anchors and connections of electrical work to structure to prevent damage as result of earthquake. Install in accordance with California UBC Zone 4. When requested submit calculations for anchors and connections signed by Structural Engineer licensed in the State of California.
- B. Accessibility and Clearance: Install electrical equipment, outlets, junction boxes, and pull boxes in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.
 - 1. Minor adjustments in location of equipment: Make when necessary, providing such adjustments do not adversely affect functioning equipment.
- C. Structural Fittings and Penetrations: Install inserts, hangers, anchor bolts, and related structural items at proper time in coordination with work of other trades.

3.04 CUTTING AND PATCHING

- A. Comply with requirements of Division 1 and as specified herein.
- B. General: Be responsible for costs of cutting and patching for work under Division 26.
- C. Cutting: Coordinate and supervise cutting required.
 - 1. Provide core drilling of concrete for passage of electrical items.
 - 2. Cut existing construction using methods least likely to damage adjoining construction.
 - 3. Temporarily cover openings when not in use.
- D. Patching: Seal openings and repair and refinish any damage to building elements using skilled mechanics of trades involved. Match existing adjoining construction to maximum extent possible.
 - 1. Waterproofed surfaces: Coordinate with appropriate Section of Specifications covering such work to ensure continuity of waterproofing.
 - 2. Concrete Surfaces: Coordinate with Civil Plans for concrete work.
 - 3. AC Paving: Coordinate with Civil Plans for AC Paving work.

3.05 EQUIPMENT BASES AND SUPPORTS

- A. Supplementary Framing: Provide supporting steel for equipment requiring supplementary framing.
 - 1. Fabricate supports in accordance with applicable codes.

2. Supplementary framing: Designed to carry weight of equipment, conduit, piping, and contents and to withstand thrust exerted by expansion or contraction of piping.
3. Seismic design: Design supplementary framing to resist seismic forces as specified above.
4. Brace and fasten supplementary framing to structure in accepted manner.
5. Finish (Ferrous Metal): Hot-dipped galvanized finish or provide one coat rust inhibiting primer, shop applied, after fabrication with one coat of rust inhibiting paint applied after installation.

3.06 ELECTRIC WORK FOR EQUIPMENT PROVIDED BY OTHER TRADES

- A. Under the work of Division 26 provide work and materials as specified throughout this paragraph for electrically powered equipment provided by other trades. Electrical Contractor shall coordinate installation of equipment with trades providing such equipment.
- B. Provide complete line voltage power connections for all electrically powered equipment furnished by others as indicated on the Electrical Drawings and in accordance with the requirements of the equipment installed.
- C. Locations of equipment as shown on the Electrical Drawings are diagrammatic and approximately correct. Verify exact locations in field with trades furnishing equipment.
- D. Under Division 26 work furnish, install and connect the following for equipment:
 1. Conduit and wiring for line voltage power to the equipment.
 2. Disconnect switches.
 3. Motor starters when not furnished with, or as an integral part of, the equipment.
- E. All line and low voltage controls and associated wiring not shown on the Electrical Drawings, including all associated raceways, boxes and control devices shall be furnished, installed and connected under the work of the other trade or persons providing the equipment. Materials and installation shall be in accordance with the requirements of Division 26. All low voltage wiring shall be installed in conduit.

3.07 TESTING

- A. Electrical System Testing and Adjusting: Adjust and test entire system.
 1. Test all wiring for continuity, short circuits, and improper grounds.
 2. Test all circuits for proper neutral connections.
 3. Insulation resistances: Test for compliance with values required by applicable electrical code.

- B. Equipment and Device Checking and Adjusting: Check for correct functional performance in accordance with apparatus ratings, operating sequence, and code requirements.
 - 1. Motors: Check and adjust for correct direction of rotation.
- C. Refer to all other Division 26 Sections of these Specifications for additional adjusting and testing requirements.
- D. Furnish all equipment, labor and temporary wiring required for tests. Remove and replace all defective workmanship and materials at no expense to Owner.

3.08 CLEANING

- A. Clean all electrical equipment, including switchgear, panelboards, switches, and other devices of grease, dirt, and other foreign matter.
- B. Clean up and remove all debris and materials not installed in work, leaving premises clean.
- C. Plated surfaces: Polish.

END OF SECTION

SECTION 26 05 13

WIRE AND CABLE

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Requirements for wiring and cables for conveying electrical power and signal up to 600 volts.

1.02 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements
- B. Section 26 05 33.01 Raceways
- C. Section 26 05 33.02 Boxes

1.03 SUBMITTALS

- A. Submit in accordance with Section 26 00 00.
- B. Provide manufacturer's product data showing insulation type and conductor type.

PART 2 – PRODUCTS

2.01 CONDUCTORS

- A. Individual Conductors: copper, with type THHN/THWN, 600 volt rated insulation and as follows:
 - 1. Conductors shall be minimum No. 12 AWG size and conductors run underground or under slab, minimum size shall be No. 12 AWG.
 - 2. Conductors for power and control circuits shall be stranded, except that:
 - a. Sizes No. 10 and smaller may be solid.
- B. Wire color-code shall be as follows:

	<u>480/277V</u>	<u>120/240V</u>
A Phase ...	Brown	Black
B Phase ...	Orange	Red
C Phase ...	Yellow	-
Neutral ...	Grey	White

- 1. Ground wire insulation color shall be Green.

2. For individual conductors larger than No. 6, insulation color may be black with 3M Co. Scotch 35, or equal, tape bands (colored per above) located at each end of the conductor run and at all other locations required by the CEC.
- C. Signal conductors shall have copper conductors and be as noted on the plans and shall be rated for the installation locations e.g. wet locations, direct burial, etc.
- D. All wire shall be brought to the job in unbroken packages and approved by the Owner's Representative before being installed.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. All wiring, including low-voltage wiring, shall be run in approved raceways unless otherwise specifically noted or approved.
- B. All wiring shall be done with identified neutrals and color-coded phase wires.
- C. Feeders shall consist of individual conductors installed in conduit.
- D. All branch circuit conductors shall be continuous from outlet to outlet and no splice shall be made except within outlet, junction or pull boxes.
- E. Feeder conductors shall be continuous from equipment to equipment. Splices in feeder conductor runs are not permitted unless specifically noted on the Drawings or approved by the project Electrical Engineer.
- F. Splices: When splices are permitted and unless otherwise detailed on the plans, the following applies:
 - a) Conductor splices for conductors AWG#6 and smaller, join the conductors securely, both mechanically and electrically using screw-on type connectors. The preferred product is WIRENUT twist-on connector by Ideal.
 - b) Use high compression barrel splices for conductors larger than AWG#6. The preferred barrel splice is Burndy HYLINK splice. The spliced area shall be covered to provide equal or greater insulation that that of the adjoining conductors. Insulation over the spliced area shall extend 3 to 5 overall diameters of the insulated wire. The preferred insulation product is COLD SHRINK by 3-M Company.
- G. All branch circuit wires in panel boards shall be properly identified with linen tape or other approved methods. All wires shall be neatly formed and fastened with clips or lacings.

3.02 TESTING

- A. Test all wiring for continuity, short circuits, loose neutrals and improper grounds.
- B. Check all terminations for loose connections and verify connections properly torqued.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding of electrical equipment and raceway systems.

1.02 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements.
- B. Section 26 05 00 Basic Electrical Materials and Methods.
- C. Section 26 05 33.01 Raceways.
- D. Section 26 05 13 Wire and Cable.

1.03 REFERENCES

- A. Reference standards:
 - 1. California Electrical Code (CEC).

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Ground Wires:
 - 1. 600 Volt and below: Insulated copper per Section 26 05 13.
 - 2. Size: Not less than requirements of CEC for building electrical systems. Provide larger sizes than required by codes when noted on Drawings.
- B. Bolted Connections: Everdur hardware, bolts, and lock washers.
- C. Welded Connections: Either Erico Cadweld Process or Continental Industries Thermoweld Process.
- D. Compression Connections: Thomas & Betts Series 5300 fittings. Use manufacturer's specific instructions and tools for each connection.
- E. Ground Rods: Copper or copper-clad steel, minimum $\frac{3}{4}$ inch diameter. Provide minimum 8-foot-long rods where direct buried (non-accessible) and minimum 10-foot-long rods where installed in ground wells or other accessible locations.

PART 3 – EXECUTION

3.01 GENERAL

- A. Ground all electrical systems in accordance with CEC.

3.02 INSTALLATION

- A. Grounding System:

1. Make connections mechanically secure and electrically continuous.
2. Clean contact surfaces of ground connections.
3. Raceway Systems: Install metallic raceways mechanically and electrically secure at joints, boxes, cabinets, fittings, and equipment. At point of electrical service entrance, bond metallic raceways together with ground conductor and connect to system ground bus. Bond boxes as specified in this Section for equipment.
4. Provide separate green equipment ground conductor in all electrical raceways to effectively ground panels, controls, motors, disconnect switches, and noncurrent carrying metallic enclosures. Use bonding jumpers, grounding bushings, lugs, buses, etc. Connect equipment ground to electrical system ground. Use same size equipment ground conductors as phase conductors up through No. 10 AWG unless otherwise noted. Use CEC Table 250.122 for conductor size with phase conductor's No. 8 and larger except provide larger sizes when indicated on the Drawings.

3.03 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- B. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point using suitable ground testing equipment. Resistance shall not exceed 10 ohms.

END OF SECTION

SECTION 26 05 33.01

RACEWAYS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Requirements for raceway systems including conduit, tubing and wireways.
- B. Fittings for raceways.

1.02 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements.
- B. Section 26 05 00 Basic Electrical Materials and Methods.
- C. Section 26 05 13 Wire and Cables.
- D. Section 26 05 33.02 Boxes.

1.03 SUBMITTALS

- A. Product Data: Submit in accordance with requirements of Section 26 00 00. Provide data for each raceway type.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Steel Conduit and Tubing: ALLIED or equal
- B. PVC Coated Steel Conduit: Ocal-Blue steel conduit.
- C. Fittings and Connectors for Metal Conduit/Tubing: APPLETON or equal
- D. Rigid PVC Conduit and Fittings: CARLON or equal
- E. Wireways and Auxiliary Gutters: HOFFMAN or equal
- E. Metal Conduit Bodies: APPLETON or equal

2.02 MATERIALS

- A. All conduits shall be U.L. listed and bear the label of the National Board of Fire Underwriters.
- B. Rigid Steel Conduit (GRS): Hot-dipped galvanized with threaded, one-piece couplings and factory made elbows. Nipples through 12” in length shall be factory made. Connectors threaded type with bonding locknut, insulated throat and neoprene O-ring.

- C. PVC Coated Rigid Steel Conduit: GRS conduit factory coated with blue urethane exterior coating of 40 mil thick and interior coating of 2 mil thickness.
- D. Rigid Nonmetallic Conduit: Schedule 40 PVC plastic, rated 90 degrees C. with glue-on PVC couplings and factory made elbows and sweeps; CARLON "PLUS 40".
- D. Flexible Conduit, Liquidtight: Flexible, galvanized steel with outer thermoplastic covering, "Sealtite" or equal. Provide liquidtight, insulated throat connectors.
- E. General Purpose Wireways and Auxiliary Gutters: Galvanized sheet steel with screw covers and ANSI-49 gray epoxy paint finish over a corrosion resistant phosphate primer. NEMA-1 for indoor use, NEMA-4X for outdoor use and dry-well locations.
- F. Conduit Bodies: Threaded type for use with GRS.
 - 1. For conduits 3-inch trade size and larger containing conductors larger than 250 kcmil provide Mogul type (**NEC 6X8X Series**) bodies.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Immediately upon delivery inspect products for damage and all other items as may be directed or recommended by manufacturer. Replace damaged or defective products before starting installation.
- B. Verify delivered products are of proper sizes and types and are in total compliance with approved Submittals and the Contract Specifications. Replace non-compliant products with approved products.

3.02 STORAGE AND HANDLING

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- B. For exterior storage of fabricated products, place on sloped supports, above ground and protected from weather. Protect PVC conduit from direct exposure to sunlight.
- C. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

3.03 INSTALLATION

- A. Install as shown on Contract Drawings, in compliance with the CEC, and following product manufacturer's installation instructions.
- B. Prior to installing product insure area is clean, free of obstructions and ready for acceptance of the product.
- C. Raceway Usage:

1. Minimum permitted conduit size shall be $\frac{3}{4}$ inch trade diameter and provide minimum $\frac{3}{4}$ inch trade diameter for all underground runs, runs in or under concrete slabs, and runs in concrete and CMU walls.
 2. For conduit runs underground, in concrete or masonry block walls and under concrete slabs provide nonmetallic PVC 40 with PVC elbows and fittings. Where conduit transitions from underground or under slab to above grade provide rigid metal (GRS) elbows and risers. Where conduit rises from underground through concrete slabs on-grade and terminates directly in electrical equipment fastened to the on-grade slab, PVC elbows and risers may be used.
 3. For conduit runs exposed to the weather or damage provide rigid metal (GRS).
 4. For conduit runs in the wet well or as noted on the drawings provide PVC coated GRS.
 5. Flexible metal conduit shall be used only for the motor connections and vibrating machinery unless otherwise specifically noted on the Drawings. Those for motors and vibrating machinery shall be "liquidtight" type.
- D. Metal conduit in contact with earth or concrete shall be wrapped with a corrosion-resisting protective tape covering equal to 3M Company Scotchwrap #51 tape (maximum one inch width for conduits up to and including 2" diameter). Wrapping shall be applied uniformly and tightly, free of voids and wrinkles, with a minimum one-half inch over-lap. Field joints shall be double wrapped and wrapping shall extend at least three (3) inches over adjacent conduit coverings.
- E. No electrical conduits shall be covered before inspection and approval by the Owner's Representative. Contractor shall notify Owner's Representative that conduits are ready for inspection at least 48 hours in advance of planned covering.
- F. Exposed conduits, where permitted, shall be run parallel to or at right angles with lines of building. Exact routing of exposed conduits shall be approved by the Owner's Representative prior to installation. Groups of conduits shall be neatly racked together.
- G. Conduits shall be installed in a rigid and satisfactory manner with support spaced not more than 8 feet apart. Conduits shall be joined by approved conduit couplings and shall have ends butted in all cases where couplings are used. Conduits shall be tightly corked and otherwise well protected during construction and blown out and swabbed before wires are pulled. Ream all conduit ends after cutting. Bends shall be made with standard conduit elbows or conduit bent to not less than radius allowed by CEC. All bends shall be free from dents or flattening. Conduits shall not be run in concrete slabs except where passing through vertically.
- H. Where conduits rise from underground locations or from under floors or concrete slabs, they shall do so vertically. No curved portion of the riser's elbow shall protrude beyond the finished surface of the floor, slab or other finished grade surface.
- I. Straps and Hangers: Substantially support raceways by suitable clamps or hangers to provide rigid installation.

1. Perforated strap hangers and twisted wire attachments not allowed.
2. Do not support or fasten raceways to duct or pipe supports.

J. Joints and Connections:

1. Metal conduits: Make threaded connections watertight in threaded conduit. Cut joints square, ream smooth, and properly thread.
 - a. Fit box connections with minimum two approved locknuts and one steel, plastic or fiber bushing forming accepted tight bond with box. Provide locknuts both inside and outside of enclosure to which conduit is attached.
 - b. Provide grounding locknuts or bushing when required by Section 26 05 26.
2. PVC conduits: Make couplings and connectors watertight in all runs. Utilize solvent cement of type approved by conduit manufacturer. Provide adapters and locknuts where conduit is attached to metal boxes and panels.
3. Threads: Clean threads of rigid metal conduit. Coat male threads of steel conduit installed in concrete with red or white lead immediately before coupling together.

K. Location Requirements:

1. Raceway runs shown on Drawings are diagrammatic unless specifically dimensioned. Determine exact locations of all un-dimensioned raceway runs in field.

- L. Provide and install pull lines in all empty conduits trade size 2" and larger. The required product is "mule tape", 2500 pound tensile strength, 7/8" wide with sequential foot markings. Provide pull lines with identification tags indicating start/stop locations.

END OF SECTION

SECTION 26 05 33.02

BOXES

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Outlet boxes.
- B. Pull boxes.
- C. Junction boxes.

1.02 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements.
- B. Section 26 05 00 Basic Electrical Materials and Methods.
- C. Section 26 05 33.01 Raceways.
- D. Section 26 05 13 Wire and Cables.
- E. Section 26 05 26 Grounding and Bonding.

1.03 REFERENCES

- A. Reference Standards: See Section 26 00 00.

1.04 SUBMITTALS

- A. Submit product data in accordance with requirements of Section 26 00 00.

PART 2- PRODUCTS

2.1 MATERIALS

- A. Junction Boxes, Outlet Boxes and Pull Boxes:
 - 1. Manufacturers:
 - a. Appleton Electric Company.
 - b. Steel City.
 - c. Hoffman.

- d. National Electric Products Corp.
 - e. Raco.
 - f. Approved equal.
- B. Outlet Boxes:
- 1. For interior dry locations provide NEMA 1 galvanized steel outlet boxes of sizes required to satisfy conditions of usage.
 - a. Provide boxes minimum 1½ inches deep except provide minimum 2 inch deep for multi-gang boxes and all boxes used with 1 inch or larger trade diameter conduits.
 - 2. For exterior surface mounted outlet boxes, provide NEMA 3R cast metal type with threaded conduit entry hubs size per CEC requirements unless drawings call for larger sizes.
- C. Pull Boxes & Junction Boxes: Code gauge galvanized sheet metal pull boxes sized per code unless larger boxes are indicated on Drawings. Provide screw type cover fastenings unless hinged and latched types are indicated on Drawings. Provide removable cover on largest access side of box unless otherwise indicated. Where cast boxes are specified, provide conduit entrances with threaded hubs. Provide stainless steel screws and hardware on all boxes.
- 1. Exterior boxes: Raintight and gasketed, stainless steel, minimum NEMA 3RX construction unless otherwise noted on the plans. Provide conduit entrances with raintight hubs, MYERS or approved equal.
 - 2. Interior boxes: NEMA 1 steel boxes with screw cover unless otherwise noted on the plans.
 - 3. Finish on steel boxes shall be ANSI 61 gray polyester powder coat inside and outside over phosphatized surfaces.
 - 4. Finish on stainless steel boxes shall be smooth brushed finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Immediately upon delivery inspect products for damage, and all other items as may be directed or recommended by manufacturer. Replace damaged or defective products before starting installation.
- B. Verify delivered products are of proper sizes and types and are in total compliance with approved Submittals and the Contract Specifications. Replace non-compliant products with approved products.

3.2 STORAGE AND HANDLING

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- B. Do not store metal boxes exposed to weather.

3.3 INSTALLATION

- A. Install as shown on Contract Drawings and in accordance with product manufacturer's installation instructions.
- B. Prior to installing product insure area is clear, free of obstructions and ready for acceptance of the product.
- C. Outlet boxes and Pull boxes:
 - 1. Rigidly mount boxes and provide with suitable screw fastened covers. Plug open knock-outs or holes in boxes with suitable blanking covers.
 - 2. Install boxes in locations accessible after completion of Project.
 - 3. Provide pull boxes and junction boxes as indicated and in compliance with applicable codes.
 - 4. For surface mounted work provide cast outlet boxes at all exterior locations and all interior damp or wet locations.
 - 5. Support boxes independently of conduit.

END OF SECTION

SECTION 26 05 53

ELECTRICAL IDENTIFICATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Nameplates and tape labels.
- B. Wire and cable markers.

1.02 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background unless otherwise specified.
- B. Wire and Cable Markers: Cloth markers, split sleeve or tubing type.
- C. Permanent black marker.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General:
 - 1. Degrease and clean surfaces to receive nameplates and tape labels.
 - 2. Install nameplates and tape labels parallel to equipment lines.
- B. Secure nameplates to equipment fronts using screws or rivets. Secure nameplate to inside face of recessed panel board doors in finished locations.
 - 1. Embossed tape not allowed.
- C. Wire Identification: Provide wire markers on each conductor in panel board/pedestal gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number for power circuits and with control wire number as indicated on schematic and interconnection diagrams for control wiring.
- D. Junction Box Identification: Using permanent black marker, designate respective panel designation and circuit numbers on junction box cover.
- E. Equipment Identification:

1. Provide nameplates identifying electrical distribution and control equipment and disconnects.
2. Panel boards and Power Pedestals:
 - a. Use 1/4-inch lettering to identify equipment designation.
 - b. Use 1/8-inch lettering to identify voltage rating and source.
 - c. Individual circuit breakers in switchboards, 1/8-inch lettering to identify panel or equipment served.
3. Individual circuit breakers, enclosed switches, and motor starters: 1/8-inch lettering to identify load served.

END OF SECTION

SECTION 26 06 20.13

POWER PEDESTALS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Requirements for freestanding outdoor power pedestals rated 600V or less.

1.02 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements.

1.03 APPLICABLE STANDARDS

- A. The standards listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only and the latest edition will apply.
- B. National Electrical Manufacturers Association (NEMA).
- C. National Fire Protection Association (NFPA) Publication:
 - 1. NFPA -70.....National Electrical Code.
- D. Underwriters Laboratories (UL)
 - 1. UL 489.....Circuit Breakers, Molded Case
 - 2. UL 508.....Pedestals

1.04 SUBMITTALS

- A. Submit product data for each pedestal in accordance with provisions of Section 26 00 00.
- B. Product data shall show the following:
 - 1. Complete electrical ratings to include amperes and volts.
 - 2. Pedestal components arrangement.
 - 3. Outline drawings showing overall dimensions, weights, anchoring points and dimensioned conduit entry areas.
 - 4. One-line diagram.
 - 5. Bussing material and short circuit withstand ability.

6. Circuit breaker ampere ratings (trip and frame size) and short circuit interrupting ratings.
7. Control elements and wiring diagrams to demonstrate control functions.

1.05 TESTING

- A. Routine Factory Tests:
 1. Routine tests shall be made by the manufacturer on each pedestal to ensure that the design performance is maintained in production.
 2. Factory tests shall be in accordance with UL 508.

1.06 SERVICE CONDITIONS

- A. All pedestals shall be suitable for use in California Seismic Zone 4 area.

1.07 SPARE PARTS

- A. Finish paint: Total of one (1) pint of each finish color used on pedestal. Ship with pedestal.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. Design as shown on drawings is based on TESCO Controls, Inc. Products. Provide TESCO pedestals as described on the drawings, no substitutions to conform to the District's standard.

2.02 GENERAL REQUIREMENTS

- A. Free-standing, dead-front, totally enclosed, pedestal with non walk-in, front only access construction.
- B. 100% rated Copper phase and neutral conductors and copper equipment ground conductor.
- C. Service pedestal shall be U.L. listed as service entrance equipment.

2.03 GENERAL CONSTRUCTION

- A. Pedestal shall have section arrangements, voltage and ampere ratings and equipment/devices as shown on drawings. The pedestal line-up shall be provided with an automatic transfer switch as described in the contract documents, motor starters, and controls, see Electrical Specification sections which detail requirements for the integrated devices and equipment.

- B. Pedestal sections shall be rear aligned, and front connected with all incoming and outgoing connections made from the front.
- C. Pedestal shall be free standing, dead front, 304 stainless steel, and totally enclosed. Construction shall be NEMA 3RX, for outdoor use and shall have open space in bottom for bottom entry conduits.
- D. Pedestal shall consist of the required number of vertical sections bolted together to form one-piece construction.
- E. Pedestal shall include all protective devices and equipment together with necessary interconnections, instrumentation and control wiring.
- F. Pedestal shall have dimensions as shown on the Drawings. Approximate dimensions for each section adhering to maximum dimensions shown.
- G. Provide adequate lifting means and be capable of being rolled or moved into installation position and bolted directly to the floor without the use of floor sills.
- H. Pedestals shall be constructed in accordance with NEMA and UL 508 standards.
- I. Pedestal interior conductors shall be copper.
- J. Neutral conductors shall have 100 percent capacity.
- K. A copper ground conductor shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the pedestal. It shall have an ampacity not less than 25 percent of the rating of the main bus.
- L. Each pedestal section shall have equipment elements (i.e. circuit breakers, transformers, starters, controls, etc.) as described on the plans and in the specifications, and shall be properly installed to function as required by the various manufactures of the equipment. Each section of the pedestal shall have adequate means to maintain environmental conditions within the pedestal section for proper operation of the equipment. As a minimum each pedestal section shall have dust filtered ventilation. The pedestals will be installed outdoors at a location near Monterey, California.

2.04 CIRCUIT BREAKERS

- A. Circuit breakers shall be 80% rated, molded case, thermal-magnetic type with adjustable magnetic trip unless otherwise noted on Drawings.
- B. Provide breakers of trip amps, number of poles and minimum interrupting capacities specified.
- C. Breakers shall have distinct On-Tripped-Off positions. Trip mechanism shall operate all poles of multiple devices simultaneously during open, close, and trip operations.

2.05 MOTOR STARTERS

- A. Each motor shall be controlled using a variable frequency drive (VFD) as specified in other sections of this specification.
- B. VFD's and peripheral equipment shall include the following elements:
 - a. Circuit breaker sized to support all VFD operations.
 - b. Environmental controls (HVAC equipment) to ensure VFD operational parameters are always maintained.
 - c. Door-mounted pilot devices & controls as noted on the plan sheets.

2.06 TERMINATIONS

- A. Pedestal incoming main lugs shall be sized to accommodate the required quantity and sizes of cables specified by the Utility and shall meet EUSERC requirements and be Pacific Gas & Electric (PG&E) approved. Contractor shall coordinate with PG&E prior to purchase of pedestal to ensure all utility requirements are being met with the proposed equipment. Provide the Utility with pedestal Shop Drawings for Utility approval prior to purchase of pedestal.
- B. All lugs for terminating conductors shall be compatible with copper or aluminum conductors and shall be acceptable to the controlling requirements e.g. utility parameters.
- C. Main incoming landing lugs shall be provided with the pedestal.

2.07 PAINTING

The power pedestal finish shall meet the following requirements:

1. Enclosures and fittings shall be prepared for finishing, utilizing a five-stage dip process and the coating shall be electrostatically applied powder.
2. The paint coating shall be dry powder electrostatically applied to produce a finish of 3 to 5 mils thickness. The coated metal shall then be baked. The coating shall be commercially smooth, substantially free of flow lines, paint washout, streaks, blisters, and other defects that would impair serviceability or detract from general appearance.
3. Salt spray resistance, the undercutting of the film of the coating shall not exceed 1/8" average, from lines scored diagonally and deep enough to expose the base metal, after 2500 hours exposure in a salt spray cabinet in accordance with ASTM Designation: B 117.
4. There shall be no coating loss when tested by California Test 645. Compliance of the coating system to the above requirements may be determined by the application of the coating, to 4" x 8" x 0.024" test specimens of the same material as the cabinets, in the same manner as applied to the cabinet. Testing shall include tape pull and mandrel bend testing in compliance with California Test Method 645.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Immediately upon delivery inspect equipment for damage, loose mechanical and electrical connections, and all other items as may be directed or recommended by manufacturer. Replace damaged or defective products before starting installation at no additional cost to the District.
- B. Verify delivered equipment is of proper ratings and in total compliance with approved Submittals and the Contract Specifications. Replace non-compliant products with approved products.

3.02 STORAGE AND HANDLING

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.
- B. Do not store products exposed to weather.
- C. Provide off-site storage and protection when site does not permit on-site storage protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
- F. Transport and handle products in accordance with manufacturer's instructions.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

3.03 INSTALLATION

- A. Install as shown on Contract Drawings and in accordance with product manufacturer's installation instructions.
- B. Prior to installing product ensure area is clean, free of obstructions and ready for acceptance of the product.
- C. Install pedestals level and plumb and with clearances in accordance with CEC. Anchor pedestal in accordance with the Drawings and California UBC requirements for Seismic Zone 4.
- D. Torque all bolted connections per manufacturer's instructions.
- E. Neatly arrange field installed cabling within pedestal enclosure. Radius of cable bends shall not be less cable manufacturer's recommended radii and in not case less than CEC minimums.

- F. Prior to energizing equipment verify all components are properly connected, free from shorts and unintentional grounds and neutral is properly grounded.
- G. Initial energization of pedestal shall be done with all circuit breakers in the open (off) position.

3.04 TESTS

- A. Test all components for proper operation. Verify correct voltages.
- B. Manually close and open each circuit breaker. Adjust magnetic trip settings on breakers equipped with adjustable magnetic trip.

END OF SECTION

SECTION 26 09 00
CONTROL SYSTEM

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. These specification requirements are for Pump Station Controls and Communications herein referred to as Station Controls.

1.02 REFERENCES

- A. The Station Controls and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of IEC, UL, CSA, and NEMA.

1.03 WARRANTY

- A. A twelve-month renewable warranty shall be provided on materials and workmanship from date of invoice.

1.04 SUBMITTALS-FOR REVIEW/APPROVAL

- A. The following information shall be submitted to the Engineer:
 - 1. Dimensioned outline drawings of the completely assembled control system.
 - 2. Schematic diagram and interconnection diagrams.
 - 3. Component list.
 - 4. Power and control connection diagram(s).
 - 5. Complete documentation to demonstrate functionality of the control system as called for on the drawings.

1.05 SUBMITTALS-FOR INFORMATION

- A. When requested by the Engineer the following product information shall be submitted:
 - 1. Descriptive bulletins on discrete system components.
 - 2. Product sheets on discrete system components.

1.06 SUBMITTALS-FOR CLOSE-OUT

- A. The following information shall be submitted for record purposes prior to final payment.
 - 1. Final as-built drawings and information for Station Controls installed in its enclosure.

2. Installation information.
3. Operation & Maintenance Manuals

1.07 QUALIFICATIONS

- A. Electronic Station Controls shall be based on products as specified herein and detailed on the drawings to match the owner's standard installation.
- B. Qualifications & Quality Control
 1. It is the intent of these Specifications that the Programmable Logic Controller (PLC) and the Supervisory Control and Data Acquisition (SCADA) components specified herein and, on the drawings, shall be supplied by an Instrumentation & Controls (I&C) subcontractor. The I&C subcontractor must show proof of experience in selecting, furnishing, programming, customizing, debugging, supervising, installing, and placing into operation all hardware and software specified within this section.
 - i. The I&C subcontractor shall be either a manufacturer or a "system house," with service facilities, regularly engaged in the design and the installation of digital system and their associated subsystems as they are applied to the municipal water or wastewater industry. The I&C subcontractor shall satisfy the following criteria:
 - ii. Employs an experienced professional Control Systems Engineer or Electrical Engineer to supervise or perform the work required by this specification section.
 - iii. Has performed work of similar or greater complexity on at least three (3) previous projects.
 - iv. Has been actively engaged in the type of work specified in this specification section for a minimum of five (5) years.
 - v. Has specific and current experience with the hardware including PLC's.
 - vi. The I&C subcontractor shall furnish equipment that is the product of one manufacturer to the maximum practical extent. Where this is not practical, all equipment of a given type shall be the product of one manufacturer.
 - vii. The I&C subcontractor shall allow the Owner and Engineer to inspect and witness the testing of the PLC hardware and SCADA system at the field acceptance test. Suitable notice shall be provided to allow this inspection before any equipment is brought online.
 2. All material shall be new, of current manufacture, free from defects, and of the quality specified or shown. Each type of material shall be of the same manufacturer throughout the work. All material shall be the product of established, reputable manufacturers normally engaged in the production of the item being furnished.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Equipment shall be handled and stored in accordance with the manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.09 OPERATION AND MAINTENANCE MANUALS

- A. Five (5) copies of the equipment operation and maintenance manuals shall be provided.
- B. Operation and maintenance manuals shall include the following information:
 - 1. Instruction books on all discrete system components.
 - 2. Recommended renewal parts list.
 - 3. Complete printout of the control software with descriptive notes of explanation of software functions.

PART 2 – PRODUCTS

2.01 CONTROLS

- A. Unless otherwise noted control products shall be provided and installed by the power pedestal vendor.
- B. Pump Control PLC Allen Bradley Micrologix 1400 running RSLogix 500 software.
 - 1. Controller program will be written to implement the ladder logic functions as detailed on the drawings. The contractor will provide the owner with a detailed print out of the controls with explanatory notes for future manipulation and maintenance. Furthermore, provide training and support which includes training for up to eight hours for three people and an agreement for twelve months of remote support (i.e. telephone, email, written, etc.).
 - 2. PLC Operator Interface (HMI), “C-more Touch Panel” by AutomationDirect. Standard terminal, 10-inch color LCD display, 1024 x 600 pixel; LED backlight; supports (3) serial, (1) Ethernet and (2) USB ports; (1) memory card slot and (1) audio line out.
 - 3. The PLC, HMI, radio, and radio antenna shall be furnished by the District's designated SCADA System Integrator as a completely wired and tested back-pan assembly. The assembly shall be installed and interconnected as part of the power pedestal control section by the power pedestal supplier see specification section 26 06 20.13.

The back-pan assembly will include the PLC, radio for SCADA communication, power supplies, battery backup, and terminal blocks. PLC, HMI, SCADA programming, and radio configuration shall be performed by the District's designated SCADA System Integrator.

The Contractor shall engage the services of the District's designated SCADA System Integrator and ensure coordination with all trades including the MCC supplier. No substitutions are allowed.

The District's designated SCADA System Integrator is Calcon Systems, Inc., 12919 Alcosta Blvd., San Ramon, CA 94583. Contact Ryan Smith, General Manager, rsmith@calcon.com, 925-277-0665.

C. Level Controls

1. Pulsar Zenith 140 ultrasonic pump station controller.

- i. Provide a panel-mounted Ultrasonic Level Controller.
- ii. The level controller and transducer system shall be a non-contacting, ultrasonic level transducer and controller, with integral analog display, suitable for control of lift station pumps.
- iii. Range to match installed transducer.
- iv. Device Input: 4-20 mA, proportional to level; pump control relay contacts, and alarm relay contacts for "Low Level" and "High Level".
- v. Inputs:
 - a. Seven digital inputs NO or NC with 24 VDC internal supply, available maximum 20 mA.
 - b. Analog input, isolated input for loop powered device 4-20 mA source.
- vi. Outputs:
 - a. Isolated Analog output, of 4-20 mA or 0-20 mA into 500Ω.
 - b. Serial output, RS232 via RJ11 port.
 - c. Six form "C" (SPDT) 5A, 220 VAC.
- vii. Power Supply: 120 volts AC
- viii. Local Display: LCD
- ix. Accuracy: +/- 0.25% of range. Calibration shall be unaffected by changes in barometric pressure
- x. Housing: Polycarbonate NEMA 3 for panel mounting.
- xi. Transmitter cable: 2 core copper conductor twisted shielded cable, 18 AWG
- xii. Communication: RS 485 with MODBUS RTU via terminal blocks
- xiii. The Level Controller shall be mounted to the door of the control section

- xiv. Provide Pulsar Zenith 140, or manufacturer's current model, no substitutions.
2. Pulsar Zenith transducer for installation in wet well.
 - i. Level transducers shall be Pulsar Zenith dB10 ultrasonic level transducer, or current model from that manufacturer, no substitutions.
 - ii. Instrument range shall be 1.0 to 33.0 feet (0.3 m to 10 m).
 - iii. Cable length shall be as required for mounting conditions, field verify prior to purchase.

D. Mechanical Float Switches

1. Provide float switches for indication of wet-well levels.
2. Provide float-type switch, with restraint device to allow adjustment of contact elevation. Contact elevation shall be adjustable from 6 inches to 20 feet below mounting location.
3. All wetted parts of float shall be constructed from conductive polypropylene/carbon black or similar non-corrodible material, hermetically sealed and suitable for Class I, Division 1 hazardous environment.
4. Sensing unit housing must be acceptable for mounting in a Class I, Div. 1 hazardous location
5. Float shall operate in environment temperatures from -15 to +250 degrees Fahrenheit (-25 to 120°C).
6. Float shall be equipped with a minimum 30-foot cable. Cable length shall be as required for mounting conditions, field verify prior to purchase.
7. Flygt model ENM-10; 3 conductor AWG 16 SJOW oil resistant cable; Form C relay contacts rated at 13 amps @ 240 VAC; provide with tether weight provided with intrinsically safe panel connections.

E. Pump Alarm Monitor

1. Flygt MiniCAS system.

2.02 COMMUNICATIONS EQUIPMENT

- A. Provide SCADA communications via radio signal to the existing master polling PLC; station programming; develop the new site screen and modify existing site screens coordinate with the owner for detailed requirements. Communications equipment shall be provide by the District's SCADA System Integrator as noted above.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine installation area to assure there is enough clearance to install control hardware.
- B. Insure proper environmental controls are in place (i.e. cooling, filtering, etc).
- C. Verify field measurements are as shown on Drawings.

3.02 INSTALLATION

- A. The station controls are to be installed in a single control enclosure as shown on the drawings. The enclosure shall be provided with cooling and ventilation to support the requirements of the equipment installed. The equipment will be located outdoors near Monterey, California.
- B. The station controls shall be installed per the equipment manufacture’s specifications with a minimum clearance of 6 inches on each side of the enclosure.
- C. A standard wiring diagram shall be included for making the appropriate electrical connections.
- D. Provide all labor, materials, equipment and incidentals required and install complete, ready for operation, and test the station controls, as shown on the drawings and/or specified herein. Integrate remote site SCADA into existing agency SCADA insuring data, control, visualization, animation, and functionality are duplicated between the remote site and owner’s central control room.
 - 1. Provide appropriately sized PLC for the remote site.
 - 2. Program remote site PLC.
 - 3. Coordinated with the preferred SCADA integrator and integrate the new system with the existing District system.
 - 4. Minimize downtime of existing PLC to no more than 120-minute interval every 24 hours.
 - 5. Provide hardware specified herein
 - 6. Network Connections for all equipment including radio
- E. Anchor all equipment in accordance with CBC requirements for Seismic Zone 4.

3.03 REQUIRED ALARMS AND SIGNALS

- A. See plans for the required alarms and signals.

- B. Provide the following analog signals through the PLC to the District SCADA system:
 - 1. Wet Well Water Level (4-20 mA)

3.04 FIELD QUALITY CONTROL

- A. Inspect installed station control and enclosure for anchoring, alignment, grounding and physical damage.

3.05 ADJUSTING

- A. Adjust all circuit breakers, switches, access doors, operating handles for free mechanical and/or electrical operation as described in manufacturer's instructions.

3.06 MANUFACTURER'S CERTIFICATION

- A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted, and tested in accordance with the manufacturer's recommendations.
- B. The Contractor shall provide three (3) copies of the manufacturer's representative's certification before final payment is made.

3.07 TRAINING

- A. The Contractor shall provide a training session for up to 3 owner's representative for 1 normal workday at a jobsite location determined by the owner.
- B. The training shall be conducted by a manufacturer's qualified representative.
- C. The training program shall consist of the following Instructions on the proper maintenance and operation of the equipment.
 - 1. I&C subcontractor shall hold no less than 5 coordination meetings:
 - 2. Kickoff meeting within three weeks of receiving Notice to Proceed
 - 3. Three ongoing coordination meetings on or near project milestone dates as determined by the construction schedule
 - 4. A final coordination meeting prior to the beginning of commissioning.
 - 5. I&C subcontractor shall coordinate two training sessions: One just prior to commissioning which may be in conjunction with the final coordination meeting, and one after successful commissioning.
 - 6. I&C subcontractor is required to coordinate all access and work on existing agency SCADA equipment with agency staff.

3.08 CLEANING

- A. Clean to remove construction debris, dirt, shipping materials.
- B. Repaint scratched or marred exterior surfaces to match original finish.

END OF SECTION

SECTION 26 29 23

VARIABLE FREQUENCY DRIVE

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. These specification requirements are for variable frequency drives herein referred to VFD's.
- B. They are for use with NEMA design B, AC motors to control motor starting, stopping and speed.

1.02 REFERENCES

- A. The variable frequency drive and all components shall be designed, manufactured and tested to conform with the following: EMC Directive 89/336/EEC; ENC61800-3; LVD 73/23/EEC; UL 508 C

1.03 WARRANTY

- A. A twenty-four-month warranty shall be provided on materials and workmanship from date of invoice.

1.04 SUBMITTALS – FOR REVIEW/APPROVAL

- A. The following information shall be submitted to the Engineer.
 - 1. Dimensioned outline drawings as mounted within the Power Pedestal.
 - 2. Control Schematic diagram.
 - 3. Component list.
 - 4. Power and control connection diagram(s).

1.05 SUBMITTALS-FOR CLOSE-OUT

- A. The following information shall be submitted for record purposes prior to final payment.
 - 1. Final as-built drawings.
 - 2. Installation information.
 - 3. Maintenance Manuals
 - 4. Operating Manuals.

1.06 QUALIFICATIONS

- A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.

- B. The manufacturer of this equipment shall be produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Equipment shall be handled and stored in accordance with the manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.08 OPERATION AND MAINTENANCE MANUALS

- A. Five (5) copies of the equipment operation and maintenance manuals shall be provided.
- B. Operation and maintenance manuals shall include the following information:
 - 1. Instruction books.
 - 2. Recommended renewal parts list.

PART 2 - PRODUCT

2.01 VARIABLE FREQUENCY DRIVE

- A. VFD Motor Controllers
 - 1. VFD shall be as manufactured by ABB or Allen Bradley, no other manufacturer is acceptable to conform to the District's standards.
 - 2. The VFDs shall be voltage rated as noted on the plans. The VFD shall provide microprocessor-based control for three-phase induction motors. The controller's full load output current rating shall be based on constant torque application at 40°C ambient and 2.5, 5, 10 or 15 kHz standard switching frequency.
 - 3. The VFDs shall be of the Pulse Width Modulated (PWM) design converting the utility input voltage and frequency to a variable voltage and frequency output (16-bit DSP) via a two-step operation. Adjustable Current Source VFDs are not acceptable. The VFD shall run at the above listed switching frequencies.
 - 4. V/Hz and Sensorless Vector Control.
 - 5. NEMA 1 enclosure installed within the Power Pedestal.
 - 6. Single and three phase input voltage.
 - 7. 150% current overload capacity.
 - 8. Four isolated programmable digital inputs.
 - 9. Two programmable relay outputs.
 - 10. Two isolated programmable analog inputs.
 - 11. Protective features: Over current, motor overload, drive over temperature, output phase-to-phase and phase-to-ground short circuit, DC bus over and under voltage and external fault.
 - 12. Control features: Linear and "S" ramp acceleration and deceleration, local/remote control, DC braking, torque boost, motor, motor slip

compensation, electronic pot, preset speeds, adjustable V/Hz profile, maximum and minimum adjustable frequency limits, two skip frequencies, adjustable output current limit, JOG, ride-thru, flying start and PID regulator.

13. Display readings: motor speed, frequency, voltage, current, last fault, heat sink temperature and drive status.
14. Ambient: 32°F (0°C) to 104°F (40°C), 3300ft (1000m) altitude, 90% humidity, non-condensing.
15. RS-232 Serial Interface.

2.02 MOTOR DATA

- A. The VFD shall be designed to operate a NEMA design B motor with a nameplate rating as indicated on drawings.

2.03 CONTROL OPTIONS

- A. The peripheral VFD control circuitry shall be operated from the pedestal power source at 120 volts and as outlined on the project control diagrams.
- B. Operator devices shall be door mounted and shall be:
 1. Red STOP and green START push buttons.
 2. Three position H-O-A switch which provides for manual (HAND) start or remote signal (AUTO) start from user-supplied relay contacts.
 3. Red RUN pilot light illuminated whenever the soft start is provided a run command and no-fault condition is present.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine installation area to assure there is enough clearance to install VFD.
- B. Verify that VFD is ready to install.
- C. Verify field measurements are as shown on Drawings.

3.02 INSTALLATION

- A. The VFD is to be installed in the power pedestal. The power pedestal shall be provided with VFD manufacture recommended cooling and ventilation. The VFD will be install in an outdoor power pedestal near Monterey, California.

- B. The VFD shall be installed per the manufacturer's specifications with a minimum clearance of 6 inches on each side of the enclosure.
- C. A standard wiring diagram shall be included for making the appropriate electrical connections.
- D. Anchor in accordance with CBC requirements for Seismic Zone 4.

3.03 FIELD QUALITY CONTROL

- A. Inspect installed VFD for anchoring, alignment, grounding and physical damage.

3.04 ADJUSTING

- A. Adjust all modes, switches, access doors, operating handles for free mechanical and/or electrical operation as described in manufacturer's instructions.

3.05 MANUFACTURER'S CERTIFICATION

- A. A qualified factory-trained manufacturer's representative shall certify in writing that the equipment has been installed, adjusted, and tested in accordance with the manufacturer's recommendations.
- B. The Contractor shall provide three (3) copies of the manufacturer's representative's certification before final payment is made.

3.06 TRAINING

- A. The Contractor shall provide a training session for up to 2 owner's representatives for one-half of a normal workday at a jobsite location determined by the owner.
- B. The training representative shall be conducted by a manufacturer's qualified representative.
- C. The training program shall consist of the following:
 - 1. Instructions on the proper maintenance and operation of the equipment.

3.07 CLEANING

- A. Clean to remove construction debris, dirt, shipping materials.
- B. Repaint scratched or marred exterior surfaces to match original finish.

END OF SECTION

SECTION 26 32 00

EMERGENCY POWER SYSTEMS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. General requirements for work related to the provision and installation of emergency power equipment and systems described elsewhere in these Specifications.

1.02 DEFINITIONS

- A. For the work of this Contract “Emergency Power Systems” shall mean:
 - 1. Engine-Generator Set and Accessories (owner furnished contractor installed equipment).
 - 2. Engine-Generator Set Weatherproof Sound Enclosure (owner furnished contractor installed equipment).
 - 3. Automatic Transfer Switch and Accessories.

1.03 RELATED SECTIONS

- A. Section 26 00 00 Electrical General Requirements.
- B. Section 26 05 00 Basic Electrical Materials and Methods.
- C. Section 26 36 23 Automatic Transfer Switch.

1.04 SCOPE OF WORK

- A. Provide, install and acceptance test complete and operable automatic, standby Emergency Power System, including related accessories and electrical interconnections. See project Drawings.

1.05 QUALITY ASSURANCE

- A. Suppliers of Emergency Power System equipment shall be the equipment manufacturer's authorized distributors and shall have 24-hour service availability and factory-trained service technicians authorized to do warranty service on all warrantable products of the manufacturers.
- B. Ensure completion of factory tests on the equipment to be shipped to this project. Provide copies of manufacturers certified test reports to Engineer (1) and owner (2).

- C. Install equipment in strict accordance with manufacturer's installation instructions. Make final connection to equipment under supervision of manufacturer's authorized representative.

1.06 SUBMITTALS

- A. Provide submittals for Automatic Transfer Switch.
- B. Submit in accordance with Section 26 00 00.
- C. As a minimum submittal shall include the following:
 - 1. Specification and data sheets.
 - 2. Shop drawings showing component layouts, certified overall dimensions, required access clearances, weights, and anchoring points and dimensioned center of gravity point.
 - 3. Wiring diagrams. Include all required external connections with field wiring terminals marked in a consistent point-to-point manner.
 - 5. Manufacturer's installation instructions.
 - 6. Manufacturer's published warranty documents.
 - 7. Manufacturer's recommended spare parts list.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver Emergency Power System equipment to site only after the areas in which they are to be installed are ready to receive them in their place of final installation.
- B. Fully protect equipment from damage and the elements.

1.08 WARRANTY

- A. Except as otherwise specified provide warranties in accordance with Section 26 00 00.

PART 2 – PRODUCTS

2.01 APPROVED MANUFACTURERS

- A. Acceptable manufacturers are specified in Sections 26 36 23.
- B. Equal products furnished by other manufacturers will be considered on a pre-approval basis.

2.02 PRODUCT DIMENSIONS

- A. Overall dimensions of Emergency Power System equipment when shown on the Drawings are for planning purposes. Exact dimensions shall be provided with product submittal.

PART 3 – EXECUTION

3.01 OWNER FURNISHED CONTRATOR INSTALLED (OFCI) EQUIPMENT

- A. OFCI equipment shall be available to the contractor at its currently installed location and that location is as shown on the contract documents. The contractor shall be responsible for all operations to disconnect, remove, relocate and re-install OFCI equipment.
- B. Prior to beginning any work on OFCI equipment the contractor in collaboration with the owner's representative shall provide a written condition report of OFCI equipment. The written report shall clearly state the condition (both physical & operational) of OFCI equipment. The contractor may request that any defect or irregularity of the OFCI equipment be corrected prior to taking responsibility for said equipment. Once the condition of OFCI equipment is agree upon and documented the contractor shall take responsibility for the OFCI equipment and work to remove and relocate may begin.
- C. Upon completion of the relocation and re-installation of the OFCI equipment the contractor shall demonstrate to the satisfaction of the owner's representative that the OFCI equipment has been re-installed and is in the same condition as before the contractor took responsibility of said equipment. The owner may request that any discrepancy between the before and after condition of the OFCI equipment be corrected prior to acceptance of the work.

3.02 INSTALLATION

- A. All work shall be performed by skilled tradesmen with minimum of five (5) years experience in the installation of emergency power systems equivalent in size and scope to the work of this Contract.
- B. Install work in full accordance with all applicable codes and manufacturer's directives.
- C. The specified equipment is to be installed within an outdoor power pedestal as shown on the contract documents. Equipment which is owner furnished contractor installed shall be integrated into the overall emergency power system.

3.03 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

- A. Repair damaged and defective work wherever possible to eliminate defects; where it is not possible to repair then replace defective work.

- B. Make all final adjustments to equipment per manufacturer's instruction and under manufacturer's authorized representative's direction.
- C. Clean all equipment surfaces. Touch-up shop-applied finishes to restore damaged areas.
- D. Protect and maintain protections to ensure work will be without damage or deterioration at time of acceptance.

3.04 ACCEPTANCE TESTING

- A. Upon completion of all work including engine-generator set initial start-up, the complete emergency power system shall be tested to show proper operation and compliance with the Specifications. The testing shall be done in two stages: Initial and Final. The time (day and hour) of the Final test shall be as directed by the Owner.
- B. Testing shall be conducted by representatives of the equipment manufacturers. Required fuel for testing shall be supplied by Contractor.
- C. Testing shall be witnessed by representatives of the Contractor, Engineer and Owner. Provide all parties with notice of time of test at least 48 hours in advance of the test.
- D. Initial portion of the acceptance test shall consist of the following stages which are to be performed in sequence and using a resistive load bank:
 - 1. Cold Start Test.
 - 2. Operation at 25%, 50% and 75% rated load for one-half (1/2) hour at each level.
 - 3. Continuous operation at full rated load for one-half (1/2) hour.
- E. Final acceptance test shall demonstrate the systems automatic operation and automatic retransfer of load from emergency to normal power:
 - 1. Simulation of utility (normal) power failure by opening of the main breaker at the main switchboard.
 - 2. Automatic start-up, load transfer and operation of the existing facility on generator power for a minimum of one-half (1/2) hour.
 - 3. Simulation of return of normal utility power by re-closure of the main breaker; automatic retransfer of load from emergency to normal power; automatic cool-down and shutdown procedures to occur.
 - 4. Demonstrate that SCADA signal is sent to SCADA transmitter and is received by the Owner's SCADA monitoring system.

F. Failures, malfunctions, incorrect operation or other problems which occur or otherwise become apparent during Acceptance Testing shall:

1. Cause immediate termination of the test being conducted, unless otherwise approved by the Engineer.
2. Be corrected to the satisfaction of the Engineer and Owner.

After corrections have been satisfactorily completed, testing shall be repeated in its entirety at no cost to the Owner.

3.05 TRAINING

- A. Contractor shall arrange for and provide training of Owner's personnel in the proper operation and routine maintenance of the Emergency Power System.
- B. The training shall be conducted by the manufacturer's authorized representatives.

3.06 OPERATIONS AND MAINTENANCE MANUALS

- A. Provide in accordance with Sections 26 36 23 and in conformance with Section 01 78 23.16.

END OF SECTION

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SECTION 26 36 23

AUTOMATIC TRANSFER SWITCH

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Requirements for automatic transfer switch.

1.02 RELATED DOCUMENTS

- A. Section 26 00 00 Electrical General Requirements.
- B. Section 26 05 00 Basic Electrical Materials and Methods.
- C. Section 26 32 00 Emergency Power Systems.

1.03 QUALITY ASSURANCE

- A. Products shall be constructed in accordance with applicable requirements of UL 891, UL 1008 and NEMA ICS-2-447.
- B. Products shall be factory tested before shipment to job-site.

1.04 SUBMITTALS

- A. Provide in accordance with Section 26 32 00.

1.05 WARRANTY

- A. Provide in accordance with Sections 26 00 00 and 26 32 00.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. Equipment described in this Section and shown on the Drawings is based on ASCO Power Transfer Switches.

2.02 GENERAL REQUIREMENTS

- A. Transfer switch shall be compatible with engine-generator set. The engine-generator set is Owner Furnished Contractor Installed (OFCI) equipment and is a Quinn Power Systems, Caterpillar Model C7.1, D175 TIER III Diesel Generator Set 175 KW Standby Rated, 158 KW Prime Rated, 480/277 volt, 3-phase, 60 Hertz, 1800 RPM, UL2200, Sound Attenuated Enclosure with a 408 gallon sub-base fuel tank.

- B. The ATS will be installed within a NEMA 3R power pedestal as indicated on the plans.
- C. All bussing copper.
- D. Amp, Voltage and Phase ratings as shown on the Drawings
- E. Minimum withstand ratings as shown on the Drawings when used with molded case, thermal-magnetic circuit breakers.

2.03 AUTOMATIC TRANSFER SWITCH (ATS)

- A. Microprocessor controlled. Provide 3 pole switches with solid neutral.
- B. Electrically-operated, mechanically held main transfer switch element with momentarily energized single-solenoid electrode operator. Maximum transfer operating time shall be one-sixth (1/6) second. Switch shall be mechanically interlocked to ensure only one of two possible positions: normal or emergency.
- C. All main contacts shall be silver composition.
- D. Provide capability to manually switch source.

2.04 ATS CONTROL

- A. Three-phase, solid-state, microprocessor control module completely enclosed in a protective cover. Interfacing relays industrial grade plug-in type with dust covers.
- B. True RMS voltage sensing of all phase of normal source. Pickup voltage adjustable from 85% to 100% of nominal, factory set at 90%. Dropout voltage adjustable from 75% to 98% of nominal, factory set at 85%.
- C. Three phase voltage sensing of emergency source. Pickup voltage adjustable from 85% to 100% of nominal, factory set at 90%. Dropout fixed at 84 to 86% of pickup.
- D. In-phase algorithm which automatically measures the frequency difference between the two sources and initiates transfer to normal at appropriate phase angles.
- E. All adjustable pickup and dropout settings fully adjustable in 1% increments and have \pm 2% or better repetitive accuracy over a -20C to +70C operating temperature range.
- F. Provide fully field-adjustable time delays as follows:
 1. Time delay on engine start (TDES): 0 to 6 seconds, factory set at 1 (one) second.
 2. Transfer to emergency (TDE): 0 to 60 minutes, factory set at 10 seconds.
 3. Retransfer to normal (TDN): 0 to 60 minutes, factory set at 5 (five) minutes.

4. Unloaded running time delay for engine cooldown: 0 to 60 minutes, factory set at 5 minutes unless otherwise instructed by the engine-generator set manufacturer.

2.05 ADDITIONAL CONTROLS AND DEVICES

- A. Engine start contacts, 10 Amp 32VDC rated, close on normal source failure.
- B. Momentary test-switch, mounted on ATS door, to simulate normal source failure.
- C. "Commit/no commit to transfer" switch.
- D. Auxiliary contacts rated 10 Amps 240VAC: three contacts closed when ATS in "normal" position and three contacts closed when ATS in "emergency" position and two contacts closed upon loss of normal power
- D. Pilot lights shall be provided on front of ATS to indicate availability of normal and emergency power sources and ATS in normal or emergency position.
- F. Statistical ATS/system monitoring data screens.

PART 3 – EXECUTION

3.01 STORAGE

- A. Store in accordance with Section 26 32 00.

3.02 PREPARATION

- A. Ensure equipment space is clean and ready for installation of the transfer switches.
- B. Have on hand adequate personnel, tools and equipment required for setting equipment in place so as not to delay the installation.
- C. Provide adequate safeguards and barriers to keep all unauthorized persons including general public safely away from the installation work.

3.03 INSTALLATION

- A. Locate as shown on the Drawings.
- B. Installation shall comply with all applicable local and state codes.
- C. Install equipment in accordance with manufacturer's instructions and the instructions included in the listing or labeling of UL listed products.
- D. Install source and load cables to equipment and make connections. Cables within equipment shall be secured per equipment manufacturer's instructions to withstand fault currents. Torque all cable lugs to manufacturer's specifications.

3.04 EQUIPMENT ANCHORAGE

- A. Anchor equipment to resist seismic zone 4 forces.

3.05 TESTS

- A. Transfer switches shall be factory tested before shipment. Tests shall include a complete functional test of all operations and controls including calibration of voltage sensors and setting of time delays.
- B. Perform on-site acceptance tests in accordance with requirements of Section 26 32 00.

END OF SECTION

SECTION 31 05 19.13

GEOTEXTILE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes: Geotextile, also called filter fabric, in applications such as soil material separation and subgrade stabilization.

1.02 REFERENCES

- A. AASHTO M 288 - Standard Specification for Geotextiles.
- B. ASTM
 1. D 4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 2. D 4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 3. D 4632 – Standard Test Method for Breaking Load and Elongation of Geotextiles (Grab Method).
 4. D 4751 – Test Method for Determining Apparent Opening Size of a Geotextile.
 5. D 6241 – Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
- C. Corps of Engineers, COE CW - 02215 - Geotextiles Used As Filters.

1.03 SUBMITTALS

- A. Follow Section 01 30 00 – Contractor Submittals.
- B. Submit the standard manufacturer's catalog sheets and other pertinent information.

PART 2 - PRODUCTS

2.01 GEOTEXTILE

- A. Provide a geotextile (filter fabric) designed for use in geotechnical applications. The filter fabric shall provide a permeable layer or media while retaining the soil matrix.
- B. Use fabric which meets the physical requirements for Separation, High Survivability Level installation conditions as defined in AASHTO M 288.

2.02 WOVEN GEOTEXTILE FOR USE AS STABILIZATION FABRIC

- A. Geotextile for use as stabilization fabric shall be TenCate Mirafi 600X or approved equal.
- B. Properties:

1. Material: Woven, nonbiodegradable, fabric consisting only of continuous chain polymer filaments or yarns, at least 85 percent by weight polyolefins, polyesters or polyamide, formed into a dimensionally stable network.
2. Chemical Resistance: Inert to commonly encountered chemicals and hydrocarbons over a pH range of 3 to 12.
3. Physical Resistance: Resistant to mildew and rot, ultraviolet light exposure, insects and rodents.
4. Minimum Test Values:

Property	Value (Min.)	Test Method
Grab Tensile Strength	315 lbs.	ASTM D 4632
Grab Tensile Elongation	15%	ASTM D 4633
Trapezoidal Tear Strength	113 lbs.	ASTM D 4533
CBR Puncture Strength	900 lbs.	ASTM D 6241
Apparent Opening Size	40 sieve (0.43 mm)	ASTM D 4751
Permittivity (sec-1)	0.05	ASTM D 4491
Flow Rate	4.0 gpm/sq-ft	ASTM D 4491

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install geotextiles as shown on the Drawings and as per manufacturer's instructions.

END OF SECTION

SECTION 31 10 00

CLEARING AND DEMOLITION

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, facilities, transportation and services to complete all clearing and demolition and related work as shown on the plans and/or specified herein.
- B. Work Included: All work necessary to move or remove and legally dispose of all interfering or objectionable material from the project site, including but not necessarily limited to trees, tree branches, tree stumps, brush, shrubs, weeds, debris, roots, rocks, but only as required.

1.02 REFERENCE STANDARDS

- A. Clearing and grubbing shall be in accordance with the provisions of Section 17 of the State Standard (Caltrans) Specifications, except as modified herein.

1.03 DEFINITIONS

- A. Clearing: Clearing shall consist of cutting, removing, and disposing of trees, shrubs, brush, limbs, and other vegetative growth. Clearing shall also include the removal and disposal of trash piles, rubbish and fencing, and the preservation of trees, shrubs, and vegetative growth which are not designated for removal.
- B. Grubbing: Grubbing is the removal and disposal of wood or root matter below the ground surface remaining after clearing.
- C. Stripping: Stripping refers to the removal and disposal of all organic sod, topsoil, grass, and grass roots; all evidence of surface improvements and other objectionable material remaining after clearing and grubbing.
- D. Demolition: The removal of existing structures, portions of existing structures, equipment, utilities, concrete curbs, sidewalks, and driveways, pipelines and other appurtenances.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EQUIPMENT

- A. Equipment shall be suitable for the work to be done and shall be in good operating condition. Equipment operators and workmen are to be skilled in such operations and shall be competently supervised.

3.02 CLEARING, GRUBBING AND STRIPPING

- A. Clear, grub and strip areas to be excavated or surfaced.

3.03 DEMOLITION

- A. Remove existing structures, portions of existing structures, and equipment called for on the plans and as directed by the Engineer.
- B. Contractor shall not demolish existing facilities beyond the limits designated on the drawings unless specifically directed to do so by the Engineer.

3.04 PRESERVATION OF PROPERTY

- A. The project area shall be cleared and grubbed only to the extent necessary to accommodate the work in conformance with the notes and details shown on the plans. Trees or growth shall not be trimmed back unnecessarily.
- B. Contractor shall take extreme care not to damage shrubs, trees, fences, irrigation systems and other improvements of adjacent property owners.
- C. All existing improvements not specifically designated on the plans to be removed or relocated shall remain in their original condition and location undisturbed. However, upon written permission by the Owner, existing improvements may, for the convenience of the Contractor, and at his expense, be removed and temporarily relocated during construction and shall be replaced in their original location in as good or better condition as when the Contractor entered upon the work site.

3.05 DEMOLITION OF UNDERGROUND PIPE AND CONDUIT

- A. Demolition of underground pipe and conduit shall be only as shown on the Drawings or necessary as determined in the field by the Engineer.
- B. Pipe to be abandoned shall be abandoned per Section 02 22 20.

3.06 STUMP AND ROOT REMOVAL

- A. The stumps and roots of all removed trees encountered during the course of Work, either trees removed previously on site or trees removed as part of the Work shall be removed to a depth of at least 24 inches below the natural grade.
- B. All exposed surface roots beyond the stump area shall be removed to a depth of at least 12 inches below the natural grade.
- C. Holes and depressions remaining after stump and root removal shall be filled per the Drawings.

3.07 REMOVAL OF DEBRIS

- A. All demolished and cleared material shall become the property of the Contractor and shall be legally disposed of by the Contractor.
- B. Removed concrete and asphalt concrete shall be legally disposed of off the project site at a location provided by the Contractor. Demolished concrete shall not be buried in structure backfill areas.

END OF SECTION

SECTION 31 23 00

TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes materials, testing, and installation for trench excavation, backfilling, and compacting.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).
- B. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 TESTING FOR COMPACTION

- A. Determine the density of soil in place by the use of a sand cone, drive tube, or nuclear tester.
- B. Determine laboratory moisture-density relations of existing soils by ASTM D 1557.
- C. Determine the relative density of cohesionless soils by ASTM D 2049.
- D. Sample backfill materials by ASTM D 75.
- E. Express "relative compaction" as the ratio, expressed as a percentage of the in place dry density to the laboratory maximum dry density.
- F. Compaction shall be deemed to comply with the specifications when no test falls below the specified relative compaction.
- G. The Owner will secure the service of a soils tester and pay the cost of initial testing. The Contractor will be responsible for the cost of all retests in failed areas. Test results will be furnished by the Owner's tester.

1.04 DEFINITIONS

- A. Pavement Zone. The pavement zone includes the asphalt concrete and aggregate base pavement section placed over the trench backfill.
- B. Street Zone. The street zone is the top 18 inches of the trench or depth determined by the jurisdictional agency immediately below the pavement zone in paved areas.

- C. Trench Zone. The trench zone includes the portion of the trench from the top of the pipe zone to the bottom of the street zone in paved areas or to the existing surface in unpaved areas.
- D. Pipe Zone. The pipe zone shall include the full width of trench from the bottom of the pipe or conduit to a horizontal level 12 inches above the top of the pipe. Where multiple pipes or conduits are placed in the same trench, the pipe zone shall extend from the bottom of the lowest pipes to a horizontal level 12 inches above the top of the highest or topmost pipe.
- E. Pipe Bedding. The pipe bedding shall be defined as a layer of material immediately below the bottom of the pipe or conduit and extending over the full trench width in which the pipe is bedded. Thickness of pipe bedding shall be as shown on the drawings or as described in these specifications for the particular type of pipe installed.

1.05 EXCESS EXCAVATED MATERIAL

- A. The Contractor shall make the necessary arrangements for and shall remove and dispose of all excess excavated material unless indicated differently in the special provisions for any job.
- B. It is the intent of these specifications that all surplus material not required for backfill or fill shall be properly disposed of by the Contractor at his expense at a proper disposal site.
- C. No excavated material shall be deposited on private property unless written permission from the owner thereof is secured by the Contractor. Before the Owner will accept the work, the Contractor shall file a written release signed by all property owners with whom he has entered into agreements for disposing excess excavated material, absolving the Owner from any liability connected therewith.
- D. The Contractor shall obtain a haul route permit from the city or agency having jurisdiction.

1.06 SAFETY

- A. All excavations shall be performed, protected, and supported as required for safety and in the manner set forth in the operation rules, orders, and regulations prescribed by the Division of Industrial Safety of the State of California.
- B. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrians and vehicular traffic of such excavations. Lights shall also be placed along excavations from sunset each day to sunrise of the next day until such excavation is entirely refilled.
- C. No trench or excavation shall remain open during non-working hours. The trench or excavation shall be covered with steel plates, spiked in place, or secured with temporary A.C. pavement around the edges, or backfilled. A security fence shall be installed around the work area during non-working hours.

- D. The Contractor shall notify the Owner of all work-related accidents which may occur to persons or property at or near the project site, and shall provide the Owner with a copy of all accident reports. All accident reports shall be signed by the Contractor or its authorized representative and submitted to the Owner's authorized representative within twenty-four (24) hours of the accident's occurrence.

1.07 ACCESS

- A. Unobstructed access must be provided to all driveways, water valves, hydrants, or other property or facilities that require routine use.

1.08 PERMITS

- A. All work shall conform to the specifications and requirements of the State of California Department of Transportation, the city having jurisdiction, and/or other agencies involved. The Contractor shall keep a copy of all the required permits in the job site and comply with all the terms and conditions of said permits.

1.09 SLOPE PROTECTION

- A. Slope protection shall be installed where shown on the plans. The installation of the slope protection shall be considered a part of the work, and the Contractor shall include the expense in his cost.

PART 2 - PRODUCTS

2.01 NATIVE EARTH BACKFILL

- A. Native earth, segregated from topsoil, shall be used for trench zone backfill.

2.02 IMPORTED BACKFILL MATERIAL

- A. Whenever the excavated material is not suitable for backfill, the Contractor shall arrange for and furnish suitable imported backfill material that is capable of attaining the required relative density.
- B. The Contractor shall dispose of the excess trench excavation as specified in the preceding section. Backfilling with imported material shall be done in accordance with the methods described herein.

2.03 GRANULAR MATERIAL

- A. Granular material shall be defined as soil having a minimum sand equivalent of 30 as determined in accordance with State of California, Division of Highways, Test "California 217," with not more than 20% passing a 200-mesh sieve.

2.04 IMPORTED SAND

- A. Imported sand shall have a minimum sand equivalent of 30 per State of California, Division of Highways, Test "California 217" with 100% passing a 3/8 inch sieve and not

more than 20% passing a 200-mesh sieve. Certification that the sand meets this requirement shall be provided.

2.05 CRUSHED ROCK AND GRAVEL

- A. Crushed rock shall be the product of crushing rock or gravel. Fifty percent of the particles retained on a 3/8 inch sieve shall have their entire surface area composed of faces resulting from fracture due to mechanical crushing. Not over 5% shall be particles that show no faces resulting from crushing. Less than 10% of the particles that pass the 3/8 inch sieve and are retained on the No. 4 sieve shall be weatherworn particles. Gravel shall not be added to crushed rock.
- B. Gravel shall be defined as particles that show no evidence of mechanical crushing, are fully weatherworn, and are rounded. For pipe bedding, where gravel is specified, crushed rock may be substituted or added.
- C. Where crushed rock or gravel is specified in the bedding details on the plans, the material shall have the following gradations:

Sieve Size	1-1/2 Inch Max % Passing	1-inch Max % Passing	3/4 Inch Max % Passing
2"	100		
1-1/2"	90 – 100	100	
1"	20 – 55	90 – 100	100
3/4"	0 – 15	60 – 80	90-100
1/2"	-	-	30 – 60
3/8"	0 – 5	0 – 15	0 – 20
No. 4	-	0 – 5	0 – 5
No. 8	-	-	-

2.06 SAND-CEMENT SLURRY

- A. Sand cement slurry shall consist of one sack (94 pounds) of Portland cement per cubic yard of sand and sufficient moisture for workability.

2.07 ASPHALT CONCRETE

- A. Asphalt concrete pavement shall be Type B as specified in Section 39 of the Standard Specifications, State of California, Department of Transportation, 2015 edition.

PART 3 - EXECUTION

3.01 COMPACTION REQUIREMENTS

- A. Compaction tests shall be performed at random depths and at 200-foot intervals and as directed by the Engineer.
- B. If the backfill fails to meet the specified relative compaction requirements, the Contractor shall rework the backfill until the requirements are met. The Contractor shall make all

necessary excavations for density tests as directed by the Engineer. The compaction requirements of the city having jurisdiction or Caltrans shall prevail in all public roads. The Contractor will be responsible for the cost of all additional compaction tests in the reworked areas.

- C. Unless otherwise shown on the drawings or otherwise described in the specifications for the particular type of pipe installed, relative compaction in pipe trenches shall be as described below:
 - 1. Pipe zone and pipe base: 95% relative compaction
 - 2. Trench zone not beneath paving: 95% relative compaction
 - 3. Trench zone to street zone in paved areas: 95% relative compaction
 - 4. Street zone in paved areas: per agency requirements or 95% relative compaction. The most stringent agency requirements shall prevail
 - 5. Rock refill material for foundation stabilization: 90% relative density
 - 6. Rock refill for over excavation: 90% relative density

3.02 MATERIAL REPLACEMENT

- A. Removal and replacement of any trench and backfill material which does not meet the specifications shall be the Contractor's responsibility.

3.03 CLEARING AND GRUBBING

- A. Areas where work is to be performed shall be cleared of all trees, shrubs, rubbish, and other objectionable material of any kind which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.
- B. Organic material from clearing and grubbing operations will not be incorporated in the trench backfill.
- C. Organic material from clearing and grubbing operations will be disposed of at a proper waste disposal facility.

3.04 SIDEWALK, PAVEMENT, AND CURB REMOVAL

- A. Saw cut bituminous or concrete pavements regardless of their thickness, and curbs and sidewalks prior to excavation for the structure in accordance with the requirements of the city, or agency having jurisdiction. Curbs and sidewalks that are damaged in the course of construction are to be cut and removed from joint to joint.
- B. Haul removed pavement and concrete materials from the site to a proper disposal facility. These materials are not permitted for use as trench backfill. If the material to be removed exceeds 50 cubic yards, the Contractor shall obtain a haul route permit from the city(s) having jurisdiction.

3.05 TRENCHING AND TUNNELING

- A. Excavation for pipe, fittings, and appurtenances shall be open trench to the depth and in the direction necessary for the proper installation of the facilities as shown on the plans.

- B. Trench banks shall be kept as near to vertical as possible and shall be properly braced and sheeted.
- C. Horizontal directional drilling, where used, shall be per Section 33 05 23.
- D. Tunneling will not be permitted.
- E. The use of a jack and bore may be employed for crossings.

3.06 BRACING

- A. The Contractor's design and installation of bracing and shoring shall be consistent with the rules, orders, and regulations of the State of California Construction Safety Orders.
- B. Excavations shall be so braced, sheeted, and supported that they will be safe such that the walls of the excavation will not slide or settle and all existing improvements of any kind, either on public or private property, will be fully protected from damage.
- C. The sheeting, shoring, and bracing shall be arranged so as not to place any stress on portions of the completed work until the general construction thereof has proceeded far enough to provide ample strength.
- D. Care shall be exercised in the drawing or removal of sheeting, shoring, bracing, and timbering to prevent the caving or collapse of the excavation faces being supported.

3.07 TRENCH WIDTHS

- A. Excavation and trenching shall be true to line so that a clear space of not more than 8 inches or less than 6 inches in width is provided on each side of the largest outside diameter of the pipe in place measured at a point 12 inches above the top of the pipe. For the purpose of this article, the largest outside diameter shall be the outside diameter of the bell on bell and spigot pipe or the pipe collar.
- B. Where the sewer trench width, measured at a point 12 inches above the top of the bell of the pipe, is wider than the maximum set forth above, the trench area around the pipe shall be backfilled with crushed rock, Class B concrete, or slurry to form a cradle for the pipe at the discretion of the Engineer.

3.08 LENGTH OF OPEN TRENCH

- A. The maximum allowable length of open trench shall be 400 feet, or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is less. Within developed areas, the length of open trench may be restricted as determined by the encroachment permit from the city or the agency having jurisdiction.

3.09 GRADE

- A. Excavate the trench to the lines and grades shown on the drawings with allowance for pipe thickness and for pipe base or special bedding.
- B. The trench bottom shall be graded to provide a smooth, firm, and stable foundation that is free from rocks and other obstructions and shall be at a reasonably uniform grade.

3.10 CORRECTION OF OVER EXCAVATION

- A. Where excavation is inadvertently carried below the design trench depth, suitable provision shall be made by the Contractor to adjust the excavation, as directed by the Engineer, to meet requirements incurred by the deeper excavation.
- B. Over excavations shall be corrected by backfilling with approved bedding material, graded crushed rock or gravel and shall be compacted to provide a firm and unyielding subgrade or foundation, as directed by the Engineer.

3.11 DEWATERING

- A. The Contractor shall provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. De-watering shall be done by methods that will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Dewatering methods may include well points, sump points, suitable rock or gravel placed below the required bedding for drainage and pumping, temporary pipelines, and other means, all subject to the approval of the Engineer. Water shall be discharged in accordance with the requirements of the project's NPDES permit.
- B. In no event shall the sanitary sewer system be used as drains for dewatering the construction trenches.
- C. Dewatering shall commence when groundwater is first encountered and shall be continuous until such times as water can be allowed to rise. No concrete shall be poured in water, nor shall water be allowed to rise around the concrete or mortar until it has set at least eight hours.

3.12 FOUNDATION STABILIZATION

- A. Whenever the trench bottom does not afford a sufficiently solid and stable base to support the pipe or appurtenances, the Contractor shall excavate to a depth below the design trench bottom, as directed by the Engineer, and the trench bottom shall be backfilled with 3/4-inch rock and compacted to provide uniform support and a firm foundation.
- B. Where rock is encountered, it shall be removed to a depth at least 6 inches below grade and the trench shall be backfilled with 3/4-inch crushed rock to provide a compacted foundation cushion.
- C. If excessively wet, soft, spongy, unstable, or similarly unsuitable material is encountered at the surface upon which the bedding material is to be placed, the unsuitable material shall be removed to a depth as determined in the field by the Engineer and replaced by crushed rock.

3.13 EXCAVATED MATERIAL

- A. All excavated material shall not be stockpiled in a manner that will create an unsafe work area or obstruct sidewalks or driveways. Gutters shall be kept clear or other satisfactory measures shall be taken to maintain street or other drainage.

- B. In confined work areas, the Contractor may be required to stockpile the excavated material off-site, as determined by the project permits.

3.14 PLACING PIPE BEDDING

- A. Place the thickness of pipe bedding material over the full width of trench necessary to produce the required bedding thickness when the material is compacted to the specified relative density. Grade the top of the pipe bedding ahead of the pipe to provide firm, uniform support along the full length of pipe.
- B. Excavate bell holes at each joint to permit assembly and inspection of the entire joint.

3.15 BACKFILLING WITHIN PIPE ZONE

- A. Backfill per the detailed piping specification for the particular type of pipe and per the following.
- B. After pipe has been installed in the trench, place pipe zone material simultaneously on both sides of the pipe, keeping the level of backfill the same on each side. Carefully place the material around the pipe so that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe. Use particular care in placing material on the underside of the pipe to prevent lateral movement during subsequent backfilling.
- C. Compact material placed within 12 inches of the outer surface of the pipe by hand tamping only.

3.16 BACKFILL WITHIN TRENCH ZONE

- A. Compact per the detailed piping specification for the particular type of pipe and per the following.
- B. Push the backfill material carefully onto the backfill previously placed in the pipe zone. Do not permit free fall of the material until at least 2 feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pipe.
- C. The remaining portion of the trench to the street zone or ground surface, as the case may be, shall be backfilled, compacted and/or consolidated by approved methods to obtain the specified relative compaction.
 - 1. Compaction using vibratory equipment, tamping rollers, pneumatic tire rollers, or other mechanical tampers shall be done with the type and size of equipment necessary to accomplish the work. The backfill shall be placed in horizontal layers of such depths as are considered proper for the type of compacting equipment being used in relation to the backfill material being placed. Each layer shall be evenly spread, properly moistened, and compacted to the specified relative density. The Contractor shall repair or replace any pipe, fittings, manholes, or structures damaged by the Contractor's operations as directed by the Engineer.
 - 2. Consolidation of backfill performed by flooding, poling, or jetting shall obtain a relative compaction of the backfill material at least equal to that specified. When flooding, poling, or jetting methods are used, material for use as backfill shall be

placed and consolidated in layers not exceeding 3-feet thick. Flooding, poling, or jetting methods shall be supplemented by the use of vibratory or other compaction equipment when necessary to obtain the required relative compaction. Care shall be taken in all consolidating operations to prevent the movement or floating of the pipe. Consolidation methods shall not be used where the backfill material is not sufficiently granular to be self-draining during and after consolidation, or where foundation materials may be softened or otherwise damaged by the quantities of water applied. The Contractor shall rectify any misalignment of the pipe because of consolidation operations as directed by the Engineer.

- D. If the excavated native material is too wet to achieve the required compaction, provide imported backfill or sand-cement slurry within the trench zone.

3.17 BACKFILL WITHIN STREET ZONE

- A. The street zone within roadbed areas shall be compacted using approved hand, pneumatic, or mechanical type tampers to obtain the required relative compaction.
- B. All work shall be done in accordance with the requirements and to the satisfaction of the city or the agency having jurisdiction.
- C. Flooding and jetting will not be permitted in this Zone.

3.18 SIDEWALK, PAVEMENT, AND CURB REPLACEMENT

- A. Replace bituminous and concrete pavement, curbs, and sidewalks damaged or removed during construction in accordance with the requirements of the city or the agency having jurisdiction.

3.19 SLOPE PROTECTION

- A. Where cutoff walls or concrete anchors are required, they shall be in accordance with the plans, with a minimum thickness of 12 inches. The wall shall extend at least 12 inches to undisturbed material on each side of the trench as excavated. Cemented rubble and concrete surface slope protection shall be a minimum of 4-inches thick.
- B. Wall or anchors shall be placed with a minimum horizontal spacing of:
 - 1. Not over 36 feet center to center on grades 25% to 35%
 - 2. Not over 24 feet center to center on grades 35% to 50%
 - 3. Not over 16 feet center to center on grades 50% and over
- C. Material used for construction of cutoff walls or concrete anchors shall consist of cast-in-place reinforced concrete or reinforced hollow unit masonry. When reinforced hollow unit masonry is used, all cells in the block shall be filled solidly with grout. A No. 4 reinforcing bar shall be placed vertically in each row of cells and No. 9-gage wall mesh shall be placed in each horizontal joint. In addition, a bond beam shall be placed at the top with two No. 4 bars.
- D. Where cutoff walls or concrete anchors are constructed of reinforced concrete, they shall have No. 4 reinforcing bars placed at 6-inches on center each way in the center of the wall. The bars shall extend full length and height of the wall.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING AND SEALS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
- B. Asphalt Paving
- C. Fog Seal
- D. Slurry Seal
- E. Pavement Markings
- F. Related Sections:
 - 1. Section 31 23 00 – Trenching, Backfilling and Compacting

1.02 REFERENCES

- A. Standard Specifications, State of California, Department of Transportation (CalTrans), 2015 Edition (State Standard Specifications)

1.03 DESCRIPTION

- A. The Contractor shall pave or repave all road surfaces within public Right-of -Ways, private right-of-ways, driveways, drainage courses, and other surfaces as provided for in the Contract Documents. Except as provided for in the Contract Documents, all paving materials shall be constructed of asphalt concrete or an asphaltic emulsion, with or without aggregate.
- B. Paint binder (tack coat) shall be applied to the vertical surface of all structures to which new asphalt concrete will abut. Additionally, where the Contract Documents provide for the placement of new asphalt concrete over existing pavement surfaces, a tack coat shall be applied to the surface of the old pavement. Where called for in the Contract Documents, the surface of aggregate base shall receive a prime coat of liquid asphalt immediately prior to commencing paving operations.
- C. Miscellaneous areas shall be those areas or structures called for in the Contract Documents to be surfaced or constructed of asphalt concrete. Such areas shall include but not be limited to, drainage ditches, equipment pads, walkways, and asphalt dikes.
- D. Asphalt Dikes - Asphalt dikes shall be constructed to the line and grade provided for in the Contract Documents. Asphalt dikes whose continuous length exceeds 5 linear feet shall be constructed by the use of an extrusion machine.

1.04 FOG SEAL

- A. Where provided for in the Contract Documents, the Contractor shall apply a fog seal that covers the repaved trench section and the adjacent street pavement. The Engineer shall determine the limits of the fog seal application. Such fog seal shall be constructed in accordance with the provisions of Section 37, "Bituminous Seals" of the State Standard Specifications. The exact proportion of water to asphaltic emulsion shall be determined by the Contractor up to a maximum of one part water to one part asphaltic emulsion.

1.05 SLURRY SEAL COAT

- A. Where provided for in the Contract Documents, the Contractor shall construct a seal coat of asphaltic emulsion and screenings that covers the repaved trench section and the adjacent street pavement. The Engineer shall determine the limits of the seal coat application. Such seal coat shall be constructed in accordance with the provisions of Section 37, "Bituminous Seals" of the State Standard Specifications for a double seal coat. A Certificate of Compliance shall be submitted for all materials used in constructing the double seal coat.

1.06 PAVEMENT MARKINGS

- A. Where trench and pavement work crosses or damages existing pavement markings, markings shall be replaced in kind. Markings shall be constructed in accordance with the provisions of Section 84, "Markings" of the State Standard Specifications, and the requirements of the jurisdiction which owns the roadway.

1.07 SUBMITTALS

- A. Provide submittals in accordance with Section 01 30 00, Contractor Submittals.
- B. Submit certificates of compliance for materials provided under this section.

PART 2 - PRODUCTS

2.01 ASPHALT CONCRETE PAVEMENT

- A. Asphalt concrete pavement shall be in accordance with the provisions of Section 39, "Hot Mix Asphalt" of the State Standard Specifications and this Section. Except as provided for in the Contract Documents, a Certificate of Compliance shall be submitted in lieu of the testing and reporting requirements of the State Standard Specifications.
- B. Aggregate - Except as provided for in the Contract Documents, all asphalt concrete used in the construction of asphalt concrete pavements shall be Type "B" meeting the gradation requirements for ½-inch maximum, medium of Section 39-1.02E, "Aggregate" of the State Standard Specifications.
- C. Asphalt Binder - Asphalt binder for asphalt concrete shall be a steam refined asphalt, Grade PG 64-10, conforming with the requirements of Section 92, "Asphalts" of the State Standard Specifications. The percentage of asphalt binder in asphalt concrete pavement shall be between 5-½ percent and 6 percent by weight.

- D. Asphalt Concrete for Miscellaneous Areas - The gradation of aggregate for surfacing of miscellaneous areas shall be the same as for other areas. The percentage of asphalt binder shall be increased by 1-percent by weight over that percentage for asphalt concrete placed in roadways.

2.02 COLD-MIX ASPHALT CONCRETE

- A. General - Cold-mix asphalt concrete used in temporary paving applications shall be a plant mixed product conforming with the requirements of this Section. Cold-mix may be supplied directly from the batch plant or stockpiled on the job-site.
- B. Aggregate - Aggregate shall meet the following gradation requirements:

Sieve Size	Percentage Passing
½-inch	100
¼ - inch	95-100
No. 4	58-72
No. 8	34-48
No. 30	18-32
No. 50	13-23
No. 200	2-9

- C. Asphalt Binder - Asphalt binder for cold-mix asphalt shall be Type SC-800 in accordance with the requirements of Section 93, "Liquid Asphalts" of the State Specifications. The percentage of asphalt binder shall be between 4.8 and 7.5 percent.

2.03 PAINT BINDER AND PRIME COAT

- A. Paint Binder (Tack Coat) - Paint binder shall be Type RS-1 asphaltic emulsion conforming with the provisions of Section 94, "Asphaltic Emulsions" of the State Standard Specifications.
- B. Prime Coat - Prime coat shall be Type SC-70 liquid asphalt conforming with the provisions of Section 93, "Liquid Asphalts" of the State Standard Specifications.

PART 3 - EXECUTION

3.01 ASPHALT PAVING

- A. Upon completion of all underground construction, including but not limited to trench backfill and aggregate base, the Contractor shall construct the final asphalt concrete surface. Such asphalt concrete surface shall be of the same depth, or greater, as the existing surface material. In no case shall the new asphalt concrete be less than 2-inches in depth.
- B. All valve boxes, manholes, monument boxes, and other adjustable structures shall be brought to grade prior to placing the final lift of asphalt concrete. Where the distance between the edge of the new pavement and the existing edge of pavement, existing curb or gutter lip, or asphalt dike is less than 2 linear feet, the existing pavement shall be removed and replaced to the edge of pavement, existing curb or gutter lip or asphalt dike.

- C. All temporary paving material, loose aggregate base, and other deleterious material shall be removed from the trench of the underlying surface. The surface of the aggregate base or sand cement slurry backfill and all abutting surfaces shall be prepared by spraying with a paint binder at a rate of 0.25 gallons per square yard. The Contractor shall prevent overspray onto adjacent pavement surfaces and other surfaces not scheduled to be paved. Paint binder shall not be tracked out of the work area by vehicles or equipment.
- D. Hot asphalt concrete shall be placed in the area to be paved and compacted by the use of rollers or vibratory plate type compaction equipment. The use of vibratory plate compaction equipment shall be limited to projects whose area totals less than 100 square feet and/or those areas where insufficient space is available for the operation of vibratory rollers. All spreading and compacting operations shall be in accordance with the provisions of Section 39, "Hot Mix Asphalt" of the State Standard Specifications except that tolerances for trench repairs will be measured by the use of a straight edge of sufficient length to span the full width of the trench plus 2-feet on each side of the trench line.
- E. If the total depth of asphalt paving exceeds 2-½ inches, the asphalt shall be laid in a minimum of 2 lifts with the maximum lift equaling 2-½ inches. The minimum thickness of any lift of asphalt concrete shall be equal to twice the maximum size aggregate in the asphalt concrete mix. Each lift shall be fully compacted and finished prior to placing the next lift except that the grade tolerances shall apply for the final lift only.
- F. All new asphalt concrete surfaces shall be abutted to adjoining surfaces along a neat sawcut line. In no case shall new asphalt be feathered over existing surface material, placed against damaged surfaces, or over or against any material not adequately prepared as defined herein. The final surface of the asphalt concrete shall be no more than ¼-inches above the adjacent existing surface nor shall the final surface be below the level of the adjacent surface. In areas of paving other than trench repairs, the plane of the surface shall not vary more than ¼-inches above or below the average plane of the surface when measured with an 8-foot straight edge.
- G. Skin patching shall not be considered an acceptable method of achieving the tolerances herein. Skin patching is hereby defined as a mix of asphaltic concrete whose maximum aggregate size is less than or equal to the No. 4 sieve used to fill depressions in the pavement plane.
- H. The final lift of asphalt concrete shall be placed in one continuous operation as the final order of work for the project. Where trenches do not form an unbroken line throughout the project, asphalt concrete may be placed in one continuous operation for each continuous trench, subject to the prior approval of the Engineer.
- I. All paving not conforming with the provisions of these specifications, the Contract Documents, or any public agency having jurisdiction over the work shall be immediately removed and replaced in accordance with the provisions of these specifications, the Contract Documents, and the directions of such agencies having jurisdiction over the work.

3.02 FOG SEALING

- A. Fog seal shall be constructed in accordance with the provisions of Section 37, "Bituminous Seals" of the State Standard Specifications, to the limits shown on the Drawings, listed in the Encroachment Permit, or as indicated by the Engineer.

3.03 SLURRY SEALING

- A. Slurry seal coat shall be constructed in accordance with the provisions of Section 37, "Bituminous Seals" of the State Standard Specifications for a double seal coat, to the limits shown on the Drawings, listed in the Encroachment Permit, or as indicated by the Engineer.

3.04 PAVEMENT MARKING

- A. Pavement markings shall be replaced in kind following final paving and sealing. Markings shall be constructed in accordance with the provisions of Section 84, "Markings" of the State Standard Specifications, and the requirements of the jurisdiction which owns the roadway.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. New chain link fencing and gates as shown on the plans and specified herein.
2. The replacement of existing chain link fencing and/or gates disturbed during construction to equal or better condition.
3. The intent of this specification is to provide for a complete installation in a workmanlike and professional manner. Not all required materials, installation procedures or hardware may be specifically listed.

B. Related Sections:

1. Section 03 30 00 – Cast-in-Place Concrete

1.02 REFERENCES

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

1. A36 - Structural Steel.
2. A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
3. A123 - Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
4. A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. A392 - Zinc-Coated Steel Chain-Link Fence Fabric
6. A817 - Metal-Coated Steel Wire for Chain-Link Fence Fabric and Marcellled Tension Wire.
7. F567 - Installation of Chain-Link Fence.
8. F626 - Fence Fittings.
9. F668 - Polyvinyl Chloride Coated Steel Chain-Link Fences.
10. F900 - Industrial and Commercial Swing Gates.
11. F1043 - Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework.
12. F1083 - Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

B. State of California Department of Transportation (Caltrans).

1.03 MANUFACTURER'S QUALIFICATIONS

- ###### A.
- Fence, gates, and accessories shall be products of manufacturers regularly engaged in manufacturing items of type specified.

1.04 SUBMITTALS

- A. Furnish the following information:
 - 1. Manufacturer's Literature and Data for chain link fencing, gates and all accessories.
 - 2. Manufacturer's Certificates for zinc coatings.
 - 3. Manufacturer's installation instructions.
- B. Shop Drawings for swinging gates and fence terminations.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Materials shall conform to ASTM F1083 and ASTM A392 for ferrous metals, zinc coated; and detailed specifications forming the various parts thereto; and other requirements specified herein. Zinc coat metal members (including fabric, gates, posts, rails, hardware and other ferrous metal items) after fabrication shall be reasonably free of excessive roughness, blisters and sal-ammoniac spots.

2.02 CHAIN LINK FABRIC

- A. For lift station: ASTM A392 knuckled top and bottom. Single width fabric to full height of fence. Nine (9) gauge finished wire size, 2-inch mesh. Class 1 chain link fence fabric with 1.2 ounces of zinc coating per square foot of uncoated wire surface shall be used. Vinyl coated chain link fence shall be black polyvinyl chloride coated steel link fabric and fittings. Polyvinyl chloride shall be applied by the thermal extrusion process.
- B. For replacement fence: ASTM A392 knuckled top and bottom. Single width fabric to full height of fence. Nine (9) gauge finished wire size, 3.5-inch mesh. Class 1 chain link fence fabric with 1.2 ounces of zinc coating per square foot of uncoated wire surface shall be used.
- C. Top and bottom tension wire shall be ASTM A817 and ASTM F626, having the same coatings as the fence fabric.

2.03 POSTS AND RAILS

- A. ASTM F1083, Grade SK-40A, round, zinc coated steel.
 - 1. Dimensions and weights of posts shall conform to the tables in the ASTM Specification.
 - 2. Dimensions and weights of gate posts shall conform to CALTRANS Detail A85.
- B. Provide post braces and truss rods for each gate, corner, pull or end post.
 - 1. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.
 - 2. Fit with suitable expansion sleeves and means for securing rail to each gate, corner, and end posts.

- C. Posts, rails, and braces shall be hot-dipped galvanized. Where used with black fence fabric, post, rails and other hardware shall be black powder-coated or coated with two coats of black metal paint applied over a metal primer.

2.04 ACCESSORIES

- A. Accessories as necessary shall include caps, rail and brace ends, wire ties or clips, braces and tension bands, tension bars, truss rods, and miscellaneous accessories conforming to ASTM F626.

2.05 SWING GATES

- A. ASTM F900, type as shown on the plans.
- B. Gate framing, bracing, latches, hardware and coatings shall be the same as the fabric.
- C. Gate leaves more than 8 feet wide shall have either intermediate members and diagonal truss rods, or shall have tubular members as necessary to provide rigid construction, free from sag or twist.
- D. Attach gate fabric to the gate frame by a method standard with the manufacturer, except that welding will not be permitted.
- E. Arrange latches for padlocking so that padlock will be accessible from both sides of the gate regardless of the latching arrangement.

2.06 CANTILEVER SLIDE GATES

- A. Gate Frame: Shall be made in accordance with ASTM F 1184 Type II Class 2, and in compliance with UL-325, and ASTM 2200. (No substitution) Gate to be made of Aluminum Alloy 6005A-T61. All square members are 2" sq. weighing 0.94 lb/FT (139 kg/m). Complete frame welded to top (HI-STRENGTH) one piece track and top frame member and 4" x 2" bottom rail weighing 1.71 lbs./ft (2.54 kg/m) Supply 2 truck assemblies that are swivel type having lubricated and scaled ball bearing wheels that will align in the track during all normal operations of the gate.
- B. Gate Finish (Frame): Polymer Coated in color to match fence
- C. Chain Link Filler: As specified. Chain link fabric filler installed using hook bolts that are inserted through pre-drilled holes in the frame. To these hook bolts the fabric will be attached by means of a tension bar which is laced through the last link of the fabric. The hook bolts shall be 15" (381mm) on center and all four sides of the gate. This shall assure a drum like tightness to the fabric. This fabric shall give additional strength to the gate.
- D. Diagonal adjustable 1/4" (6 mm) stainless steel truss cables (2) shall be provided inside each panel of the gate. (One each direction).
- E. Track shall be an enclosed (HI-STRENGTH) combination track and top rail aluminum extrusion weighing 4.75 lb/ft (7.03 kg/m). It shall withstand a 2,000 lb (907.2 kg) reaction load.

- F. Truck assembly: Swivel type, zinc die cast, with 4 sealed lubricant ball bearing wheels 2" (50 mm) in diameter. The load bearing wheels shall have an extruded dynamic load rating of 4,500 pounds each. And 2 side rolling wheels to ensure truck alignment in track. Truck assemblies shall be held to post brackets using 5/8" (16 mm) diameter stainless steel bolts which shall have a load rating of 11,000 pounds. Truck assembly to withstand 2,000 lb (907.2 kg) reaction load.
- G. Bottom guide wheel assemblies: Each assembly shall consist of two 3" (75 mm) diameter wheels with covers Per UL-325 and ASTM F 2200, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each guide post.
- H. Gate post brackets, latch and keepers shall be galvanized steel.
- I. Gate posts shall be 4" O.D. (101.6 mm) schedule 40 weighing 9.11 lb/ft (13.6 kg/m) minimum. Single gates with single tracks shall have 3 gate posts (1 latch post and 2 support posts). Single gates with dual tracks shall have 5 gate posts (1 latch and 2 dual support posts). Double gates shall have twice the number of support posts but do not have a latch post.

2.07 GATE HARDWARE

- A. Manufacturer's standard products, installed complete. The type of hinges shall allow gates to swing through 180 degrees, from closed to open position. Hang and secure gates in such a manner that, when locked, they cannot be lifted off hinges.
- B. Provide stops and keepers for all gates. Latches shall have a plunger bar arranged to engage the center stop. Arrange latches for locking. Center stops shall consist of a device arranged to be set in concrete and to engage a plunger bar. Keepers shall consist of a mechanical device for securing the free end of the gate when in full open position.
- C. Provide provision for locking gate with a padlock. Lock to be provided by Owner.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fence with a properly trained crew, on previously prepared surfaces, to lines and grades as shown.
- B. Install fence in accordance with ASTM F567 and with the manufacturer's printed installation instructions, except as modified herein or as shown.
- C. Maintain all equipment, tools, and machinery while on the project in sufficient quantities and capacities for proper installation of posts, chain links and accessories.
- D. Supply accessories (posts braces, tension bands, tension bars, truss rods, and miscellaneous accessories), as required and recommended by the manufacturer, to accommodate the installation of a complete fence, with fabric that is taut and attached properly to posts, rails, and tension wire.

3.02 EXCAVATION

- A. Provide post holes to the depth and diameter shown on the manufacturer's printed installation instructions.
- B. Clear loose material from post holes.
- C. Grade area around finished concrete footings as shown on the grading plans and dispose of excess material in conformance with Section 31 23 16.

3.03 POST SETTING

- A. Install posts plumb and in alignment.
- B. Straight runs between braced posts shall not exceed 500 feet
- C. Set posts in concrete footings of dimensions recommended by the manufacturer.
- D. Thoroughly compact concrete so as it to be free of voids and finished in a slope or dome to divert water running down the post away from the footing.
- E. Cure concrete a minimum of 72 hours before any further work is done on the posts.
- F. Fit all exposed ends of post with caps.
- G. Provide caps that fit snugly and are weathertight.
- H. Where top rail is used, provide caps to accommodate the top rail.
- I. Install post caps as recommended by the manufacturer.

3.04 TOP AND BOTTOM RAILS

- A. Install rails before installing chain link fabric. Provide suitable means for securing rail ends to terminal and intermediate post.
- B. Top rails shall pass through intermediate post supporting arms or caps.
- C. The rails shall have expansion couplings (rail sleeves) spaced as recommended by the manufacturer.

3.05 FABRIC

- A. Install and pull taut tension wire before installing the chain link fabric.
- B. Pull fabric taut and secured with wire ties or clips to the top rail, bottom rail and tension wire close to both sides of each post and at intervals of not more than 24 inches on center.
 - 1. Secure fabric to posts using stretcher bars and ties or clips.

3.06 GATES

- A. Install gates plumb, level, and secure for full opening without interference.
- B. Set keepers, stops and other accessories into concrete as required by the manufacturer.
- C. Adjust hardware for smooth operation and lubricate where necessary.

3.07 REPAIR OF GALVANIZED SURFACES

- A. Use galvanized repair compound, stick form, or other method, where galvanized surfaces need field or shop repair. Repair surfaces in accordance with the manufacturer's printed directions.

3.08 FINAL CLEAN UP

- A. Remove all debris, rubbish and excess material from the construction site.

END OF SECTION

SECTION 32 90 00

PLANTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Furnishing and placing topsoil for finish grading and for seeding and planting.
- B. Seeding, mulching, fertilizing and maintenance of areas indicated on the Drawings.

1.02 REFERENCES

- A. Reference standards: Comply with applicable provisions of the following:
 - 1. Nomenclature: "Western Garden Book," 1999 edition or later; Sunset Publishing Co., Menlo Park, CA.
 - 2. Plant material standards: "American Standard for Nursery Stock," 2004 edition; American Association of Nurserymen.
 - 3. ANSI Z 60.1, Nursery Stock

1.03 SUBMITTALS

- A. Provide submittals in accordance with Section 01 30 00, Contractor Submittals.
- B. Submit certification from supplier that topsoil conforms to these specifications (if topsoil commercially procured).
- C. Submit certification from seed supplier that each type of seed conforms to these specifications and California Seed Law. Certification shall accompany seed delivery.
- D. For unpackaged materials, submit analysis by recognized laboratory made in accordance with methods established by Association of Official Agricultural Chemists, when applicable.
- E. Submit name and experience of a qualified Landscaper.

1.04 QUALITY ASSURANCE

- A. The Contractor for all work under this Section shall have a Class A general contractor's license or a Class C-27 landscape contractor's license. Contractor shall have a minimum of 5 years experience in the installation of hydroseed.
- B. Do not make substitutions of approved plants and materials unless approved in writing by the Engineer. When specified planting material is not obtainable, submit proof of non-availability together with proposal for use of equivalent material. Substitutions of larger size or better grade than specified will be allowed, but with no increase in unit price.

1.05 LAYOUT

- A. Contractor shall familiarize themselves with the Drawings, these specifications, ongoing and future work by other disciplines prior to bidding this Work.
- B. Contractor shall inspect project site and become familiar with actual grades, limits of work, and other site conditions under which work is to be performed.
- C. LIMITS OF WORK: Revegetation shall be conducted within the Project Limits as shown in the Drawings. No work is to be conducted outside of the work area boundaries or staging areas shown on the Drawings. Contractor shall not disturb ground adjacent to work area.

1.06 DELIVERY, STORAGE AND HANDLING OF MATERIALS

- A. Deliver packaged materials in fully labeled original containers showing weight, analysis and name of manufacturer. Protect materials from deteriorating during delivery, and while stored at Site.
- B. Delivery of seed to the project site shall be timed so that all seed delivered to the site is used within 60 days.
- C. Contractor shall store seed in the original containers in a cool, dry, and shaded place once delivered to the project site and until used.

1.07 INSPECTIONS

- A. Contractor shall notify at a minimum, 3 working days in advance, the Engineer to schedule inspections, field approvals, and monitoring during installation activities at the following stages in the installation and monitoring process:
- B. At completion of Planting Contractor shall schedule a final inspection.

PART 2 - PRODUCTS

2.01 2.01 TOPSOIL

- A. Topsoil shall be fertile, friable, naturally sandy loam surface soil obtained from excavation or borrow operations having the following characteristics:
- B. pH value between 5.5 and 6.5
- C. Liquid limit: 50 or less
- D. Plasticity index: 20 or less
- E. Gradation: maximum of 10 percent passing the No. 200 sieve
- F. Topsoil shall be reasonable free of subsoil, clay lumps, weeds, non-soil materials and other litter or contamination. Topsoil shall not contain roots, stumps and stones larger than 2-inches.

- G. Obtain topsoil from naturally well-drained areas where topsoil occurs at a minimum depth of 4-inches and has similar characteristics to that found at placement site. Do not obtain topsoil from areas infected with growth of poison oak or other noxious weeds.

2.02 WATER

- A. Water shall be potable water from municipal water supplies.

2.03 SEED

- A. Conform to U.S. Department of Agriculture rules and regulations of Federal Seed Act and California Seed Law. Seed shall be certified 90 percent pure and furnish 80 percent germination and meet the following requirements:

- 1. Seed requirements and application rates for grass areas:

<u>Species</u>	<u>Common Name</u>	<u>Pounds per Acre</u>
Bromus carinatus	California brome	6
Elymus glaucus	Western ryegrass	10
Bromus Horeacus	Blando Brome	4.5
Trifolium Hirtum	Rose Clover	4.5
Trifolium Incarnatum	Crimson Clover	4.5

- B. Wet, moldy or otherwise damaged seed will not be accepted.

2.04 FERTILIZER FOR SEEDED AREAS

- A. Dry and free-flowing, inorganic, water soluble commercial fertilizer, which is uniform in composition. Deliver in unopened containers which bear manufacturers guaranteed analysis. Caked, damaged, or otherwise unsuitable fertilizer will not be accepted.

- B. Fertilizer shall contain minimum percentages of the following elements, unless a specific fertilizer is specified by the seed supplier:

- 1. Nitrogen: 10 percent
- 2. Phosphoric acid: 20 percent
- 3. Potash: 10 percent

2.05 MULCH FOR SEEDED AREAS

- A. Virgin wood cellulose fibers from whole wood chips having minimum of 20 percent fibers 0.42 inches in length and 0.01 inches in diameter.

- B. Cellulose fibers manufactured from recycled newspaper and meeting same fiber content and size for cellulose fibers from wood chips.

- C. Dye mulch green for coverage verification purposes.

2.06 SOIL STABILIZER FOR SEEDED AREAS

- A. Provide a tackifier meeting the requirements of Section 21 of the Caltrans Standard Specifications.

2.07 EROSION CONTROL FABRIC

- A. Erosion control fabric shall be a layer of 100% coconut fiber stitched with biodegradable thread between biodegradable natural fiber top and bottom nets, such as C125BN available from North American Green (1-800-772-2040).
- B. Certification that the erosion control fabric meets this specification shall be provided to the Engineer by the Contractor prior to application.

2.08 EROSION CONTROL FABRIC STAPLES

- A. Erosion control fabric staples shall be made of 12-inch long, 11-gauge (minimum) steel wire staples.

2.09 SUBSTITUTIONS

- A. In the event that specified Hydroseed materials are limited by their availability or lacking in health or vigor the Engineer reserves the right to substitute different plant materials for those specified, as long as the substituted materials are the same size as the specified materials, at no additional cost to Owner.
- B. Any substitutions desired by the Contractor must meet the approval of the Engineer prior to delivery and start of work with such materials.

PART 3 - EXECUTION

3.01 EXCAVATION

- A. Excavate topsoil for areas to receive grass or landscaping from areas to be further excavated. Stockpile in area approved by Engineer.
- B. Stockpile topsoil to depth not exceeding 8-feet. Cover to protect from erosion.

3.02 TOPSOIL PLACEMENT

- A. Place no topsoil until subgrade has been approved. For areas to be seeded or sodded, scarify or plow existing material to depth of 4-inches, or as indicated on the Drawings. Remove vegetation and foreign inorganic material. Place 4-inches of topsoil on loosened material and roll lightly with appropriate lawn roller to consolidate topsoil.
- B. Increase depth of topsoil to 6-inches when placed over sand bedding and backfill materials.
- C. Remove spilled topsoil from curbs, gutters and paved areas.

- D. Place topsoil to promote good drainage and compact with light roller. Water topsoil after placement until saturated for minimum depth of 6-inches. Fill-in and recompact areas of settlement.
- E. Protect topsoil from wind and water erosion until planting is complete.

3.03 HYDROSEEDING

- A. Hydroseed shall be applied within one week of the completion of final grading. Hydroseed shall be applied to a hand-raked bare soil prior to installation of erosion control fabric. A delay in the application of hydroseed must be approved by the Engineer. Hydroseeding timing should be coordinated to occur after grading and other disruptive construction activities are completed. The Contractor shall notify the Engineer at least 3 workdays prior to hydroseed slurry preparation and application so that the Engineer can be present for the hydroseed installation.
- B. The Hydroseed seed mix shall be applied to all areas where the soil surface is disturbed by construction.
- C. Contractor shall use a commercial hydroseeder having a built-in agitation system with the capacity to continuously agitate, suspend, and homogeneously mix slurry.
- D. Contractor shall prepare hydroseed slurry mix immediately prior to application at the project site.
- E. Application rates:
 - 1. Seed: Apply uniformly at rates given in Paragraph 2.03.
 - 2. Fertilizer: Apply uniformly at rate of 500 pounds per acre.
 - 3. Mulch: Apply uniformly at rate of 50 pounds per 1000 square-feet.
 - 4. Soil Stabilizer: Apply uniformly at rate of 500 pounds per acre.
 - 5. Fertilizer: Apply uniformly at rate of 40 pounds per acre.
- F. Suspend operations under conditions of drought, excessive moisture, high winds or extreme or prolonged cold. Obtain Engineer's approval before resuming operations.

3.04 EROSION CONTROL FABRIC INSTALLATION

- A. The Contractor shall install erosion control fabric immediately after hydroseeding.
- B. Erosion control fabric shall be installed in all areas where slopes exceed 1.5H:1V and the hydroseed mix has been applied.
- C. Install erosion control fabric perpendicular to the slope as follows.
 - 1. Fit the soils surface contour and hold in place with steel wire staples driven vertically into the soil at 18- to 24-inch spacing.
 - 2. Erosion control fabric shall overlap along all edges at least 6 inches. Ends of side strips shall be buried into the soil at least 6 inches.
 - 3. Drive staples along edges to securely anchor mesh to ground.

3.05 MAINTENANCE OF SEEDED AREAS

- A. Maintain grassed areas for a minimum 90 days, or as required to establish acceptable growth. For areas seeded in the fall, continue maintenance following spring until acceptable growth is established.
- B. Maintain grassed areas by watering, fertilizing, weeding and trimming.
- C. Repair areas damaged by erosion by regarding, rerolling and replanting.
- D. Reseed small sparse grass areas. When sparse areas exceed 20 percent of planted area, reseed by hydromulch.

3.06 CLEANUP AND PROTECTION

- A. During planting work, keep pavements clean and work area in orderly condition.
- B. Protect planting work and materials from damage due to planting operations. Maintain protection during installation and maintenance period. Treat, repair or replace damaged planting work as directed by Engineer.
- C. Dispose of excess soil and waste in accordance with requirements of Division 01. On-site burning of combustible material will not be permitted.

END OF SECTION

SECTION 33 01 30.71

MANHOLE REHABILITATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section includes:
 - 1. Rehabilitation of concrete manhole structures as indicated on the contract drawings.
- B. Related Sections
 - 1. Trenching, Backfilling and Compaction – Section 31 23 00
 - 2. Cast-In-Place Concrete – Section 03 30 00
 - 3. Precast Concrete Manholes – Section 33 05 61
 - 4. Painting and Coating – Section 09 90 00

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
 - 1. C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens)
 - 2. C293 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)
 - 3. C496 - Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
 - 4. C882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear
 - 5. C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
 - 6. C666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
 - 7. D638 - Standard Test Method for Tensile Properties of Plastics
 - 8. D695 - Standard Test Method for Compressive Properties of Rigid Plastics
 - 9. D790 - Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - 10. D4258 - Standard Practice for Surface Cleaning Concrete for Coating
 - 11. D4259 - Standard Practice for Abrading Concrete
- B. Occupational Safety and Health Administration (OSHA)
- C. The Society for Protective Coatings (SSPC)
 - 1. PA1 - Shop, Field, and Maintenance Painting of Steel
 - 2. SP1 - Solvent Cleaning
 - 3. SP13 - Surface Preparation of Concrete

- D. American Concrete Institute (ACI)
 - 1. RAP-3 – Spall Repair by Low Pressure Spraying
 - 2. 546R – Concrete Repair Guide

1.03 SUBMITTALS

- A. Coatings Manufacturer shall submit for approval the following:
 - 1. Copies of manufacturer's technical information and application instructions for each material proposed for use. Specify exactly which product is being proposed for each coating type (as specified below). This may be accomplished through a reference table along with information on the various products, or by a separate, tabbed section with information on products being submitted for each system in a separate tab of a binder. Submittal of general manufacturer's literature without detailing which product is proposed for each paint system will be unacceptable.
 - 2. Letter from the Coatings Manufacturer certifying the Coatings Installer as factory trained and qualified.
 - 3. Test reports from an independent testing laboratory confirming chemical resistance of coating for chemicals common to municipal wastewater treatment facilities.
- B. Furnish copies of the final, approved submittal to the coatings installer so that it is clear which product is to be used for which each system.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Store products in accordance with manufacturer's directions.
- B. All materials shall be delivered to the site in the manufacturer's sealed containers. Each container shall be labeled by the manufacturer, and the label shall be intact upon delivery.

PART 2 - MATERIALS

2.01 CEMENTITIOUS COATING

- A. Coating material furnished under this specification shall be a prepackaged mortar mix, including all cement, aggregates and required additives.
- B. The chemical composition of the cement portion as well as the aggregates of the mortar mix shall be as follows:
 - 1. Al₂O₃ 39 – 44%
 - 2. CaO 35 - 40%
 - 3. FeO+Fe₂O₃ 9 – 15%
 - 4. SiO₂ 4-9%
- C. The design properties of the mortar mix shall be as follows:
 - 1. Compressive Strength per ASTM C109
 - a. >5,500 psi at 24 hours
 - b. >7,000 psi at 28 days

2. Flexural Strength per ASTM C293
 - a. >900 psi at 24 hours
 - b. >1,300 psi at 28 days
 - c. Splitting Tensile Strength >550 psi at 24 hours per ASTM C496
 - d. Bond Strength >2,000 at 28 days per ASTM C882
 3. Shrinkage at 28days <0.07% cured at 90% relative humidity per ASTM C157
 4. Freeze/Thaw after 100 Cycles: No visible damage after 100 cycles per ASTM C666
- D. Mix shall have been successfully used on at least 25 similar projects over a minimum of five (5) years
 - E. Mix shall be designed to withstand long-term exposure to hydrogen sulfide with pH values of 2 or lower.
 - F. Water used in mixing shall be clean, potable water, free of oil, acid, alkali and other material that may be detrimental to the performance of the mix.
 - G. Mix shall be one of the following approved products:
 1. SewperCoat PG
 2. Raven 705CA
 3. Parsons CA Liner
 4. Mainstay ML-CA
 5. Or Approved Equal

2.02 HYDRAULIC CEMENT

- A. Hydraulic cement shall be used to plug voids, major cracks, and locations showing signs of infiltration.
- B. Hydraulic cement shall be one of the approved products:
 1. Parson Quick Plug
 2. Parson RPM
 3. Mainstay ML-10
 4. Or Approved Equal

2.03 EPOXY COATINGS

- A. Epoxy Coatings shall be used on all manholes, wet well, and valve vault where indicated to be coated on the project plans.
- B. Epoxy coatings shall meet the following physical properties:
 1. Compressive strength: > 16,000 psi per ASTM D695
 2. Flexural strength: > 12,000 psi per ASTM D790
 3. Tensile strength: > 7,500 psi per ASTM D638
- C. Products:
 1. Parson Environmental: Parsonpoxy SEL-80

2. Raven Lining Systems: Raven 405
 3. Madewell: Mainstay DS-5
 4. Or Approved Equal
- D. Where cementitious repair coatings are used, the epoxy coating shall be of the same manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

- A. Installation shall be in conformance with the manufacturer's recommendations and with these specifications.
- B. Care shall be exercised not to damage adjacent work during surface preparations.
- C. All protective coating materials shall be used within the manufacturer's recommended shelf life.
- D. Mixing:
 1. Coatings of different manufacturers shall not be mixed together.
 2. Mixing of multi-component coating systems shall be performed in accordance with Manufacturer's recommendations. Components must be mixed in complete batches and used immediately.

3.02 SURFACE PREPARATION

- A. All loose material, debris, and roots shall be removed from the manhole.
- B. All oil, grease, and form release and curing compounds shall be removed by detergent cleaning in accordance with SSPC-SP1 before abrasive blast cleaning. Surface preparation shall be performed in accordance with the latest editions of the following standards:
 1. ASTM D - 4258: Standard Practice for Surface Cleaning Concrete for Coating
 2. ASTM D - 4259: Standard Practice for Abrading Concrete
- C. Concrete surfaces and deteriorated concrete surfaces to be coated or lined shall be abrasive blast cleaned in accordance with SSPC SP13 to remove existing coatings, laitance, deteriorated concrete, and to roughen the surface equivalent to the surface of the No. 60 grit flint sandpaper (surface profile of 2.5 to 4 mils).
- D. Concrete surfaces requiring repairs in excess of one-quarter inch (1/4") depth shall be repaired and brought flush with the surface, in accordance with the coating manufacturers' recommendations to provide a continuously smooth and even surface for application of top coat.

3.03 APPLICATION OF MATERIALS

- A. Coating shall be applied by a Manufacturer approved installer.

- B. Care shall be exercised to prevent loose manhole rehabilitation materials from mixing with the sewer flows. Use a flow through plug or bypass pump as necessary.
- C. Coating applied by spray methods shall be in accordance with the manufacturer requirements and as follows:
 - 1. Material shall not be applied to frozen surfaces or surfaces that may freeze within 24 hours of application
 - 2. Application shall be at an angle as near perpendicular to the sub-surface as practicable with the application nozzle held 1 foot from the sub-surface. If nozzle flow is non-uniform and slugs, sand spots and wet sloughs result, the nozzle shall be directed away from the work area until the faulty conditions are corrected.
- D. Whether spray or trowel application is used, the application shall be according to the principles of good workmanship outlined in SSPC-PA1-82 and shall provide a finish which is continuous, uniform in thickness, and verified free of pores or other defects using electrical discontinuity testing (high voltage spark testing).
- E. Coatings shall be applied to all walls, benches and inverts.

3.04 MANHOLE REHABILITATION

- A. Rehabilitate manhole as indicated in the repair matrix on the Drawings and described herein:
 - 1. Rehabilitate Manhole / Manhole Coating:
 - a. Prepare all interior surfaces in accordance with the product manufacturer's recommendations and these specifications.
 - b. Repair any cracks, voids, and leaks with hydraulic cement mortar, in conformance with the product manufacturer's recommendations.
 - c. Apply cement to all interior floor/bench, wall, and ceiling surfaces in conformance with manufacturer's recommendations. Minimum thickness is indicated on drawings. Minimum thickness is measured from locations that protrude the furthest into the manhole.
 - d. Unless otherwise noted, manholes to be coated shall have a 1-inch minimum coating thickness applied to all interior surfaces of the manhole.
 - e. Select manholes shall have a 2-inch minimum coating thickness applied to provide additional structural support, as identified on the plans.
 - f. Minimum coating thickness shall be measured from the flat surface of the existing manhole. Where pitting, cracking, corrosion, and holes are present additional coating thickness will be required.
 - 2. Grout Around Pipe:
 - a. Prepare surfaces in accordance with the product manufacturer's recommendations and these specifications.
 - b. Apply hydraulic cement around pipe to manhole connection, filling all voids, cracks, and leaks, in conformance with the product manufacturer's recommendations.
 - 3. Repair/Reform Bench & Invert:
 - a. Prepare surfaces in accordance with the product manufacturer's recommendations and these specifications.

- b. Repair and reform damaged portions of the bench and trough with hydraulic cement in conformance with the product manufacturer's recommendations and as detailed on the Plans.
- 4. Remove Ladder:
 - a. Remove ladder rungs by cutting off the ladder rungs flush with the interior surface of the manhole. Cement mortar shall be applied over remaining portion of the ladders, refer to section 3.04.A.1 for more information.
- 5. Grout Voids / Spot Repair:
 - a. Prepare surfaces in accordance with the product manufacturer's recommendations and these specifications.
 - b. Repair cracks, voids, and leaks with hydraulic cement mortar, in conformance with the product manufacturer's recommendations.
- 6. Replace Frame & Lid:
 - a. Excavate around existing manhole and remove existing frame and cover.
 - b. Install new frame, cover, and concrete collar in conformance with project drawings. New cover shall be flush with existing grade in streets and pathways. Outside of roadways and pathways, new cover shall be at or above existing grade to match existing conditions.
- 7. Raise Manhole:
 - a. Raise manhole frame and lid as detailed on the Plans. The manhole frame and lid shall be replaced in all locations where the manhole is raised.
- 8. Replace Manhole:
 - a. Contractor has the option to replace any existing manhole with a new manhole instead of performing the manhole rehabilitation as required on the drawings and these specifications.
 - b. Sewer flows shall be maintained by bypass pumping when replacing a manhole.
 - c. Contractor is responsible for removing a disposing of the existing manhole.
 - d. New manhole shall be installed in conformance with specification Sections 31 23 00, 33 05 61 and 03 30 00 and in conformance with the project drawings.

3.05 FIELD TESTING

- A. Proper, safe access shall be provided in locations where requested by the Engineer to facilitate inspection. Additional illumination shall be furnished when the Engineer requests. Proper ventilation and atmospheric monitoring shall be provided as well as all other safety equipment and precautions required by OSHA for a safe inspection in all areas.
- B. The Engineer will conduct wet-film thickness testing. Contractor shall recoat any areas found deficient in thickness.
- C. Holiday Testing:
 - 1. Engineer will visually inspect coverage for blisters, sags, and holidays. Contractor shall repair areas identified by this inspection prior to conducting holiday test.
 - 2. Contractor shall holiday test, in the presence of the Engineer.
 - a. Holiday testing equipment and procedures shall be done in strict accordance with the latest edition of the NACE "Standard Recommended Practice Discontinuity (Holiday) Testing of Protective Coatings."

- b. Areas that contain holidays shall be marked and repaired or recoated in accordance with the coating manufacturer's printed instructions and then retested.
- 3. Holiday detectors shall be of the following type:
 - a. High voltage pulse-type holiday detector such as Tinker & Razor Model AP-W, D.E. Stearns Co. Model 14/20, or equal shall be used. The unit shall be adjusted to operate at a voltage of at least 110 volts/mil desired thickness.
 - b. Contractor shall provide the City with material samples upon request for testing.

3.06 ADJUSTMENT AND CLEANING

- A. At the completion of the Work, Contractor shall remove all material and debris associated with the Work of this Section.
- B. At the completion of the Work, Contractor shall clean all surfaces to which coatings were applied, as well as all adjacent, uncoated surfaces in a manner acceptable to the Engineer.
- C. Coatings shall be protected from damage until Final Acceptance of all Work in the area that was coated. Coatings damaged in any manner by Contractor prior to Final Acceptance of all Work in that area shall be repaired or replaced in a manner acceptable to the Engineer at no additional cost to the Owner.
- D. Just prior to Final Acceptance of all Work in the area that was coated, Contractor shall clean all coatings, as recommended by the manufacturer, to provide a finished product acceptable to the Owner.

END OF SECTION

SECTION 33 05 05.33

LEAKAGE AND INFILTRATION TESTING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes the requirements and procedures for leakage and infiltration testing of gravity sewer systems, in accordance with ANSI/ASTM C828, Low Pressure Air Test.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 33 31 11 PVC Gravity Sewer Pipe
- B. Section 33 05 05.31 Hydrostatic Testing of Pressure Pipelines
- C. Section 33 05 61 Precast Concrete Manholes
- D. Section 33 05 62 Polymer Concrete Wet Well

1.03 TESTING

- A. General: All tests shall be made in the presence of the Owner's inspector.
- B. Leakage: Each section of sewer between two successive manholes shall be tested for leakage and the leakage test shall be made on all manholes.
- C. Infiltration: The infiltration test shall be made where excessive groundwater is encountered in the trench.
- D. Retesting: Even though a section may have previously passed the leakage or infiltration test, each section of sewer shall be tested subsequent to the last backfill compacting operation if, in the opinion of the Engineer, heavy compaction equipment or any of the operations of the contractor or others may have damaged or affected the structural integrity or watertightness of the pipe, structure, and appurtenances.
- E. Other Utilities: Owner's official tests will not be made until after all the other utilities have been installed and their trench compaction verified.
- F. Excessive Leakage or Infiltration: If the leakage or infiltration rate is greater than the amount specified, the pipe joints shall be repaired or, if necessary, the pipe shall be removed and relaid by the contractor.
- G. Acceptance: The sewer will not be accepted until the leakage or infiltration rate, as determined by test, is less than the maximum allowable.
- H. House Laterals: House laterals are not to be connected until after the sewer main has been successfully tested.

- I. Force Mains: Force mains shall be pressure tested per Section 33 11 00.

PART 2 - MATERIALS

2.01 EQUIPMENT

- A. The contractor shall furnish all equipment and materials required for testing.

PART 3 - EXECUTION

3.01 AIR TEST FOR PVC GRAVITY SEWERS

- A. Test Section: Each section of sewer between two successive manholes shall be tested by plugging all pipe outlets with suitable test plugs.
- B. Addition of Air: Air shall be slowly added until the internal pressure is raised to 4.0 pounds per square inch gage (psig). The compressor used to add air to the pipe shall have a blow-off valve set at 5 psig to ensure that at no time the internal pressure in the pipe exceeds 5 psig.
- C. Internal Pressure: The internal pressure of 4 psig shall be maintained for at least two minutes to allow the air temperature to stabilize, after which the air supply shall be disconnected and the pressure allowed to decrease to 3.5 psig.
- D. Minimum Duration for Allowable Pressure Drop: The time in minutes that is required for the internal air pressure to drop from 3.5 psig to 3.0 psig shall be measured. The results shall not be less than the minimum permissible duration for air test pressure drop shown below.

MINIMUM DURUATION FOR AIR TEST PRESSURE DROP	
Pipe Size (Inches)	Time (Minutes)
4	2-1/2
6	4
8	5
10	6-1/2
12	7-1/2
15	9-1/2

- E. Retest: If the pressure drop from 3.5 psig to 3.0 psig occurs in less time than the above-tabulated or calculated values, the pipe shall be overhauled and, if necessary, replaced and relaid until the joints and pipe shall hold satisfactorily under this test.

3.02 INFILTRATION TEST

- A. Preparation of Test Section: The end of the sewer at the upper structure shall be closed to prevent the entrance of water, and pumping of groundwater shall be discontinued for at least three days, after which the section shall be tested for infiltration.

- B. Allowable Infiltration Rate: The infiltration shall not exceed 0.025 gpm per inch of diameter per 1,000 feet of main line sewer being tested, not including the length of laterals entering that section.
- C. Excessive Infiltration: Where infiltration in excess of the allowable amount is discovered before completion and acceptance of the sewer, the sewer shall be immediately uncovered and the amount of the infiltration reduced to a quality within the specified amount of infiltration, before the sewer is accepted.
- D. Individual Leaks: Even if the infiltration is less than the allowable amount, any individual leaks that may be observed shall be stopped as ordered by the Owner's inspector.
- E. Completion of Tests: All tests must be completed before the street or trench is resurfaced, unless otherwise directed by the Owner's inspector.

3.03 DEFLECTION TEST

- A. General: All PVC main line pipe shall be tested for deflection, joint displacement, or other obstruction by passing a rigid mandrel through the pipe by hand, not less than 30 days after completion of the trench backfill, but prior to permanent resurfacing. The mandrel shall be a full circle, solid cylinder, or a cylinder, approved by the Engineer as to design and manufacture. The circular cross section of the mandrel shall have a diameter of at least 95 percent of the specified average inside pipe diameter of the pipe, as follows:

Pipe Material	Nominal Size Inches	Minimum Mandrel Diameter Inches
PVC-ASTM D 3033	6	5.169
(SDR 35)	8	7.309
	10	9.137
	12	10.963

3.04 MANHOLE LEAKAGE TEST

- A. General: Water tightness of manholes shall be tested in connection with tests of sanitary sewers, or at the time the manhole is completed and backfilled.
- B. Plugs: All manhole inlets and outlets shall be plugged with approved stoppers or plugs.
- C. Fill Level: The manhole shall be filled with water to 2-inches below the bottom of the tapered cone section, with a minimum depth of 4 feet and a maximum depth of 20 feet. The water shall stand in the manhole for a minimum of one hour to allow the manhole material to reach maximum absorption. Before the test is begun, the manhole shall be refilled to the original depth as needed.
- D. Test Requirements: The drop in water surface shall be recorded after a period of from 15 minutes to one hour. The time of the test shall be determined by the Owner's inspector and may be varied to fit the various field conditions. The maximum allowable drop in the water surface shall be 1/2 inch for each 15-minute period of testing.

- E. Visible Leaks: Even though the leakage is less than the specified amount, the contractor shall stop any leaks that may be observed, to the satisfaction of the Owner's inspector.

END OF SECTION

SECTION 33 05 16

PRECAST CONCRETE UTILITY VAULTS AND WET WELL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes the materials, manufacture, and installation of precast concrete utility vaults and wet well with access hatches.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).
- B. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
 - 1. 31 23 00 Trenching, Backfilling and Compacting
 - 2. 03 30 00 Cast-in-Place Concrete

1.03 APPROVED MANUFACTURERS

- A. Precast Vaults and Manholes
 - 1. Jensen Precast
 - 2. Oldcastle Precast
 - 3. Or approved equal.
- B. Joint Sealing Compound
 - 1. Henry Company (Ramnek)
 - 2. Conseal
 - 3. Or approve equal.
- C. Waterproofing (Exterior)
 - 1. Grace Dehydratine 4
 - 2. Or approved equal
- D. Traffic Rated Hatches
 - 1. Bilco Company
 - 2. Safe-Hatch by Flygt
 - 3. Jensen MetalTech
 - 4. USF Fabrication
 - 5. Or approved equal

1.04 SUBMITTALS

- A. Provide submittals in accordance with Section 01 33 00, Submittal Procedures.
- B. Submit manufacturer's data and details of following items for approval:
 - 1. Shop drawings of manhole sections, base units and construction details, reinforcement details, jointing methods, materials, and dimensions
 - 2. Frames, grates, rings, and hatches
 - 3. Materials to be used for pipe connections
 - 4. Materials to be used for stubs and stub plugs, if required

PART 2 - MATERIALS

2.01 PRECAST CONCRETE VAULT

- A. Precast concrete structures shall comply with ASTM C913, except as modified herein.
- B. Precast concrete vaults and covers shall be manufactured in a plant especially designed for that purpose and shall conform to the shapes and dimensions indicated on the plans.
- C. Design loads shall consist of dead load, live load, impact, and in addition, loads due to water table and any other loads which may be imposed upon the structure. Live loads shall be for H-20 per AASHTO standard specifications for highway bridges. Design wheel load shall be 16 kips. The live load shall be that which produces the maximum shears and bending moments in the structure.
- D. Concrete shall be Class A conforming to Section 03 30 00.
- E. Vault floor shall be treated such that a non-skid surface is provided.
- F. Vault floor shall contain grooved channels to convey drainage to a sump area.
- G. Wall openings shall be sized to permit sealing the annular space with a mechanical seal (Calpico Pipe Lynx, EnPro Corporation Link-Seal, or approved substitute).

2.02 PRECAST CONCRETE WET WELL

- A. Precast concrete structures shall comply with ASTM C478, except as modified herein.
- B. Precast concrete vaults and covers shall be manufactured in a plant especially designed for that purpose and shall conform to the shapes and dimensions indicated on the plans.
- C. Design loads shall consist of dead load, live load, impact, and in addition, loads due to water table and any other loads which may be imposed upon the structure. Live loads shall be for H-20 per AASHTO standard specifications for highway bridges. Design wheel load shall be 16 kips. The live load shall be that which produces the maximum shears and bending moments in the structure.
- D. Concrete shall be Class A conforming to Section 03 30 00.
- E. Wall openings for gravity inlet pipes shall have boot style connectors per ASTM C-923.

- F. Wall openings for pressure pipes and conduits shall be sized to permit sealing the annular space with a mechanical seal (Calpico Pipe Lynx, EnPro Corporation Link-Seal, or approved substitute).

2.03 VAULT AND WET WELL BASES

- A. Concrete used in pouring the vault base shall be Class A concrete per section 03 30 00, Cast-in-Place Concrete.
- B. Precast bases are acceptable in lieu of field-formed bases with the approval of the Engineer.

2.04 ACCESS HATCH

- A. Access hatch frames and covers shall be fabricated aluminum with stainless steel hardware, 2-leaf design with integral fall protection grating.
- B. Covers shall be fabricated with supports to resist deflection.
- C. All covers shall be hinged providing access to the entire vault. Covers shall have spring hydraulic assists.
- D. All covers shall be equipped with a hold-open mechanism with safety chains.
- E. All covers shall be equipped with a flush, locking device with locking eyes up.
- F. All covers must be H20 traffic rated for equipment or vehicle loading.
- G. Where vault includes installed steps, hatch shall be equipped with a “ladder up” to provide access assistance.

2.05 GASKET SEALS

- A. Preformed plastic sealing gaskets conforming to Federal Specification SS-S-210A; Ram-Nek or equal.

2.06 JOINT SEALING COMPOUND

- A. Compound shall be Quik-Seal by Associated Concrete Products; Ram-Nek by Henry Company; or approved equal.

2.07 EXTERIOR WATERPROOFING

- A. Waterproofing shall be formulated to comply with Federal Specification SS-A-701.

2.08 INTERIOR COATING

- A. Wet well interior shall be coated with 2-part epoxy per Section 09 90 00.
 - 1. Raven 405
 - 2. Hydro-Pox GL 212
 - 3. Elastuff 120 hydrophobic Polyurethane Elastomer with Uni-Tile Sealer

- B. Coat wall, floor and underside of lid.

2.09 CEMENT-MORTAR GROUT

- A. Grout for watertight joints between precast sections shall be composed of one part Portland cement to two parts of clean, well-graded sand of such size that all passes a No. 8 sieve. Cement, aggregate and water for mortar shall conform to the applicable provisions of section 03 30 00.

2.10 EPOXY GROUT

- A. Epoxy grout shall be used in repairing manhole, vault and concrete base surfaces. Epoxy grout shall be made with epoxy and sand. The sand shall be clean, bagged, graded and kiln-dried silica sand. The prepared grout shall wet the concrete surface and provide proper adhesion, or a coat of epoxy shall be applied prior to placing epoxy grout. The epoxy bonding compound shall be as specified in Section 03 60 00.

2.11 INSIDE DROP BOWL

- A. Provide inside drop bowl system at inlet pipe, as indicated on the drawings.
- B. Drop bowl system shall consist of drop bowl, drop pipe and stainless steel pipe brackets.
- C. System shall be Reliner as manufactured by Duran, Inc., or approved equal.
- D. Drop bowl may be field mounted or pre-mounted at casting facility.

PART 3 - EXECUTION

3.01 EARTHWORK

- A. Excavation and backfill for precast concrete vaults shall be in accordance with Section 31 23 00 and the requirements herein.
- B. The contractor shall prepare an excavation large enough to accommodate the structure and permit grouting of openings and backfilling operations.
- C. The bottom of the structure shall be placed on 12- inches of compacted, crushed rock sub-base, graded level and to the proper elevation as shown on the plans, unless otherwise indicated by the Engineer.

3.02 INSTALLATION

- A. Openings or "knockouts" in precast concrete vaults shall be located as shown on the drawings and shall be sized sufficiently to permit passage of the largest dimension of pipe and/or coupling flange. Upon completion of installation, all voids or openings in the vault walls around pipes shall be filled with 3,000-psi concrete or mortar, using an approved epoxy for bonding concrete surfaces.
- B. After the structure and all appurtenances are in place and approved, backfill shall be placed such that finished grade is sloped away from vault (in unpaved areas) or such that

vault is flush with finished grade (in paved areas) to the original ground line or to the limits designated on the plans, unless otherwise indicated by the Engineer.

- C. All joints between precast concrete vault sections shall be made watertight using preformed mastic material. The sealing compound shall be installed according to the manufacturer's recommendations to provide a watertight joint which remains impermeable throughout the design life of the structure. All joints shall be filled with dry-pack non-shrink grout.
- D. Frames and covers shall be built up so that the cover is flush with the surrounding surface unless otherwise specified on the drawings or by the Owner's representative in the field. The contractor is responsible for placing the cover at the proper elevation where paving is to be installed and shall make all necessary adjustments so that the cover meets these requirements.
- E. Waterproofing shall be applied to the exterior walls of all buried vaults in accordance with the manufacturer's instructions. Protection shall be placed over the waterproofing to prevent damage.

END OF SECTION

SECTION 33 05 61

PRECAST CONCRETE MANHOLES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes the materials, manufacture, and installation of precast concrete manholes and manhole frames and covers.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).
- B. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
 - 1. 31 23 00 Trenching, Backfilling and Compacting
 - 2. 03 30 00 Cast-in-Place Concrete

1.03 APPROVED MANUFACTURERS

- A. Precast Manholes
 - 1. Jensen Precast
 - 2. Oldcastle Precast
 - 3. Or approved equal.
- B. Joint Sealing Compound
 - 1. Henry Company (Ramnek)
 - 2. Conseal
- C. Waterproofing
 - 1. Grace Dehydratine 4
- D. Lids and Covers
 - 1. Christy
 - 2. Utility Vault
 - 3. Phoenix Iron Works

1.04 SUBMITTALS

- A. Provide submittals in accordance with Section 01 33 00, Submittal Procedures.

1.05 FRAMES AND COVERS

- A. All precast sections shall be provided with fabricated aluminum or steel frames and covers as specified or shown on the drawings and shall be built up so that the cover is flush with the surrounding surface unless otherwise specified on the drawings or by the Engineer in the field.

PART 2 - MATERIALS

2.01 PRECAST CONCRETE MANHOLES

- A. Precast reinforced concrete manholes shall comply with ASTM C 478.
- B. Manhole components shall be designed for H-20 highway loads and site soil conditions.
- C. Manholes shall be fabricated only from eccentric taper sections and standard cylinder units of the proper internal diameter.
- D. Unless noted otherwise, minimum diameter of manholes and manhole sections shall be 48-inches. Minimum depth shall be 7-feet. Depth shall be measured from proposed finish surface elevation to the lowest pipe invert.
- E. Manhole sections shall be furnished without steps.
- F. Drop manholes of greater than 1-ft difference between inlet and outlet inverts are not permitted without the Engineer's approval.

2.02 MANHOLE FRAMES AND COVERS.

- A. Manhole frames and covers shall be made of ductile iron conforming to ASTM A 536, Class 400, or cast iron conforming to ASTM A 48, Class 30. Casting shall be smooth, clean and free from blisters, blowholes and shrinkage. Frames and covers shall be of the traffic type, designed for H-20 loading.
- B. Each manhole cover shall be ground or otherwise finished so that it will fit in its frame without rocking. Frames and covers shall be match-marked in sets before shipping to the site.
- C. Cover shall have "S" or "SANITARY SEWER" cast thereon as shown in the plans. No other lettering on the top side shall be permitted.
- D. Before leaving the foundry, castings shall be cleaned and subject to hammer inspection. Castings shall be dipped twice in a preparation of asphalt or coal tar and oil applied at a temperature of not less than 290°F, not more than 310°F, and in such a manner as to form a firm and tenacious coating.

2.03 MANHOLE BASES

- A. Concrete used in pouring the manhole base shall be Class A concrete per section 03 30 00, Cast-in-Place Concrete.
- B. Precast bases are acceptable in lieu of field-formed bases with the approval of the Engineer.

2.04 JOINT SEALING COMPOUND

- A. The joint sealing compound shall be a permanently flexible plastic material complying in every detail to Federal Specification SS S-00210 (GSA-FSS) dated July 26, 1965. "Quickseal", or approved equal.

2.05 WATERPROOFING

- A. Waterproofing shall be formulated to comply with Federal Specification SS-A-701.

2.06 CEMENT-MORTAR GROUT

- A. Grout for watertight joints between precast sections shall be composed of one part Portland cement to two parts of clean, well-graded sand of such size that all passes a No. 8 sieve. Cement, aggregate and water for mortar shall conform to the applicable provisions of section 03 30 00.

2.07 EPOXY GROUT

- A. Epoxy grout shall be used in repairing manhole, vault and concrete base surfaces. Epoxy grout shall be made with epoxy and sand. The sand shall be clean, bagged, graded and kiln-dried silica sand. The prepared grout shall wet the concrete surface and provide proper adhesion, or a coat of epoxy shall be applied prior to placing epoxy grout. The epoxy bonding compound shall be as specified in Section 03 60 00.

2.08 INTERIOR COATING

- A. The interior walls and inverts of all new manholes shall be epoxy coated. Epoxy coating shall be per the requirements of Section 09 90 00.

PART 3 - EXECUTION

3.01 EARTHWORK

- A. Excavation and backfill for precast concrete vaults shall be in accordance with Section 312300 and the requirements herein.
- B. The contractor shall prepare an excavation large enough to accommodate the structure and permit grouting of openings and backfilling operations.
- C. The bottom of the structure shall be placed on 12- inches of compacted, crushed rock sub-base, graded level and to the proper elevation as shown on the plans, unless otherwise indicated by the Engineer.

3.02 INSTALLATION

- A. Openings or "knockouts" in precast concrete vaults shall be located as shown on the drawings and shall be sized sufficiently to permit passage of the largest dimension of pipe and/or coupling flange. Upon completion of installation, all voids or openings in the vault walls around pipes shall be filled with 3,000-psi concrete or mortar, using an approved epoxy for bonding concrete surfaces.

- B. After the structure and all appurtenances are in place and approved, backfill shall be placed such that finished grade is sloped away from vault (in unpaved areas) or such that vault is flush with finished grade (in paved areas) to the original ground line or to the limits designated on the plans, unless otherwise indicated by the Engineer.
- C. All joints between precast concrete vault sections shall be made watertight using preformed mastic material. The sealing compound shall be installed according to the manufacturer's recommendations to provide a watertight joint which remains impermeable throughout the design life of the structure. All joints shall be filled with dry-pack non-shrink grout.
- D. Frames and covers shall be built up so that the cover is flush with the surrounding surface unless otherwise specified on the drawings or by the Owner's representative in the field. The contractor is responsible for placing the cover at the proper elevation where paving is to be installed and shall make all necessary adjustments so that the cover meets these requirements.
- E. Waterproofing shall be applied to the exterior walls of all buried vaults in accordance with the manufacturer's instructions. Protection shall be placed over the waterproofing to prevent damage.

3.03 WET WELL INFILTRATION TESTING

- A. General: Water tightness of the wet well shall be tested in connection with tests of gravity pipelines, or at the time the wet well is completed and backfilled.
- B. Plugs: All manhole inlets and outlets shall be plugged with approved stoppers or plugs.
- C. Fill Level: The wet well shall be filled with water to 4-feet below the bottom of the lid, with a minimum depth of 4 feet and a maximum depth of 20 feet. The water shall stand in the wet well for a minimum of one hour to allow the wet well material to reach maximum absorption. Before the test is begun, the wet well shall be refilled to the original depth as needed.
- D. Test Requirements: The drop in water surface shall be recorded after a period of from 15 minutes to one hour. The time of the test shall be determined by the Owner's representative and may be varied to fit the various field conditions. The maximum allowable drop in the water surface shall be 1/2 inch for each 15-minute period of testing.
- E. Visible Leaks: Even though the leakage is less than the specified amount, the contractor shall stop any leaks that may be observed, to the satisfaction of the Owner's representative.

END OF SECTION

SECTION 33 05 62

POLYMER CONCRETE MANHOLE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes the materials, manufacture, and installation of precast polymer concrete manholes, bases, lids and appurtenances.

1.02 REFERENCES

- A. ASTM C 33 Standard Specification for Concrete Aggregates
- B. ASTM C 478 Standard Specification for Precast Reinforced Concrete Manhole Sections
- C. ASTM C 443 Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets
- D. ASTM C 497 Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile
- E. ASTM C 579 Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic, Surfacing, and Polymer Concretes
- F. ASTM C 580 Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
- G. ASTM C 857 Standard Practice for Minimum Structural Design Loading for Underground Utility Structures
- H. ASTM C 923 Standard Specification for Resilient Connectors Between Reinforced Concrete Manholes Structures, Pipes, and Laterals
- I. ASTM C 990 Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections using Preformed Flexible Joint Sealants
- J. ASTM D 648 Test Method for Deflection Temperature of Plastics Under Flexural Load in Edgewise Position
- K. ASTM D 6783 Standard Specification for Polymer Concrete Pipe
- L. ASTM D 2584 Test Method for Ignition Loss of Cured Reinforced Resins
- M. ACI 350-06 Code Requirements for Environmental Engineering Concrete Structures & Commentary
- N. ACI 440.1R-15 Guide for the Design and Construction of Structural Concrete Reinforced with Fiber-Reinforced Polymer (FRP) Bars

- O. ACI 548.6R-96 Polymer Concrete-Structural Applications State-of-the-Art Report
- P. California Greenbook Standard Specifications for Public Works Construction Section 211-2

1.03 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 30 00, Contractor Submittals
- B. Submit manufacturer's data and details of following items for approval:
 - 1. Shop drawings of manhole sections, base units and construction details, reinforcement details, jointing methods, materials, and dimensions
 - 2. Summary of criteria used in manhole design including, as minimum, material properties, loading criteria, and dimensions assumed. Include certification from manufacturer that polymer concrete manhole design meets or exceeds the load and strength requirements of ASTM C 478 and ASTM C 857.
 - 3. Frames, grates, rings, and covers
 - 4. Materials to be used in fabricating pipe drop connections
 - 5. Materials to be used for pipe connections
 - 6. Materials to be used for stubs and stub plugs, if required
 - 7. Proof of independent Chemical Resistance testing conducted in accordance with the Standard Specifications for Public Works Construction (California Greenbook) Section 211-2
- C. Submitted sealed drawings by a registered Professional Engineer.

PART 2 - PRODUCTS

2.01 POLYMER CONCRETE MANHOLES

- A. Provide precast polymer concrete manhole sections, monolithic base section and lid.
- B. Provide base riser section with monolithic floors, unless shown otherwise.
- C. Provide riser sections joined with bell and spigot / ship-lap design seamed with butyl mastic and or rubber gaskets (ASTM C 990) so that on assembly, manhole base, riser and top section make a continuous and uniform manhole structure.
- D. Construct riser sections for polymer concrete manholes from standard polymer concrete manhole sections of the diameter indicated on drawings. Use various lengths of polymer concrete manhole sections in combination to provide correct height with the fewest joints.
- E. Design wall sections for depth and loading conditions with wall thickness as designed by polymer concrete manufacturer.
- F. Provide tops to support AASHTO HS-20 or HL-93 or vehicle loading or loads as required and receiving cast iron frame covers or hatches, as indicated on drawings.

- G. Manholes shall be designed with sufficient bottom anchorage and side friction to resist buoyancy. Field cast floatation collars are acceptable.

2.02 DESIGN CRITERIA:

- A. Polymer Concrete Manhole risers, cones, flat lids, grade rings and manhole base sections shall be designed by manufacturer to meet the intent of ASTM C 478 with allowable compositional and sizing differences as designed by the polymer concrete manufacturer.
 - 1. AASHTO HS-20 or HL-93 design or as required loading applied to manhole cover and transition and base slabs
 - 2. Polymer manholes will be designed based upon live and dead load criteria in ASTM C 857 and ACI 350-06
 - 3. Unit soil weight of 120 pcf located above portions of manhole, including base slab projections
 - 4. Internal liquid pressure based on unit weight of 63 pcf
 - 5. Dead load of manhole sections fully supported by polymer concrete manhole base

2.03 DESIGN:

- A. Polymer Concrete Manhole risers, cones, flat lids, grade rings and manhole base sections shall be designed by manufacturer to meet loading requirements of ASTM C 478, ASTM C 857 and ACI 350-06 as modified for polymer concrete manhole design as follows:
 - 1. Polymer Concrete Mix Design shall consist of thermosetting resin, sand, and aggregate. No Portland cement shall be allowed as part of the mix design matrix.
 - 2. All aggregate, sand and quartz powder shall meet the requirements of ASTM C 33, where applicable. All sand and aggregate shall be inert in an acidic environment
 - 3. Reinforcement
 - a. Steel reinforcement per ASTM C 478, or
 - b. Acid resistant reinforcement (FRP Bar) in accordance with ACI 440.1R-06 as applicable for polymer concrete design
 - 4. Thermosetting Resin
 - a. The resin content shall not be less than 7% of the weight of the sample as determined by test method D 2584.
 - b. Resin selection shall be suitable for applications in the corrosive conditions to which the polymer concrete manhole structures will be exposed.
 - c. Resin additives such as curing agents, pigments, dyes, fillers and thixotropic agents, when used, shall not be detrimental to the structural or corrosion resistance properties of the manhole.
 - 5. Each polymer concrete manhole component shall be free of all defects, including indentations, cracks, foreign inclusions and resin starved areas that, due to their nature and degree or extent, detrimentally affect the strength and serviceability of the component part. Cosmetic defect shall not be cause for rejection. The nominal internal diameter of manhole components shall not vary more than 2%. Variations in height of two opposite sides of risers and cones shall not be more the 5/8 inch. The under run in height of a riser or cone shall not be more than 1/4 in/ft of height with a maximum of 1/2 inch in any one section

6. Marking and Identification - Each manhole shall be marked with the following information - Manufacturer's name or trademark, Manufacturer's location and Production Date
7. Manhole joints shall be assembled with a bell/spigot or shiplap butyl mastic and/or gasketed joint so that on assembly, manhole base, riser and top section make a continuous and uniform manhole. Joint sealing surfaces shall be free of dents, gouges and other surface irregularities that would affect joint integrity
8. Minimum clearance between wall penetrations and joints shall be per manufacturer's design
9. Construct invert channels to provide smooth flow transition with minimal disruption of flow at pipe-manhole connections. Invert slope through manhole is as indicated on drawings. All precast base sections to be cast monolithically. Polymer bench and channel are to be constructed with all polymer concrete material. Extended ballast slab requirements for buoyancy concerns can be addressed with cementitious concrete material
10. Provide resilient pipe to manhole connectors conforming to requirements of ASTM C 923 or other options as available. All connectors are to be water tight. Install approved resilient connectors at each pipe entering and exiting manholes in accordance with manufacturer's instructions.

2.04 GROUTING

- A. All materials needed for grouting and patching will be a polyester mortar compound provided by the manufacturer or an approved equal by the manufacturer

2.05 MANUFACTURER

- A. Manufacturer of precast polymer concrete items shall employ manufacturing methods and material formulation in use for a minimum of five years. Submit manufacturer references with materials data.
- B. Manufacturers:
 1. Armorock LLC, Boulder City, Nevada, www.armorock.com
 2. U.S. Composite Pipe, a division of Thompson Pipe Group, Alvarado, Texas, www.uscompositepipe.com
 3. iNTERpipe, Des Moines, Iowa, www.polymerpipe.com
 4. Or approved equal

2.06 ACCESS HATCH

- A. Access hatch frames and covers shall be fabricated aluminum with stainless steel hardware, 2-leaf design with integral fall protection grating.
 1. Flygt Safe-Hatch
 2. Bilco JDAL-H20
 3. Or approved equal.
- B. Covers shall be fabricated with supports to resist deflection.

- C. All covers shall be hinged providing access to the entire vault. Covers shall have spring hydraulic assists.
- D. All covers shall be equipped with a hold-open mechanism with safety chains.
- E. All covers shall be equipped with a flush, locking device with locking eyes up.
- F. All covers must be H20 traffic rated for equipment or vehicle loading.

2.07 MANHOLE FRAMES AND COVERS

- A. Provide manhole frames and covers per Section 33 05 61.

2.08 CAST-IN-PLACE CONCRETE BASE

- A. Provide cast-in-place concrete base for cast-around manholes per Section 33 05 61. Provide ring-form to create top channel sized to receive manhole barrel.
- B. Cast-in-place bases shall be epoxy-coated per Section 09 90 00.

2.09 INSIDE DROP BOWL

- A. Provide inside drop bowl system at inlet pipe, as indicated on the drawings.
- B. Drop bowl system shall consist of drop bowl, drop pipe and stainless steel pipe brackets.
- C. System shall be Reliner as manufactured by Duran, Inc., or approved equal.
- D. Drop bowl may be field mounted or pre-mounted at casting facility.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The installation of wet wells shall be in accordance with the project plans and specifications and the manufacturer's recommended practices.
- B. Handling: Properly rated slings and spreader bar shall be used for lifting. The type of rigging used shall be per the manufacturer's recommendation.
- C. Place the precast polymer concrete base and install all lateral pipes as shown on the plans into flexible connectors per flexible connector manufacturer's instructions.
- D. Place manhole section plumb and level, trim to correct elevations, as follows:
 - 1. All joint surfaces of precast sections and surface of manhole base shall be thoroughly inspected for damage and cleaned prior to setting precast sections. The sections shall be set in preformed plastic sealing gaskets.
- E. Jointing:

1. Sealing surfaces and joint components shall be inspected for damage and cleaned of all debris.
 2. Joint sealants shall be installed in accordance to the manufacturer's instructions. Handling of barrel sections after the sealant has been affixed shall be carefully controlled to avoid bumping the gasket and thus displacing it or contaminating it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced if damaged and repositioned if displaced.
 3. Apply joint lubricant to elastomeric seals. Use only lubricants approved by the manufacturer.
 4. Care shall be taken to properly align the manhole section with the previously set section before it is lowered into position.
 5. Placement and compaction of surrounding backfill material shall be applied so as to provide sufficient and equal side pressure on the manhole.
- F. Before any work is started on adjusting or repairing a manhole, the channels in the base shall be covered with strips of wood and the entire base covered with a heavy piece of canvas. This cover shall be kept in place during all work. Upon completion of the WORK the wood strips and the canvas shall be removed from the manhole allowing no debris to fall or remain in the manhole.

3.02 COLD JOINT PIPE PENETRATIONS

- A. Where required, cold joint pipe penetrations shall be grouted using a corrosion resistant grout and a rubber water stop grout ring.

3.03 LEAKAGE TESTING

- A. Water tightness of wet well shall be tested in connection with tests of sanitary sewers and manholes, or at the time the manhole is completed and backfilled.
- B. Perform leakage test per the requirements of Section 33 05 05.33.

3.04 DEFECTIVE POLYMER CONCRETE AND REPAIRS

- A. Precast polymer concrete showing cracks, rock pockets, voids, spalls, or other defects that adversely affect the structural adequacy of the manhole shall be considered defective.
 1. The Engineer shall be the arbiter as to whether polymer concrete is defective.
- B. Defective polymer concrete resulting from improper casting or curing shall be repaired or replaced at the plant prior to shipment.
 1. All damaged polymer concrete surfaces shall be inspected and any pour joints, voids, rock pockets, tie holes, etc. shall be patched at one time.
- C. Damaged polymer concrete that results from transportation, handling, or storage after the piece has left the plant shall be repaired or replaced at no expense to the Owner, in accordance with the manufacturer's recommendations.

3.05 INSIDE DROP BOWL

A. Installation shall be in accordance with manufacturer requirements.

END OF SECTION

SECTION 33 11 00

GENERAL PIPING REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. General requirements for piping systems, including pipe, joints, fittings, and valves.
 - 2. Pressure testing
- B. Related Sections:
 - 1. Section 02 01 00 – Existing Facilities
 - 2. Section 09 90 00 – Painting and Coating
 - 3. Section 31 23 00 – Trenching, Backfilling and Compacting
 - 4. Section 33 11 13.15 – Ductile Iron Pipe and Fittings
 - 5. Section 33 11 13.90 – Thrust Restraint
 - 6. Section 33 31 13 – Sanitary Sewer Pressure Piping
 - 7. Section 33 12 16 – Manual Valves
 - 8. Section 40 92 13 – Automatic Valves

1.02 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI)
 - 1. ANSI A13.1 – Piping and Piping Systems
 - 2. ANSI A31.1 – Power Piping ASME
 - 3. NSF 61 – Listing of Certified Drinking Water System Components – Health Effects
- B. American Society of Mechanical Engineering (ASME) – Boiler and Pressure Vessel Code
- C. California Plumbing Code (CPC)
- D. American Waterworks Association (AWWA)
 - 1. AWWA C116 Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
 - 2. AWWA C210 – Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
 - 3. AWWA C600 Installation of Ductile Iron Water Mains and Their Appurtenances
 - 4. AWWA C605 Underground Installation of PVC and Molecularly Oriented PVC Pressure Pipe and Fittings
 - 5. AWWA C900 PVC Pressure Pipe and Fabricated Fittings
 - 6. AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 Inch through 65 Inch

1.03 SUBMITTALS

- A. Submit in accordance with Section 01 30 00.
- B. Catalog cuts and product information showing materials and dimensions.
- C. Hydrostatic testing plans
- D. Operation and Maintenance manuals

PART 2 - MATERIALS

2.01 PIPE, FITTINGS, AND GASKETS

- A. Replacement of any pipe, fitting, and gasket shall be in-kind or equal.
- B. Ductile Iron Pipe and Fittings shall be as specified in Section 33 11 13.15.
- C. HDPE Pressure Pipe and fittings shall be as specified in Section 33 31 00.
- D. Mechanical joint restraints shall be EBAA Megalug or equal.

2.02 VALVES

- A. Valves shall be as specified in Section 33 12 16 and Section 40 92 13.
- B. Multiple brands for same type of valve will not be accepted.

2.03 COATINGS

- A. All above-ground pipe, valves and fittings shall be epoxy-coated, colored green for sewer service per Section 09 90 00.
- B. New equipment shall receive final finish coats at the factory in accordance to AWWA C116. Each coat of paint shall be of the consistency as specified by the paint manufacturer, or thinned as necessary, and applied in accordance with the manufacturer's written instructions. Work shall be free from "runs", "bridges", "shiners", or other imperfections. Care shall be taken to obtain a uniform, unbroken coating over welds, edges and corners. Weld splatter shall be removed and all welds neutralized with thinner. Blasted surfaces shall be coated within four hours of being sandblasted. All dust shall be removed from surfaces prior to coating.
- C. All surfaces to be coated or painted shall be in the specified condition to receive the material before any coating or painting is performed. Follow manufacturer's instructions. During and after final application of protective coatings, all metal surfaces shall be checked mechanically with an Elcometer, Mikrotest, or other approved dry film thickness gage to insure that the specified dry film thickness has been attained. Coating testing and repair of damages, flawed areas, holidays, or mishaps shall conform to applicable AWWA standards.

- D. Care shall be taken to prevent damage to coated surfaces during shipment. Any coatings damaged during shipment shall be refinished as the original at no extra cost to the Owner.
- E. Coatings shall be guaranteed for a period of one year following the date of final acceptance by the Owner.

2.04 BURIED PIPING WARNING TAPE

- A. Plastic warning tape shall be an inert plastic film specifically formulated for prolonged underground use. The minimum thickness shall be 4 mils and the minimum width of the tape shall be 6 inches. Printing shall be a minimum of 2-inch block letters.
- B. Warning tape for domestic water pipelines shall be blue with black printing having the words "CAUTION: DOMESTIC WATER-LINE BURIED BELOW."
- C. Warning tape for sanitary sewer pipes shall be green with black printing having the words "CAUTION: SANITARY SEWER BURIED BELOW."
- D. Warning tape for recycled water pipelines shall be purple with black printing having the words "CAUTION: RECYCLED WATER-LINE BURIED BELOW."

PART 3 - EXECUTION

3.01 GENERAL

- A. Location: Install piping to the line and grade as shown on the Drawings, except for adjustments to avoid existing features.
- B. Confirm dimensions at the Project Site prior to pipe fabrication.
- C. Contractor shall take all measures necessary to maintain the existing sewer mains and services in operation until completion of the pipeline construction.

3.02 PIPING INSTALLATION

- A. Trenching
 - 1. The Contractor shall bear full responsibility for safety related to his trenching operations.
 - 2. Trenching, bedding, and backfill operations including but not limited to, pavement cutting and restoration, excavation, shoring, and steel plates shall be in accordance with Section 31 23 00. Insofar as practicable and at all times on grades in excess of 1-foot horizontal to 10-foot vertical (10 percent), trenching and pipe-laying operations shall proceed uphill from the lowest point with the bell end leading.
- B. Daily Limits - The Contractor shall excavate only that length of trench in which he can safely and properly install pipe and backfill daily. No trenches may be left open when the Contractor is not actively prosecuting work related to that trench. To facilitate the prosecution of the work, the Contractor may request to use plates to cover open trenches. The use of steel plates shall be dependent upon the prior approval of the Engineer.

C. Handling and Placing

1. Handle pipe, fittings, and appurtenances in such a manner as to insure delivery to the Project Site in a sound, undamaged condition. Take particular care not to injure linings and coatings and to keep the pipe clean. Load and unload these items using hoists in a manner to avoid shock or damage. Under no circumstances shall they be dropped, skidded, or rolled against other pipe.
2. Repair damaged items to the satisfaction of the Engineer. Set aside damaged items that cannot be repaired and remove from Project site within 24 hours.
3. The Contractor shall employ such devices and equipment as will enable the pipe to be transported, stored, and installed in its final location or configuration, as provided for in the Contract Documents.
4. Pipe to be installed in trenches shall be lowered into the trench using lowering slings and other devices that will prevent an uncontrolled drop into the trench. Compacted bedding material conforming with Section 31 23 00 shall be installed in the bottom of the trench and compacted prior to placing pipe in the trench. Bell holes shall be excavated such that the pipe is fully supported by the pipe barrel. Pipe shall not be permitted to be supported solely by the bells. Where the Contract Documents call for or the Contractor elects to use sand/cement slurry backfill material, the pipe shall be supported on wooden blocks or other supports on each side of every joint. An additional block at mid-span shall be used for PVC pipe. Such blocks shall be of such dimension as to raise the pipe high enough to clear the bells and long enough to span at least 2/3 of the trench width. Wooden blocks shall be redwood or pressure treated timber.

- D. Locator Wire - A wire to be used for future subsurface location shall be installed concurrent with pipe laying operations. The wire shall be a minimum of 12 gauge THW or THWN solid copper wire and shall be continuous for the entire length of pipe laid. The wire shall be secured to the pipe by either tape, mastic, or looping at a maximum interval of 12 feet. Connections between lengths of wire shall be made either by crimp connectors, or wire nut connectors. Each connection shall be at least double-wrapped with PVC electrical tape with each turn lapping the previous turn by at least 50-percent. The wire shall be brought to the surface in each valve box with at least 2 feet of wire more than that required to reach the surface. The wire shall be protected during backfilling operations to prevent displacement or continuity breaks. Any damage to the locator wire shall be immediately repaired.

E. Installation of Pipe Warning Tape

1. Warning tapes shall be installed a minimum 1-foot above and centered on the pipe. The warning tape shall be installed continuously for the length of the pipe and shall be fastened to valve stem casings or other vertical appurtenances by plastic adhesive tape.
2. Warning tape is not required for pipes installed by trenchless methods.

F. Valves

1. Clean valves of foreign material and inspect in open and closed positions prior to installation
2. Unless otherwise indicate, install valves with operating stem vertical. Mount horizontal valves in such a manner that adequate clearance is provided for operation.

3. Clean flange faces prior to installing flanged valves. After cleaning, insert gasket and nuts, tighten progressively and uniformly. If flanges leak under pressure, loosen nuts, reseal or replace gasket, retighten nuts, and retest joints.
4. Test valves in same manner as specified for piping systems. Protect parts of valves that could be damaged during pipeline test. Joints shall be watertight at specified test pressures. Repair any damage to valves.

G. Bolting Procedures

1. Description - All fittings, joints, assemblies, valves, and miscellaneous special fittings shall be installed in accordance with this Section. The required torque shall be as specified in the Contract Documents, the referenced specifications, and the manufacturer's recommendations.
2. Contractor shall have a calibrated torque wrench on site at all times.
3. Procedure
 - a. The pipe and fitting (or fittings) shall be carefully aligned using slings, blocks, jacks, or other means necessary to establish and maintain the correct alignment. Under no circumstances shall the bolts be used to achieve the correct alignment. As the bolts are inserted through the flange the gasket shall be inserted between the mating faces of the fitting and pipe.
 - b. After taking up the free slack in the nuts, the Contractor shall tighten each bolt in opposing succession taking multiple passes to achieve the proper. Opposing succession is hereby defined as tightening the first nut then the nut diametrically opposed to the first and proceeding either clockwise or counterclockwise in this manner around the circumference of the joint until the required torque is achieved. In no case shall the Contractor tighten the nuts in direct sequence or over-tighten any nut with respect to its opposing mate.
 - c. During the tightening operation and again upon completion of the tightening operation, the space between the mating faces of the fitting and pipe shall be inspected for evidence of non-parallel assembly. The tolerance for parallel assembly shall be 1/16-inches for mechanical joint faces and 1/32-inches for flanged faces. Other fittings and faces shall be within the tolerance recommended by the manufacturer. If the space is non-parallel in excess of such tolerance, the joint shall be completely disassembled and the installation repeated. The gasket shall be inspected for damage prior to retightening the bolts. If the mating faces of the fitting and pipe cannot be brought into parallel alignment the joint shall be disassembled, the pipe removed, the gasket replaced, and the assembly repeated.
 - d. Upon completion of the bolting operation between elements of the fittings and joints, the Contractor shall tighten all thrust restraint gripping surfaces in the same manner of opposing succession. The thrust restraining follower gland shall be tightened to the recommended torque as recommended by the manufacturer. The twist-off nut shall be considered as a safety mechanism to prevent damage from excessive torsional forces. The shear capability shall not be used in lieu of proper tightening, including the use of limiting torque wrenches.
 - e. All bolts on the fittings or joint, including those of the thrust restraining devices, shall be subject to a torque test by the Engineer. If any bolts are found to be under- or over-torqued or in any way evidencing damage, the Engineer may direct their readjustment or replacement in accordance with the provisions of this Section.
 - f. Upon completion of the bolting operation, all buried fittings shall receive a liberal coating of bitumastic type material (Protecto Wrap 160/160H, Tapecoat Brush-

Applied Coating, Christy's HD-50 Coal Tar Coating, or approved substitute). This coating shall be thoroughly worked into the spaces between joint faces, under and around bolts and nuts, and on all surfaces that will be in soil contact. The coating shall be allowed to attain an initial set prior to commencing any backfill operations and in no case shall backfill operations commence less than 1-hour after coating is completed.

3.03 HYDROSTATIC PRESSURE TESTING

- A. Hydrostatic pressure testing is required for pressure pipeline segments only (force main and pump system piping).
- B. Upon completion of pipeline construction, the Contractor shall fill the pipeline with water from an approved source. All work involved in hydrostatic testing of pipelines shall conform to the requirements of AWWA C600, AWWA C605 and the provisions of the Contract Documents.
- C. The Contractor shall provide all pumps, fittings, labor, equipment, and materials and all assistance necessary, including but not limited to, temporary thrust restraint and connection to the supplying water source for the hydrostatic testing of all pipelines. Hydrostatic testing shall be performed in the presence of the Owner's Inspector. Test pressures shall be a minimum of 150 psi or 150-percent of the service pressure for the pipeline, whichever is the greater.
- D. Test pressures shall be held for a minimum of 2 hours or that period of time provided for in the Contract Documents. During the hydrostatic test the pressure shall not be allowed to vary more than 5 psi above or below the required test pressure. Pressure variances outside the allowable range shall be considered a failed test. Tests shall not be held against closed line valves without the prior approval of the Engineer and all hydrant valves shall be open. Where service lines have been installed prior to conducting the hydrostatic test, the service line to the meter stop shall be included in the test. An additional allowance of 0.0078 gph/inch of service line diameter may be included for each service line included in the hydrostatic test in the calculation of allowable leakage in such cases.
- E. Upon completion of pipeline construction all pressure pipelines shall be hydrostatically tested and observed for leaks. The Contractor shall schedule the hydrostatic test with the Engineer at least two (2) days in advance of the test. The pipelines or pump suction barrels shall be filled and carefully brought to the test pressure. Failure of any portion of the system shall be cause for rejection and the Contractor shall promptly identify and correct the deficiencies causing the failure. The hydrostatic test shall be repeated until a satisfactory test is achieved. All visible leaks shall be promptly repaired regardless of the actual leakage measured.
- F. This procedure shall be followed until an acceptable test is achieved. The Contractor may be charged for the Engineer's time for reinspection for all tests after the first retest in accordance with the General Conditions.
- G. Allowable Leakage - The allowable leakage will be calculated by the following formula:

$$L_a = (LD\sqrt{P})/148,000$$

where: L_a = Allowable leakage

L = Length of the pipe run

D = Nominal diameter of the pipe in inches

P = Test pressure

- H. Flanged above-grade pipe shall have no leakage allowance. Contractor shall correct all visible leakage.
- I. The allowable leakage for differing lengths of pipe runs and higher test pressures will be provided for in the Contract Documents or by direction of the Engineer. The allowable leakage for test sections of differing diameters will be calculated as the sum of the computed leakage for each size.
- J. Equipment - The Contractor shall provide a test pump capable of supplying 250 psi static pressure, a means of adding replacement water during the test, and gauges and meters to monitor the pressure and replacement water used.

END OF SECTION

SECTION 33 11 13.15

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes materials, installation, and testing of ductile-iron pipe and fittings.
- B. Related sections:
 - 1. Section 01 57 20 – Erosion and Sediment Control
 - 2. Section 31 23 00 – Trenching, Backfilling and Compaction
 - 3. Section 33 11 00 - General Piping Requirements
 - 4. Section 33 12 16 – Manual Valves

1.02 REFERENCED CODES AND STANDARDS

- A. American Water Works Association (AWWA), latest edition:
 - 1. C104 – Cement Mortar Lining for Ductile-Iron Pipe and Fittings
 - 2. C105 – Polyethylene Encasement for Ductile –Iron Pipe Systems
 - 3. C110 – Ductile-Iron and Gray-Iron Fittings
 - 4. C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - 5. C115 – Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
 - 6. C150 – Thickness Design of Ductile Iron Pipe
 - 7. C151 – Ductile-Iron Pipe, Centrifugally Cast
 - 8. C600 – Installation of Ductile-Iron Water Mains and Their Appurtenances
 - 9. C606 – Grooved and Shouldered Joints
- B. NSF International
 - 1. 60 – Drinking Water Treatment Chemicals – Health Effects
 - 2. 61 – Drinking Water System Components – Health Effects

1.03 APPROVED MANUFACTURERS

- A. Fittings
 - 1. US Pipe
 - 2. Tyler
 - 3. Sigma
 - 4. Or equal
- B. Pipe
 - 1. U.S. Pipe
 - 2. Pacific States

3. American Pipe
 4. Or approved equal
- C. Gaskets
1. Tripac 2000
 2. US Pipe
 3. John Crane Co.
 4. Or equal

1.04 USE OF GRAY-IRON FITTINGS

- A. Gray-iron fittings may not be substituted for ductile-iron.

1.05 SUBMITTALS

- A. Contractor shall provide submittals for review and approval by the Engineer in accordance with Section 01 30 00.
- B. Provide shop drawings or catalog cuts for all work and materials included in this Section.

PART 2 - PRODUCTS

2.01 DUCTILE-IRON PIPE

- A. Pressure class or thickness class of DIP shall be determined by the design method detailed in AWWA C150 the "Thickness Design Method."
- B. Ductile-iron pipe shall be manufactured in accordance with AWWA C151.
- C. All ductile-iron pipe shall be pressure class 350 for bell and spigot pipe. Flanged pipe shall be thickness class 53 unless indicated otherwise.
- D. All ductile iron pipe and fittings in sewer applications shall be polyurethane or polyethylene lined and coated.
- E. All buried ductile iron pipe shall have a factory applied bituminous coating of not less than 1 mil. in thickness.
- F. All exposed above-grade ductile iron pipe shall be epoxy-coated per Section 09 90 00.
- G. Unless otherwise called out on the plans, a "push-on" type joint shall be used. The joint dimensions and gasket shall be as specified in AWWA C111.
- H. Where restrained joints are called, push-on joints shall be restrained with locking gasket rated for 250 psi operating pressure for DIP.
- I. Flanges for ductile-iron pipe shall be the "screwed-on" type in accordance with AWWA C115.
- J. Outlets for DIP shall be as follows:

- | | | |
|----|----------------------|------------------------------------|
| 1. | 2" or smaller: | bronze service saddle |
| 2. | 2-1/2": | tapped tee or service saddle |
| 3. | 4" to 8" and larger: | D.I. tee fitting or service saddle |
| 4. | 12" and larger | D.I. tee fitting |

2.02 DUCTILE-IRON FITTINGS FOR PVC AND DUCTILE IRON PIPE

- A. Except as otherwise indicated on the drawings, all fittings on pipelines and piping assemblies shall be manufactured of ductile iron in accordance with the provisions of AWWA C110 and C153. The interior of the fitting shall be lined with polyurethane or polyethylene rated for sanitary sewer service. The exterior shall be coated with 100% solids epoxy.
- B. The body of the fitting shall be free of blows, sand pits, abrasions deeper than 10 percent of the material thickness, cracks, and other defects that adversely affect the performance of the fitting under pressure in-situ or the corrosion potential of that fitting. Likewise the coatings shall be free of chips, holes, abrasions, and scratches that reduce the thickness of the coating below the tolerances specified herein.
- C. Evidence of such defects or damage shall be cause for rejection of the fitting and the Contractor shall replace such defective or damaged fittings at no cost to the Owner.
- D. Push-on to push-on fittings shall not be used unless restraints are provided as described below.
- E. Restrained fittings shall be used where a thrust block is not specified. Where restrained joints are called, push-on joints shall be restrained with locking gasket rated for 250 psi operating pressure for DIP. Push-on joints shall be restrained with a mechanical type bell restraint for C-900 PVC pipe. Mechanical joint restraints shall be EBBA IRON, INC., MEGALUG, UNIFLANGE Series 1400, or approved equal. Flanged fittings may be used.
- F. Unless otherwise indicated on the drawings, all fittings with flanged ends shall be ductile iron class 150. The gasket surface shall have a serrated finish of approximately 16 serrations per inch, approximately 1/32-inch deep, with serrations in either a concentric or spiral pattern. All flanges shall be flat faced. In addition, all flanges shall meet the following tolerances:

1.	Bolt circle drilling	$\pm 1/16$ inch
2.	Bolt hole spacing	$\pm 1/32$ inch
3.	Eccentricity of bolt circle and	$\pm 1/32$ inch
4.	Maximum facing with respect to bore	$\pm 1/32$ inch

2.03 JOINTS

- A. Joints on fittings used in subsurface installations of transmission and distribution pipelines shall be mechanical joint or flanged type, as provided for in the Contract Documents, conforming to the requirements of AWWA C111. In piping assemblies, both subsurface and above grade, the joints shall be either mechanical joint or flange type conforming with the requirements of AWWA C110, C111, and C153 as provided for in the Contract Documents.

- B. Mechanical Joints - Each mechanical joint shall be supplied with an SBR gasket. The retainer or follower gland shall be replaced with a thrust restraining follower gland in accordance with the provisions of Section 33 11 13.90, Thrust Restraint.

2.04 GASKETS

- A. Gaskets for flanged joints shall be 1/8-inch thick, cloth-inserted rubber. Full face type gaskets with pre-punched holes shall be used where both flanges are flat face. Ring gaskets, 1/8-inch thick vulcanized butadiene rubber (SBR) or neoprene rubber gasket conforming with the provisions of AWWA C110, extending to the inner edge of the bolts may be used where a raised face flange is present.
- B. Rubber gaskets for push-on and mechanical joints shall be vulcanized butadiene rubber (SBR) manufactured in accordance with AWWA C111.

2.05 BOLTS AND NUTS

- A. All bolts and nuts shall be:
 - 1. High-strength, low carbon steel conforming with ASTM A307, galvanized after fabrication, or
 - 2. Type 316 stainless steel conforming to ASTM F593 G or H for bolts, and ASTM F594 with Tripac 2000 Blue Coating for nuts.
- B. Mechanical joint bolts (tee bolts) shall be 3/4-inches in diameter and be furnished for each joint in accordance with AWWA C110, AWWA C111, and AWWA C153.
- C. The length of each bolt or stud shall be such that between 1/4 inch and 3/8 inch will project through the nut when drawn tight.
- D. All bolts and nuts which are not type 316 SS shall be coated with Christy HD-50 Bituminous Coal-Tar Coating after installation.

2.06 PLASTIC FILM WRAP

- A. All ductile-iron pipe and fittings buried underground shall be protected with plastic film wrap in accordance with AWWA C105, unless noted otherwise below. Wrap shall be a loose polyethylene tube, either 8-mil thickness of linear low-density PE or 4-mil thickness of high-density cross-laminated PE. All joints between plastic tubes shall be wrapped with 2-inch-wide polyethylene adhesive tape, Polyken 900, Scotch wrap 50, or approved equal.

2.07 LUBRICANTS

- A. Lubricant for pipe insertion shall be NSF food grade and biodegradable.

2.08 POLYETHYLENE LINING FOR SEWER APPLICATIONS

- A. Lining material for ductile iron pipe and fittings (sewer applications) shall be virgin polyethylene complying with ASTM D1248 and bonded to the interior of the pipe fittings by heat process. The lining material shall be compounded with inert filler and a compound which resists ultraviolet light.

- B. The lining shall cover the interior surface of the pipe/fitting from the lain or beveled end to the rear of the gasket socket. The lining thickness shall be not less than 20 mils. The lining may taper at the ends, starting at 4 inches from the edge of the pipe. The minimum thickness at the end of the taper shall be 10 mils.
- C. Each pipe shall be guaranteed against separation of the lining from the pipe. Random checks for operation will be made during construction and any indication of separation shall be cause for rejection. The test method shall be mutually agreed upon by the contractor and the Owner.

2.09 POLYURETHANE LINING SYSTEM

- A. The lining material shall consist of a liquid-applied polyurethane coating especially formulated for use as a protective lining of pipelines carrying sewage. The material shall be Corropipe II Wasteliner or approved equal. The dry film thickness (DFT) of the lining shall be 40 mils (0.040 inch) nominal.
- B. In order to minimize potential dimensional and assembly problems, the coating thickness on sealing areas in the bell socket interior and on the spigot end of the pipe exterior shall be 8 mils (0.008 inch) nominal with a maximum of 10 mils (0.010 inch). Thicker coatings in these areas are acceptable if it is demonstrated that joint dimensions are within allowable tolerances after coatings.
- C. The lining material shall be applied to the pipe and fittings by an applicator certified or approved by the coating manufacturer. The coating shall be holiday tested with a high voltage tester at 50 volts/mil of material thickness. The material shall be applied and repaired to the pipes and fittings in strict accordance with the manufacturer's requirements with no exceptions. Owner shall be notified five (5) days in advance of the coating installation for factory inspection during the application of the material.
- D. All field cut ends shall be repaired and sealed prior to installation per the manufacturer's recommendations.

2.10 EPOXY COATING SYSTEM

- A. Epoxy lining and coating of valves shall be per AWWA C550 and Section 33 12 16 Manual Valves. All valves shall be lined and coated by manufacturer.
- B. Surfaces to be epoxy coated shall follow the surface preparation requirements as recommended by the manufacturer.
- C. Surfaces shall be coated with organic zinc primer to a dry film thickness of 3 mils.
- D. Apply two coats of epoxy paint (4 mils each) to the primed surface. The manufacturer's recommended drying time between coats shall be followed.
- E. Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch up painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix

additional components for reasons of color or otherwise, even within the same generic type of coating.

PART 3 - EXECUTION

3.01 GENERAL

- A. Ductile-iron pipe and ductile iron fittings shall be installed in accordance with the applicable Sections of AWWA C600 and as specified herein.

3.02 TRENCHING, BACKFILLING, AND COMPACTING

- A. Trenching, backfilling, and compacting shall be in accordance with Section 31 23 00 and as specified herein.
- B. Backfill within the pipe zone, including the pipe base, shall be imported sand placed and compacted in accordance with Section 31 23 00.
- C. Backfill within the trench zone shall be native earth backfill placed and compacted in accordance with Section 31 23 00.

3.03 PLACEMENT OF PIPE IN TRENCH

- A. Lay pipes uphill if the grade exceeds 10%.
- B. The radius of curvature of the trench shall determine the maximum length of pipe section that can be used without exceeding the allowable deflection at a joint. Combined deflections at rubber gasket, restrained joint, deflection coupling or flexible coupling joints shall not exceed 2 degrees or that recommended by the manufacturer, if smaller.
- C. The manufacturer's printed installation guide outlining the radius of curvature that can be negotiated with pipe sections of various length and the deflection couplings shall be followed if applicable.
- D. The pipe shall be laid true to the line and grade shown on the plans within acceptable tolerances. The tolerance on grade is 1 inch. The tolerance on line is 2 inches.
- E. Pipe shall not be stabbed past the pipe manufacturer's pipe insertion line. Contractor shall mark new insertion lines where original spigot end is cut off.
- F. Wrap ductile-iron pipe and fittings with plastic film wrap in accordance with AWWA C105.
- G. Fittings shall be supported independently of the pipe.
- H. Until thrust blocks and supports are poured, fittings shall be temporarily supported by placing wooden skids under the bells so that the pipe is not subjected to the weight of the fitting.

- I. All exposed flanges and other metal surfaces and all damaged coatings shall be coated after assembly with a mastic, 3M, Minnesota Mining and Manufacturing EC 244, or an approved equal. Stainless steel bolts shall not be coated.
- J. Where locking gaskets are used to restrain push-on joints, the pipe bell shall be stenciled "Locking Gasket."

3.04 MECHANICAL JOINTS

- A. Mechanical joints shall be installed in accordance with the manufacturer's recommendation and Section 33 11 00. The fitting shall be thoroughly cleaned of all dirt, debris, or other deleterious material and inspected prior to incorporation into the work.
- B. The pipe end shall be beveled with a grinding tool or rasp file to facilitate the assembly of the joint. The restraining follower gland shall be slipped over the end of the pipe followed by the gasket. The Contractor shall take care that the restraining follower gland and gasket are installed in the correct alignment and that the gasket is not forced onto the pipe or otherwise damaged.
- C. The pipe end shall then be inserted into the joint to the tolerance required by AWWA C110, C111, and C153. The pipe shall be aligned as straight as field conditions permit but in no case shall the pipe be deflected in excess of 3 degrees (5/8-inch per foot) or that maximum deflection recommended by the manufacturer, whichever is the lesser. The gasket shall then be inserted into the gasket seat taking care not to force or otherwise damage the gasket. Once the gasket is fully and evenly seated in the gasket space, the follower gland shall be aligned with the mating face of the fitting and the bolts inserted and the nuts threaded onto the bolts.
- D. All bolting shall be performed in accordance with the provisions of Section 33 11 00, General Piping Requirements.

3.05 FLANGED JOINTS

- A. Flanged joints shall be installed in accordance with the manufacturer's recommendation and Section 33 11 00. The fitting shall be thoroughly cleaned of all dirt, debris, or other deleterious material and inspected prior to incorporation into the work.
- B. The pipe and fitting shall be carefully aligned using slings, blocks, jacks, or other means necessary to establish and maintain the correct alignment. Under no circumstances shall the bolts be used to achieve the correct alignment. As the bolts are inserted through the flange the gasket shall be inserted between the mating faces of the fitting and pipe.
- C. Bolt holes of flanges shall straddle the horizontal and vertical centerlines of the pipe run.
- D. Clean flanges by wire brushing before installing gasket.
- E. Clean flange bolts and nuts by wire brushing, lubricate threads with anti-seize compound, and tighten nuts uniformly and progressively. Between 1/4 inch and 3/8 inch shall project through the nut when drawn tight.

- F. All bolting shall be performed in accordance with the provisions of Section 33 11 00, General Piping Requirements.
- G. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reseal or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

3.06 ANCHORS AND THRUST BLOCKS

- A. Concrete anchors and thrust blocks shall be poured against wetted undisturbed soil in accordance with Section 33 11 13.90 and as shown on the Drawings.

3.07 PIPE SUPPORT

- A. All exposed pipe shall be supported as detailed in the plans.

3.08 TESTING

- A. All pressure piping shall be hydrostatically pressure tested in accordance with Section 33 11 00.

3.09 TAPPING

- A. Direct tapping of DIP shall not be allowed. All taps shall include a saddle with two-straps.

END OF SECTION

SECTION 33 11 13.90

THRUST RESTRAINTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes materials, installation, and testing of thrust restraints for ductile-iron pipe and fittings, PVC pipe and buried valves.
- B. Related sections:
 - 1. Section 03 30 00 – Cast-in-Place Concrete
 - 2. Section 31 23 00 – Trenching, Backfilling and Compaction
 - 3. Section 33 11 00 - General Piping Requirements
 - 4. Section 33 11 13.15 – Ductile Iron Pipe and Fittings
 - 5. Section 33 11 23 – Sewer Force Main Pipe
 - 6. Section 33 12 16 – Manual Valves

1.02 REFERENCED CODES AND STANDARDS

- A. American Water Works Association (AWWA), latest edition:
 - 1. C105 – Polyethylene Encasement for Ductile –Iron Pipe Systems
 - 2. C110 – Ductile-Iron and Gray-Iron Fittings
 - 3. C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - 4. C153 – Ductile-Iron Compact Fittings for Water Service
 - 5. C115 – Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
 - 6. C116 – Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
 - 7. C213 – Fusion-Bonded Epoxy Coatings and Linings For Steel Water Pipe and Fittings
 - 8. C219 – Bolted, Sleeve-Type Couplings for Plain-End Pipe
 - 9. C600 – Installation of Ductile-Iron Water Mains and Their Appurtenances
 - 10. C605 – Underground Installation of PVC and Molecularly Oriented PVC Water Pipe and Fittings
 - 11. C900 – PVC Pressure Pipe and Fabricated Fittings, 4-inch to 60-inch
- B. ASTM
 - 1. A536 – Standard Specification For Ductile Iron Castings
- C. NSF International
 - 1. 61 – Drinking Water System Components – Health Effects

1.03 REQUIREMENT

- A. All pressure pipe shall be restrained against joint separation by the following methods:

1. Welded continuous pipe.
 2. Bolted flanged fittings.
 3. Bell and spigot joints with locking gaskets.
 4. Bell and spigot joints with bell restraint harness.
 5. Bell and spigot joints with concrete thrust anchors/ thrust blocks at valves and fittings, as detailed on the Drawings.
 - a. If the required test pressure for the pipeline exceeds the design pressure listed in the thrust block detail on the Drawings, the Contractor bring the discrepancy to the attention of the Owner and the Engineer for clarification or revision.
 6. Mechanical joint restraints at valves and fittings.
 7. Concrete thrust blocks at valves and fittings where indicated on the Drawings.
- B. Concrete thrust blocks shall be provided where new valves and/or fittings are added to existing bell and spigot type pipelines.
- C. New ductile iron pipelines shall be fully restrained by using locking gaskets at every bell and spigot connection and mechanical restraints at every valve and/or fitting connection.

1.04 SUBMITTALS

- A. Contractor shall provide submittals for review and approval by the Engineer in accordance with Section 01 30 00.
- B. Provide shop drawings or catalog cuts for all materials to be included in the Work. Submittal shall include fittings, gaskets, bolts, coatings and associated hardware.
- C. Provide certificate of NSF-61 compliance for gasket materials and coatings coming into contact with potable water.

PART 2 - PRODUCTS

2.01 LOCKING GASKETS FOR DUCTILE IRON PIPE

- A. Rubber gaskets with embedded steel gripper teeth, rated to hold a minimum pressure of 250 psi, meeting the requirements of AWWA C111.
- B. Manufacturers:
 1. Field-Lok 350 Gasket as manufactured by U.S. Pipe
 2. Sure Stop 350 Gasket as manufactured by McWane Ductile
 3. Fast-Grip Gasket as manufactured by American Ductile Iron Pipe
 4. Or approved equal

2.02 LOCKING GASKETS FOR PVC PIPE

- A. Restrained push-on Rieber style joints meeting requirements of ASTM D3139 with gaskets meeting the requirements of ASTM F477. Locking gaskets shall provide a 2:1 safety factor for the rated pipe pressure.

B. Manufacturers:

1. Eagle Loc 900 Gasket as manufactured by JM Eagle
2. Lok-21 Gasket as manufactured by Diamond Plastics
3. RieberLok Gasket as manufactured by Ransom International
4. Or approved equal

2.03 MECHANICAL JOINT RESTRAINT

A. Design

1. Restraint devices for nominal pipe sizes 3 inch through 54 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110.
2. The devices shall have a working pressure rating of 350 psi for 3-16 inch, 250 psi for 18-48 inch and 200 psi for the 54 inch size. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.
3. An identification number tracing the date and location of manufacture shall be cast into each gland body.
4. Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600/C605, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

B. Material

1. Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.
2. Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.
3. Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.
4. Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

C. Manufacturer

1. Megalug Series 1100 for DIP produced by EBAA Iron Inc. or approved equal.
2. Megalug Series 2000 for PVC produced by EBAA Iron Inc. or approved equal.

2.04 MECHANICAL BELL RESTRAINT

A. Design

1. Ductile iron pipe bell restraint shall consist of a wedge action restraint ring on the spigot joined to a split ductile iron ring behind the bell.
 - a. The restraint ring shall have individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase. The restraint ring and its wedging components shall be made of minimum grade 65-45-12 ductile iron conforming to ASTM A536.
 - b. The wedges shall be heat treated to a minimum hardness of 370 BHN.
 - c. Torque limiting twist off nuts shall be used to insure proper actuation of the restraining wedges.

- d. The split ring shall be made of a minimum grade of 65-45-12 ductile iron conforming to ASTM A536.
 - e. The restraint devices shall be coated using thermosetting epoxy or polyester based powder coating.
 - f. The connecting tie rods that join the two rings shall be made of low alloy steel that conforms to ANSI/AWWA C111/A21.11.
2. Mechanical bell restraint shall require conventional tools and installation procedures per AWWA C600/C605.
 3. The assembly shall have a rated pressure with a minimum 2 to 1 safety factor of 350 PSI in the 16-inch size and below; 250 PSI in the 18 through 36-inch sizes.

B. Manufacturer

1. Megalug Series 1700 restraint harness for DIP, manufactured by EBAA Iron, Inc. or approved equal.
2. Megalug Series 1600 or 2800 restraint harness for PVC, manufactured by EBAA Iron, Inc. or approved equal.

2.05 RESTRAINED FLANGE ADAPTOR

A. Design

1. Restrained flange adapters shall be used in lieu of threaded, or welded, flanged spool pieces. Flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSI/AWWA C110/A21.10.
2. Restraint for the flange adapter shall consist of a plurality of individual actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of gripping wedges.
3. The flange adapter shall be capable of deflection during assembly, or permit lengths of pipe to be field cut, to allow a minimum of 0.6" gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
4. For PVC pipe, the flange adapter will have a pressure rating equal to the pipe.
5. For ductile iron pipe, the flange adapter shall have a safety factor of 2:1 minimum.
6. An identification number tracing the date and location of manufacture shall be cast into each gland body.
7. All wedge assemblies and related parts shall be coated with a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.
8. All casting bodies shall have a polyester based powder coating or thermoset epoxy coating to provide corrosion, impact and UV resistance. Coatings for wetted parts shall meet NSF 61.

B. Manufacturer:

1. Series 2100 MEGAFLANGE adapter, as produced by EBAA Iron, Inc.
2. Restrained Flange Coupling Adaptor, as produced by ROMAC Industries.
3. Or approved equal.

2.06 SLEEVE COUPLING WITH RESTRAINT

A. Design

1. Joint Restraint to prevent axial separation shall be incorporated into the design of the sleeve or coupling used to connect two plain pipe ends.
 2. Sleeve body shall be carbon steel or ductile iron.
 3. The restraint mechanism shall consist of a plurality of individually actuated gripping surfaces to maximize restraint capability.
 4. Torque limiting twist off nuts shall be used to insure proper actuating of the restraint devices.
 5. The restraint devices shall have a polyester based powder coating or thermoset epoxy coating coated using thermosetting epoxy.
 6. Ductile Iron components shall be of a minimum of 65-45-12 ductile iron meeting the requirements of ASTM A536 of the latest revision and shall be tested in accordance with the stated standard.
 7. The restrained joining system shall meet the applicable requirements of AWWA C219, ANSI/AWWA C111 and ASTM D2000.
- B. Manufacturer.
1. Series 3800 Restrained Joining System by EBAA Iron, Inc.
 2. Style 400 RG by ROMAC Industries
 3. Or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install mechanical restraints per the manufacturer's directions, the requirements of Sections 33 11 00 and 33 11 13.15, and the requirements of AWWA C600.

3.02 THRUST BLOCKS AND THRUST ANCHORS

- A. Trenching, backfilling, and compacting shall be in accordance with Section 31 23 00.
- B. Excavate pipe trench and install pipeline and fittings. Tighten all fittings and connections. Brace or support pipe or fittings as needed to prevent displacement.
- C. Excavate the area to receive the thrust block. Concrete anchors and thrust blocks shall be poured against wetted undisturbed soil. Where it is not practical to place the thrust block against undisturbed earth, the fill material placed between the blocks bearing surface and undisturbed soil shall be moisture conditioned and compacted to 95% modified proctor.
- D. Install rebar and ties, where required on the Drawings.
- E. Wet the soil without causing erosion or sloughing and place the concrete thrust block.
- F. High early strength concrete may be used to allow early backfilling of the trench.
- G. Do not pressure test the pipeline until the thrust block has achieved the required strength listed on the Drawings.

END OF SECTION

SECTION 33 12 16

MANUAL VALVES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes materials, testing, and installation of manually operated valves.
- B. Manual valves to be supplied and installed per AWWA C517, unless noted otherwise below.

1.02 MEASUREMENT AND PAYMENT

- A. Full compensation for conforming to the Provisions of this Section will be considered as included in the prices paid for the various items of Work and no additional compensation will be allowed therefore.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. All related work specified elsewhere, or in other codes or standards, will be as last revised, unless a specific date of issuance is called out in opposition to later revision date(s).
- B. Other sections of the technical specifications, not referenced below, shall also apply to the extent required for proper performance of this work.
 - 1. Trenching, Backfilling, and Compacting: 31 23 00
 - 2. Cast-In-Place Concrete: 03 30 00
 - 3. Painting and Coating: 09 90 00
 - 4. Ductile-Iron Pipe and Fittings: 33 11 13.15
 - 5. Underground Facilities Identification. 33 05 26

1.04 APPROVED MANUFACTURERS AS LISTED OR APPROVED EQUAL.

- A. Ball Valves Smaller than 3-inch
 - 1. Nibco
- B. Plug Valves
 - 1. Henry Pratt Company
 - 2. Dezurik
 - 3. Clow
- C. Valve Boxes
 - 1. Christy G5 with cast iron cover

1.05 REFERENCE STANDARDS

- A. Valves shall conform, as applicable, with the latest editions of the following codes and standards.
 - 1. AWWA C517 Resilient-Seated Cast-Iron Eccentric Plug Valves
 - 2. ASTM B62 Composition Brass or Ounce Metal Castings
 - a. Ductile Iron Castings for Valves
 - b. Ductile Iron Pipe Flanges
 - 3. ASTM D 429 Tests for Rubber Property – Adhesion to Rigid Substrates

1.06 FLANGED END

- A. All valves connecting to fittings on a main shall be flanged on at least one side and bolted to the fitting on the main.

1.07 SINGLE TYPE OF VALVE

- A. The Contractor shall choose an approved valve and then use only that valve throughout the Work (i.e., only one manufacturer and model per type of valve).

PART 2 - MATERIALS

2.01 GENERAL

- A. Product data shall be shop drawings, manufacturer's product data and installation instructions demonstrating that the proposed valve is in compliance with the reference standards as well as the intended service. If drawings are returned disapproved or not stamped, they shall be revised or corrected as necessary and resubmitted for review, acceptance, and stamping.
- B. Certified test reports shall be provided with each delivery that the valve(s) delivered complies with this specification.
- C. Valves shall be installed complete with operating handwheels or levers, extension stems, worm gear operators, operating nuts, and wrenches required for operation.
- D. Valves shall have the name of the manufacturer and the size of the valve cast or molded onto the valve body or bonnet or shown on a permanently attached plate.
- E. Valve body and trim casting shall be of domestic origin.
- F. Bolts for all valves shall be 316 stainless steel. Bolts consisting of 304 stainless steel shall not be permitted.
- G. Suitable valves shall be provided to connect to adjoining piping as specified for pipe joints.

2.02 ABOVEGROUND BALL VALVES 2 INCHES AND SMALLER

- A. Aboveground threaded end ball valves, 1/4 inch through 3 inches, for water service shall be full bore port ball type having a minimum working pressure of 200 psi. Valves shall have plastic coated lever operators.

B. Materials of construction shall be as described below:

Component	Material	Specification
Body	Bronze	ASTM B 62
Ball	Stainless Steel	ASTM B 62
Seat, Seals	Teflon	
Stem	Bronze or Copper silicon	ASTM b 62, B 99 (Alloy 651), B 584 B 371 (Alloy 694)

C. Stem material shall have a minimum tensile strength of 60,000 psi and a minimum yield strength of 30,000 psi.

2.03 FULL PORT ECCENTRIC PLUG VALVE

A. Design

1. Type: Non-lubricated eccentric type rectangular port. The port area shall be 100% of the inner ID of ductile iron pipe port area. Round plugs valves are not acceptable.
2. Valves lay-length shall be the same as standard length as AWWA C515 gate valve for each size.
3. Plug face: Resilient material which operates satisfactorily at a temperature of 180 degrees Fahrenheit continuous and 215 degrees Fahrenheit intermittent, except for valves in compressed air or digester gas service.
4. Nickel seat area must have rectangular shape design and allow for rubber plug face to move vertically and horizontally by 1/8" and not leak.
5. Grit seal: Provide flat upper and lower compression washers made of Teflon to isolate the bearing journals from grit and debris. Rubber seals are not acceptable.
6. Stem seals: Provide Chevron type "V" stem seals externally adjustable by use of a packing gland, serviceable without un-bolting the actuator or valve bonnet assembly. For buried service the packing gland shall be factory set and sealed. O-ring and U cup section style seals are not allowed
7. Discharge side of valve shall have a self-cleaning design to not allow buildup of debris inside the port areas.
8. Clearly mark valves to indicate their open and closed positions.
9. Provide valves with ends as required by piping details indicated on the Drawings.

B. Plug valve shall be rated for a minimum working pressure of 150 psi.

C. Plug valve shall be constructed of the components specified herein.

Description	Material	Specification
Body	Cast Iron	ASTM A126, Class B
Body Bearing	316L Stainless Steel	ASTM B62
Plug	Ductile Iron	ASTM A126, Class B
Grit Excluder	PTFE	
O-Ring	Non-asbestos filler in Styrene Butadiene Rubber binder	

Description	Material	Specification
Bonnet	Cast Iron	ASTM A126, Class B
Bonnet Bearing	316 L Stainless Steel	ASTM B62
Bonnet Screws	316 Stainless Steel	ASTM B62
Packing	NBR Acrylonitrile, V-type	
Key	Steel	ASTM A108
Gland	Cast Iron	ASTM A126, Class B
Gland Stud	316 Stainless Steel	ASTM B62
Nut	316 Stainless Steel	ASTM B62
Caution Tag	Stainless Steel	ASTM B62
Pipe Plugs	Galvanized Steel	Galvanized Steel
Journal Cover	Cast Iron	ASTM A126, Class B
Screws	316 Stainless Steel	ASTM B62
Friction Cone	Ryton	Ryton

D. Valve operators

1. Furnish valves with a worm gear operator.
2. All actuators shall be sized with a 1.5 times safety factor to the highest value of the valves torque for the application conditions.
3. Provided valves with motorized actuators of sufficient horsepower to operate the valve without overloading the drive motor.

E. Coating

1. Surface preparation shall be SSPC-SP5Near-White Blast Cleaned surface, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter. Holiday testing to be done on interior and exterior with high voltage tester. All holidays shall be repaired prior to installation. Factory test certifications shall be supplied with every valve for paint mil DFT, Holidays, and seat leakage.
2. Coat interior metal surfaces with two part liquid epoxy minimum (12) mils DFT.
3. Coat exterior metal surfaces with two part liquid epoxy minimum (12) mils DFT.

2.04 BOLTS AND NUTS FOR FLANGED VALVES

- A. Bolts and nuts for flanged valves shall be Type 316 stainless steel in accordance with Section 33 11 13.15.

2.05 GASKETS

- A. Gaskets for flanged end valves shall be as described in Section 33 11 13.15.

PART 3 - EXECUTION

3.01 JOINTS

- A. Bolt holes of flanged valves shall straddle the horizontal and vertical centerlines of the pipe run to which the valves are attached. Clean flanges by wire brushing before

installing flanged valves. Clean flange bolts and nuts by wire brushing, lubricate threads with oil and graphite, and tighten nuts uniformly and progressively. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reseal or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

- B. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound OR Teflon tape to pipe threads before installing threaded valves. Joints shall be watertight.
- C. Rubber ring grooves of valves shall be inspected before installation by the contractor for ridges or holes that would interfere with the rubber ring. Interferences with the rubber ring shall be corrected to a satisfactory connection or the valves replaced, as required by Engineer. (All valves shall have the same rubber-ring groove profile as the groove of the pipe couplings furnished with the pipe.)

3.02 EXTERIOR PROTECTION

- A. All exposed flanges and other metal surfaces and all damaged coatings shall be coated after assembly with bituminous mastic per Section 09 90 00. Coating of stainless steel flange bolts is not required.
- B. Wrap buried valves with 8-mil polyethylene wrap per AWWA C10

3.03 VALVE SUPPORTS

- A. Valves shall be supported as shown on plans.

3.04 VALVE BOXES

- A. Valve boxes shall be firmly supported and shall be kept centered and plumb over the operating nut of the valve.
- B. Beveled sections of pipe will not be allowed at the top of the valve extension pipe. The top cut shall be square and machine made.
- C. During the construction of new tracts, the valve extension pipes for "key valves" shall extend well above the ground level to permit ease of location in case of emergency shutoffs.
- D. The box cover shall be flush with the surface of the finished pavement or at any other level designated by the Engineer.

3.05 VALVE LEAKAGE TESTING

- A. Test valves for leakage at the same time that the connecting pipelines are tested.
- B. Valves shall have a pressure rating higher than or equal to the test pressure.

END OF SECTION

SECTION 33 31 11

PVC GRAVITY SEWER PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes materials, testing, and installation of polyvinyl chloride (PVC) gravity sewer pipe and fittings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Trenching, Backfilling and Compacting 31 23 00
- B. Cast-in-Place Concrete: 03 30 00
- C. Precast Concrete Manholes: 33 05 61
- D. Leakage and Infiltration Testing 33 05 05.33

1.03 SUBMITTALS

- A. Provide materials list showing material of pipe and fittings with ASTM references and grade.
- B. Provide certificates of compliance with all standards referenced in this section.

1.04 APPLICATION

- A. PVC SDR 26 shall be used for gravity sewer mains up to and including 15-inch in diameter, except as specifically called out on the project plans.

PART 2 - MATERIALS

2.01 PIPE AND FITTINGS

- A. ASTM Requirements: Pipe, fittings, couplings, and joints shall be in conformance with the size, material and performance requirements of ASTM D 3034, for SDR 35 and SDR 26 pipes, 15-inch and smaller, and shall have gasketed joints. Pipe shall be made of PVC plastic having a cell classification of 12454-B, 12454-C, or 13364-B as defined in ASTM D 1784. Fittings shall be made of PVC plastic having a cell classification of 12454-B, 12454-C, or 13343-C. All pipe shall be of solid wall construction with smooth interior and exterior surfaces.
- B. Manufacturer's Testing Certification: During production of the pipe, the manufacturer shall perform the specified tests for each pipe marking. A certification by the manufacturer indicating compliance with specification requirements shall be delivered with the pipe. The certification shall include the test result data.

- C. Pipe Marking: All pipe, fittings, and couplings shall be clearly marked at an interval not to exceed 5-feet as follows:
 - 1. Nominal pipe diameter
 - 2. PVC cell classification
 - 3. Company, plant, shift, ASTM, SDR, and date designation
 - 4. Service designation or legend
- D. For fittings and couplings, the SDR designation is not required. All pipe shall have a home mark on the spigot end to indicate proper penetration when the joint is made.
- E. Pipe Retest: Pipe which is not installed within 120 days of the latest test shall not be used without prior approval of the Engineer.
- F. Fitting and Coupling End Configurations: The socket and spigot configurations for fittings and couplings shall be compatible with those used for the pipe.
- G. Approved Pipe Manufacturers:
 - 1. J-M Manufacturing Ring-Tite,
 - 2. Vinyltech,
 - 3. P W Pipe,
 - 4. Diamond Plastics,
 - 5. Carlon,
 - 6. Or approved equal.
- H. Approved fittings manufacturers:
 - 1. J-M Manufacturing,
 - 2. GPK Products,
 - 3. Or approved equal.

2.02 GASKETS FOR PVC PIPE

- A. General: Unless otherwise specified, gaskets shall be manufactured from a synthetic elastomer, and shall be extruded or molded and cured in such a manner as to be dense, homogeneous and of smooth surface, free of pitting, blisters, porosity, and other imperfections. The compound shall contain not less than 50 percent by volume of first-grade synthetic rubber. The remainder of the compound shall consist of pulverized fillers free of rubber substitutes, reclaimed rubber, and deleterious substances. The tolerance for any diameter measured at any cross section shall be $\pm 1/32$ -inch (.8mm).
- B. Gasket Material Requirements: When required by the Engineer, the contractor shall furnish test samples of gaskets from each batch used in the work. Gasket material shall meet the following requirements:

Property	Value	ASTM Test Method
Tensile Strength (min. psi)	2,000	D 412
Elongation at break (% min.)	350	D 412
Shore durometer, Type A (Pipe manufacturer shall select value suitable for type)	40 to 65*	D 2240

of joint)		
Compression set (constant deflection) max % of original deflection	16	D 395
Compression strength after oven aging (96 hours, 158°F {70°C}) % of tensile strength before aging	80	D 573
Increase in Shore durometer hardness after oven aging. Maximum increase over original Shore durometer	10	D 2240
Physical requirements after exposure to ozone concentration (150 pphm. 70 hours, 140°F {40°C}), 20% strain)	No Cracks	D 1149

*This applies only to the sealing component of the gasket.

- C. Splices: No more than one splice will be permitted in a gasket. A splice shall be made by applying a suitable cement to the ends and vulcanizing the splice in a full mold. The splice shall show no separation when subjected to the following tests:
1. Elongation Test: The part of the gasket which includes the splice shall withstand 100% elongation with no visible separation of the splice. While in the stretched position, the gasket shall be rotated in the spliced area minimum of 180 degrees in each direction in order to inspect for separation.
 2. Bend Test: The portion of the unstretched gasket containing the splice shall be wrapped a minimum of 180 degrees and a maximum of 270 degrees around a rod of a diameter equal to the cross section diameter of the gasket.

PART 3 - EXECUTION

3.01 DELIVERY AND TEMPORARY STORAGE OF PIPE AT SITE

- A. Onsite Storage Limitation: Onsite pipe storage shall be limited to a maximum of one week, unless an exception is approved by Owner.
- B. Care of Pipe: At times when the pipe laying is not in progress, the open end of the pipe shall be closed with a tight-fitting cap or plug to prevent the entrance of foreign matter into the pipe. These provisions shall apply during the noon hours as well as overnight. In no event shall the sewers be used as drains for removing water which has infiltrated into the construction trenches.

3.02 HANDLING OF PIPE

- A. Moving Pipe: Pipes shall be lifted with handling beams or wide belt slings as recommended by the pipe manufacturer. Cable slings shall not be used. Pipe shall be handled in a manner to avoid damage to the pipe. Pipe shall not be dropped or dumped from trucks or into trenches under any circumstances.
- B. Inspection Pipe: The pipe and accessories shall be inspected for defects prior to lowering into the trench. Any defective, damaged or unsound pipe shall be repaired or replaced. All foreign matter or dirt shall be removed from the interior of the pipe before lowering into position in the trench.

3.03 PLACEMENT OF PIPE IN TRENCH

- A. General: All pipe shall be laid without a break, upgrade from structure to structure, with the bell ends of the pipe upgrade. Pipe shall be laid to the line and grade given so as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the flow line.
- B. Trench Excavation: Dewatering, excavation, shoring, sheeting, bracing, backfill material placement, material compaction, compaction testing, and pipe laying requirements and limitations shall be in accordance with Section 31 23 00, Trenching, Backfilling, and Compacting.
- C. Pipe Bedding: Unless shown otherwise on the drawings, pipe bedding material shall be imported sand or 3/4-inch crushed rock specified in Section 31 23 00.
- D. Subgrade at Joints: At each joint in the pipe, the pipe subgrade shall be recessed in firm bedding material so as to relieve the bell of the pipe of all loads and to ensure continuous bearing along the pipe barrel.
- E. Cleaning: The interior of the sewer pipe shall be cleaned of all dirt and superfluous materials as the work progresses.
- F. Joints: The mating surfaces of the pipe to be joined shall be wiped clean of all dirt and foreign matter and a lubricant applied that is approved by the pipe manufacturer. Then, with the surfaces properly lubricated, the spigot end of the pipe shall be positioned inside the bell and the joint shoved home.
- G. For larger diameter pipe where a lever attachment is required, the necessary precautions shall be taken to insure an undamaged pipe installation.
- H. Pipe Alignment: Unless specified otherwise, pipeline line and grade shall be as shown on the plans. Grade shall be measured along the pipe invert.
- I. PVC Pipe Curvature: Construction of curved reaches of PVC pipe shall not be accomplished by deflecting joints or by beveling pipe ends. Bending of PVC pipe to achieve vertical or horizontal curves without using deflection fittings shall be limited as follows:

<u>Diameter (Inches)</u>	<u>Minimum Radius (Feet)</u>
6	210
8	280
10	350
12	420

- J. Laterals: PVC wyes and other types of branches shall be furnished and installed along with the PVC sewer. Wyes sized as specified on the plans shall be installed for all sewer house connections and for future sewer house connections as shown on the plans. The longitudinal barrel of branch fittings, to be placed in line and grade with the sewer mains, shall be of the same diameter, quality, and type as specified herein for sewer installations. Earthwork and bedding for branches and shall conform to the applicable provisions set forth in the specification for each pipe material. The branch of wye fittings shall be inclined upward at an angle not greater than 45 degrees from a horizontal line for sewer lines up to ten feet deep, and no more than 60 degrees for sewers deeper

than 10 feet. No wye for sewer house connection branch shall be placed closer than 5 feet downstream of the centerline of any structure. The contractor shall place a support of graded crushed rock or imported sand under every wye branch when installed. The support shall be placed in accordance with the detail on the plans or as specified in Section 31 23 00, Trenching, Backfilling, and Compacting.

- K. Backfill: Backfill shall be placed and compacted in accordance with the requirements of Section 31 23 00. Backfill within the pipe zone shall be imported sand or clean native sand.

3.04 SADDLE CONNECTIONS

- A. General: All saddle connections of new laterals into existing sewer lines shall be made with a wye saddle.
- B. Scoring and Tapping: The sewer line to be saddled shall be scored to the approximate shape of wye or tee and shall be cut with a hole cutter. The tap holes shall be cleanly machined and may be further worked by hand to provide a true and neat opening for the collar wye or tee saddle. Pipe damaged during this operation shall be repaired or replaced. The Engineer shall be the sole judge as to the method of repair or replacement.
- C. Securement: The collar wye shall be secured to the sewer main with a catalytic epoxy resin. The saddle shall be tied to the main with wire of sufficient strength that no movement will occur during the setting of the epoxy resin.
- D. Encasement: After the connection has set sufficiently long for the epoxy resin to cure, the Engineer will inspect the connection and, if satisfactory, the contractor shall encase the fitting with Class B Portland cement concrete.
- E. Cleaning: The saddling operation shall be carried out in a workmanlike manner. Chips, dirt, epoxy mortar, and concrete shall be kept out of the sewer line being saddled. If directed by the Engineer, the reach of sewer main saddled shall be flushed and cleaned using a hydrocleaner or vacuum truck.
- F. Alternative Connection: In lieu of a saddle connection, a wye connection may be made by cutting the sewer and installing a wye.

3.05 CONCRETE ENCASEMENT

- A. Unless shown otherwise, concrete for encasement shall be reinforced or unformed or rough formed, and of the class as designated on the plans. Concrete shall be in accordance with Section 03 30 00, Concrete. Concrete used for encasing, cradling, bedding, cover for pipe, or other objects shall be used as shown on the Plans.

3.06 CLEANING

- A. Before testing, each pipe shall be thoroughly cleaned from manhole to manhole with a sewer scrubbing ball, and all debris and trash shall be removed from each manhole.

3.07 MANDREL TEST FOR PVC GRAVITY SEWERS 10-INCH IN DIAMETER AND SMALLER

- A. Following placement and compaction of backfill for all utilities, and prior to the placement of permanent pavement, all sewer mains shall be cleaned and mandrelled to verify that the pipeline is free from obstructions (deflections, joint offsets, lateral pipe intrusions, etc.).
- B. The Contractor shall pull a mandrel through each segment of installed sewer main to test the amount of deflection incurred during installation. The Engineer shall observe mandrel testing. The Contractor shall give at least a five (5) working-day notice to the Engineer before commencing mandrel testing.
- C. Mandrels shall be full circle, solid or rigid odd numbered (nine leg minimum) steel cylinders with pulling rings at each end and approved by the Engineer. The circular cross section of the mandrel shall have a diameter no smaller than ninety-five percent (95%) of the average inside diameter of the pipeline being tested. The length of the mandrel shall be no less than two times the full cross section diameter. A separate pull line shall be attached to each pull ring to facilitate removal of the mandrel if an obstruction is encountered.
- D. Mandrels shall be pulled through the pipeline by hand without the aid of mechanical pulling devices. Any deficiencies found by mandrel testing shall be corrected by the Contractor, at the Contractor's expense. Deficiencies shall be repaired by excavating the pipe at least to the pipe spring line. Pipe bedding and backfill shall be re-compacted after the repair. Internal rounding or vibration to correct deflection shall not be permitted. After repair and re-compaction of the pipe bedding and trench backfill material, the pipe shall be retested using the mandrel. Any pipe failing two mandrel tests shall be replaced.

3.08 LEAKAGE AND INFILTRATION TEST

- A. The pipe, manholes, and other appurtenances shall be tested for leakage and infiltration per Section 33 05 05.33, Leakage and Infiltration Testing.

3.09 CLOSED-CIRCUIT TELEVISION INSPECTION

- A. General: In addition to the regular leakage and infiltration test, the entire length of all new sewer lines shall be inspected by the contractor using closed-circuit television equipment. The inspection shall be conducted after the line has been successfully tested and prior to paving. The inspection shall be conducted in the presence of the Owner's inspector. For pipe lengths designed to absolute minimum design slopes (See Section 500-2 of the Procedural Guidelines), video inspection shall provide a profile of the sewer line.
- B. Responsibility: All labor and equipment necessary to conduct this inspection shall be furnished by the contractor.
- C. Notification: Requests for sewer line inspection shall be made to the Engineer a minimum of two working days in advance of the requested inspection date.
- D. Flushing: Each sewer section shall be flushed with water being introduced at the upstream manhole of each section prior to video recording.

- E. Stationing: The video shall show stationing corresponding to sewer stationing shown on plans for each manholes and Wye location.
- F. Submittal: The video shall be DVD format and be submitted to the Owner with two (2) of the computer printouts showing manhole numbers and stationing, wye stationing and distance between manholes prior to occupancy release for the dwelling units being served by the sewer. The tape and printout shall be labeled with the project name, tract number, street names, and contractor's name and shall list the station of any defects, dirt, low spots, etc. in the pipe.
- G. Repair of Defects: Even though the sewer line may have successfully passed the leakage and infiltration tests, any defects or low spots in the line shall be repaired to the satisfaction of the Engineer.
- H. Acceptance: Sewer section having standing water or defects shall be repaired by the contractor prior to Owner acceptance and prior to occupancy release for the dwelling units or commercial site being served by the sewer. Standing water in the system will not be allowed.

3.10 FINAL INSPECTION

- A. After paving has been completed and all manholes raised to grade, a final visual inspection shall be made. The necessary labor shall be furnished to assist the Owner's inspector in making the final inspection. Additional balling may be required if the lines are dirty, even though lines were previously balled. The contractor shall furnish a responsible person or supervisor for the final inspection to remove manhole covers and to note any corrections required by the Engineer in order to obtain final approval. Final Owner inspection shall be requested through the Engineer by giving at least two days' notice.

END OF SECTION

SECTION 33 31 23

SANITARY SEWER FORCE MAIN PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section includes materials, installation and testing of polyvinyl chloride (PVC) force main pipe.
- B. No flow shall be directed into the sewer system until final testing and written acceptance by the Owner for the pipe and manholes has been completed.
- C. Related Sections
 - 1. Section 01 33 00 – Submittals.
 - 2. Section 03 30 00 – Cast-In-Place Concrete.
 - 3. Section 31 23 19 – Dewatering.
 - 4. Section 31 23 00 – Trenching, Backfilling and Compacting.
 - 5. Section 33 11 13.15 – Ductile Iron Pipe and Fittings
 - 6. Section 33 11 13.90 – Thrust Restraint

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. American Water Works Association (AWWA)
 - 1. C110 Ductile Iron and Gray Iron Fittings, 3-inch through 48-inch
 - 2. C111 Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings
 - 3. C115 Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges
 - 4. C116 Protective Fusion-bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile Iron and Gray Iron Fittings
 - 5. C151 Ductile Iron Pipe, Centrifugally Cast
 - 6. C213 Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
 - 7. C605 Standard for Underground Installation of PVC Pipes and Fittings
 - 8. C900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fittings. 4 in. Through 65 in. for Waterworks

1.03 QUALITY ASSURANCE

- A. The Contractor shall furnish all labor necessary to assist the Engineer in inspecting pipe upon delivery. The Contractor shall remove rejected pipe immediately.
- B. All pipe of any manufacturer may be rejected if there are unsatisfactory joint assembly operations, even if the pipe conforms to these specifications. The Contractor shall remove all unsatisfactory pipe of that manufacturer of same shipment from work and shall furnish pipe from another manufacturer conforming to these specifications.

1.04 PIPELINE TESTING

- A. Contractor shall submit to the Engineer a Test Procedure Plan. All testing shall be performed by an Owner-approved testing company who will be required to provide the Engineer with certified testing results. Tester will have a gage and meter, calibrated annually. No testing shall take place against closed valves.
- B. Before testing, the pipe trench shall be backfilled to the ground surface in accordance with the project specifications.
- C. Contractor shall satisfy all testing requirements before final pavement
- D. Perform all testing in accordance with AWWA C605.
- E. Test pressure shall be 150 psi when measured at the lowest point on the pipe.

1.05 CONTRACTOR SUBMITTALS

- A. Contractor shall submit the following items for review by the Engineer:
 - 1. Product data for pipes, fittings, gaskets and other appurtenances.

PART 2 - PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PRESSURE SEWER PIPE

- A. PVC pipe shall be manufactured in accordance with AWWA C900. The pipe shall have gasket bell end or plain end with elastomeric gasket coupling.
- B. Pressure class 235 PVC pipe, DR 18, shall be used unless specifically shown otherwise on the plans.
- C. Laying lengths shall be 20 feet with the manufacturer's option to supply up to 15% random (minimum length 10 feet).
- D. Each pipe length shall be marked showing the nominal pipe size and O.D. base, the AWWA pressure class, and the AWWA specification designation (AWWA C900). For domestic water application, the seal of the testing agency that verified the suitability of the material for such service shall be included.
- E. PVC pipe for force main shall be green indicating sanitary sewer.
- F. Approved manufacturers
 - 1. J-M Manufacturing
 - 2. Vinyltech
 - 3. Certainteed
 - 4. Diamond Plastics

2.02 FITTINGS

A. Fittings shall be ductile iron pipe per Section 33 11 13.15.

2.03 MECHANICAL THRUST RESTRAINT

A. Where required, mechanical thrust restraint shall be Megalug by EBAA Iron, or approved equal, Series 2000 for mechanical joints and series 1900 for bell restraints.

2.04 PIPE SADDLE

A. Pipe saddles for connection to PVC piping shall meet AWWA C800, and be specifically designed for C900 PVC pipe and rated for 150 psi.

B. Saddle shall be nylon coated ductile iron with dual stainless steel straps.

C. Saddle shall be supplied with the outlet size as indicated in the Contract Drawings.

D. Saddle shall be as manufactured by Romac Industries, Mueller, or approved equal.

2.05 LUBRICANTS

A. Lubricant for pipe insertion shall be NSF food grade and biodegradable.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. All pipe and appurtenances shall be constructed in strict conformance with the manufacturer's written instructions, on a foundation as specified in Section 31 23 00 of these specifications.

3.02 EXAMINATION

A. Verify items provided by other sections of work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into the work.

3.03 INSTALLATION

A. General

1. Pipe shall be installed in accordance with good trade practices. The methods employed in the handling and placing of pipe, fittings, and equipment shall be such as to ensure that after installation and testing they are in good condition. Should any damage occur, such damages shall be repaired to the satisfaction of the Owner or the damaged materials shall be replaced at no additional expense to the Owner.

2. During loading, transportation, and unloading, every precaution shall be taken to prevent pipeline damage. Any damaged pipe shall be replaced or repaired to the satisfaction of the Owner. Where pipe is placed in stockpiles, it shall be neatly piled and blocked with strips between tiers.

3. Install pipes at the grades shown in the Contract drawings. Deviation from these grades by more than 0.1 feet shall be cause for rejection. Deviations of less than 0.1 feet that cause intermediate high points shall be cause for rejection.
4. At all times when the work of installing pipe is not in progress, all openings into the pipe and the ends of the pipe in the trenches or structure shall be kept tightly closed to prevent the entrance of animals and foreign materials. The contractor shall maintain the inside of the pipe clean, sanitary, and free from foreign materials until its acceptance by the Owner.
5. The pipe shall not be laid along curves at a radius less than that listed below:
 - a. The minimum-radius curves are determined by the limit of 2-degree deflection for PVC pipe joints with factory-assembled bell couplings:

Length of Pipe Section	Minimum Curve Radius
20 feet	573 feet
10 feet	287 feet
 - b. For curves of smaller radius, use high- deflection couplings or ductile-iron fittings.

B. PVC Pipe

1. Pipe shall be cut by a method recommended in the pipe manufacturer's installation guide, as approved by the Owner's representative. When pipe is cut and is to be joined to a fitting or another piece of pipe the end shall be beveled in the field or place of manufacture to create a beveled end equal in quality to the machined ends of the pipe as furnished by the manufacturer. Such machining shall not result in undercutting the wall thickness.
2. Trenching, backfilling, and compacting shall be in accordance with Section 31 23 00 and as specified herein. Compacted pipe bedding material conforming to Section 31 23 00 shall be installed in the bottom of the trench and compacted prior to placing pipe in the trench. Excavate bell holes at each joint to permit proper assembly and inspection of the entire joint and to assure the pipe is fully supported by the pipe barrel.
3. The contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source; shall assume full responsibility for any damage due to this cause; and shall pay for and perform the work to restore and replace the pipe to its specified condition and grade if any displacement occurs due to floating.
4. All connecting parts of pipe, rings, couplings, and castings shall be cleaned before assembly. After bearing has been obtained, couplings shall be assembled in a proper manner. The use of excessive lubricant will not be permitted, and the assembly of the couplings and rings shall be in accordance with the manufacturer's recommendations. Lubricant and rubber rings shall be supplied by the pipe manufacturer. All fittings and valves shall have joints that match the type of adjoining pipe.
5. All fittings and valves shall be supported so that the pipe is not subjected to the weight of these appurtenances.
6. Restrain the pipe at bends and fittings as shown on the Drawings.
7. Pipe and trench zone backfill shall be as shown on the Drawings and as specified in Section 31 23 00.

3.04 PIPE IDENTIFICATION

- A. Install warning tape in the trench per Section 33 11 00.

3.05 LOCATOR WIRE

- A. A bare 10-gauge stranded copper wire shall be placed continuously on the top center of the pipe. The wire shall not be spliced at any point, and shall be continuous from riser to riser. The wire shall be brought to the surface at valve locations and shall be accessible by removing the valve can cover. The wire shall be brought up the outside of the valve riser and folded over between the inside of the valve box and the valve riser. The wire shall be brought to within 6 inches of finish grade. The wire shall also be tapped in place by means of a plastic adhesive tape, placed at 10 foot intervals.

3.06 HYDROSTATIC TESTING

- A. All pipelines shall be pressure tested in accordance with AWWA Standard C605 following backfilling and compaction.
- B. Pipelines failing the pressure test shall be corrected and retested at the Contractor's expense.

END OF SECTION

SECTION 33 32 20

RETROFIT AND RELOCATION OF SUBMERSIBLE NON-CLOG PUMPS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for retrofit and relocation of existing submersible non-clog motor-driven pumps for service in raw sewage.

1.02 REFERENCES

- A. American Bearing Manufacturers Association (ABMA):
 - 1. 9 - Load Ratings and Fatigue Life for Ball Bearings.
 - 2. 11 - Load Ratings and Fatigue Life for Roller Bearings.
- B. American Society for Testing and Materials (ASTM):
 - 1. A 48 - Standard Specification for Gray Iron Castings.
 - 2. A 108 - Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.
 - 3. A 167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - 4. A 176 - Standard Specification for Stainless and Heat-Resisting Chromium Steel Plate, Sheet and Strip.
 - 5. A 276 - Specification for Stainless Steel Bars and Shapes.
 - 6. A 283 - Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 - 7. A 532 - Specification for Abrasion-Resistant Cast Irons.
 - 8. A 576 - Specification for Steel Bars, Carbon, Hot Wrought, Special Quality.
 - 9. A 582 - Specification for Free-Machining Stainless and Heat-Resisting Steel Bars.
 - 10. A 743 - Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion-Resistant, for General Application.
 - 11. B 148 - Specification for Aluminum-Bronze Sand Castings.
 - 12. B 505 - Specification for Copper-Base Alloy Continuous Castings.
 - 13. B 584 - Specification for Copper Alloy Sand Castings for General Applications.
 - 14. E 10 - Test Method for Brinell Hardness of Metallic Materials.
 - 15. E 18 - Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials.
 - 16. F 593 - Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - 17. F 594 - Specification for Stainless Steel Nuts.
- C. American National Standards Institute/Hydraulic Institute (ANSI/HI):
 - 1. 1.1-1.5 - Centrifugal Pumps - Nomenclature, Definitions, Application and Operation.
 - 2. 1.6 - Centrifugal Pump Tests.

3. 9.1-9.5 - General Pump Standards For Types, Definitions, Application, And Sound Measurements.

1.03 DEFINITIONS

- A. Pump head (Total Dynamic Head, TDH), flow capacity, pump efficiency, net positive suction head available (NPSHa), and net positive suction head required (NPSHr): As defined in ANSI/HI 1.1-1.5, 1.6 and 9.1-9.5 and as modified in the Specifications.
- B. Suction Head: Gauge pressure available at pump intake flange or bell in feet of fluid above atmospheric; average when using multiple suction pressure taps, regardless of variation in individual taps.
- C. Tolerances: As defined in ANSI/HI 1.6 and 2.6, or more restrictive tolerances specified herein.

1.04 SYSTEM DESCRIPTION

- A. Submersible Pumps with Components: Submersible pumps (from existing sewer lift station), motor driver, bearings, seals, supports, electrical cable, necessary controls and instrumentation, taps, lifting eyes, lifting chain and similar type items as specified and as required for complete operational units ready for use as specified and installed as indicated on the Drawings.
- B. Pump Types: Pumps to be removed from existing lift station and installed in new lift station. Pumps shall be retrofitted from NT type to NP type (rail-mounted submersible).
- C. Manufacturer shall supply its standard submittals which shall contain the following:
 1. Retrofit parts data and dimensions
 2. Typical Installation Guides
 3. Detailed Description and Dimensions of All Accessories

1.05 QUALITY ASSURANCE

- A. General: Reconfigured pumps shall be suitable for submersible installation for pumping municipal wastewater.
- B. Standards: Equipment furnished and installed by the contractor shall be in full conformity and harmony with the intent to secure the best standard of construction and equipment as a whole or in part. Pumps shall be installed in strict accordance with manufacturer specifications, standard drawings and installation instructions.
- C. Submittals: Submittal data provided shall be of sufficient depth to illustrate compliance with these specifications, the plans and other specifications that may influence the proper operation of this pump. No equipment shall be shipped until the required drawings and curves have been submitted to and acknowledged by the Engineer as being of general compliance and conformance with the information in the contract documents.

1.06 PROJECT CONDITIONS

- A. Install pumps as indicated on the drawings.

1.07 SEQUENCING AND SCHEDULING

- A. The existing pump station has three pumps, which will be converted from dry-pit to wet-pit configuration. The replacement pump station will use two of the existing pumps, and the third will be provided to the owner as a spare.
- B. Pumps shall be removed, converted and reinstalled one at a time, such that the existing pump station will have two operational pumps until the new pump station has one operational and tested pump. The second pump may then be removed, reconfigured and installed.
- C. Coordinate with Owner as required for access to and removal of existing pumps.

PART 2 - PRODUCTS

2.01 EXISTING SUBMERSIBLE PUMPS AND MOTORS

- A. Pump: ITT Flygt, model NT 3202 HT 3~ 466.
 - 1. Discharge flange diameter 4 inch
 - 2. Impeller diameter 13 15/6 inch
 - 3. Design point: 857 gpm at 162 ft TDH
 - 4. 50-ft power cable
- B. Motor: Submersible N3202.180 30-29-4AA-W 70 HP
 - 1. Stator variant: 1
 - 2. Frequency: 60 Hz
 - 3. Rated Voltage: 460V
 - 4. Number of poles: 4
 - 5. Phases: 3~
 - 6. Rated Power: 70 HP
 - 7. Rated Current: 79A
 - 8. Starting current: 550A
 - 9. Rated Speed: 1775 rpm
 - 10. Power Factor:
 - a. 1/1 Load: 0.90
 - b. 3/4 Load: 0.87
 - c. 1/2 Load: 0.80
 - 11. Efficiency:
 - a. 1/1 Load: 92.5%
 - b. 3/4 Load: 93.0%
 - c. 1/2 Load: 93.0%
 - 12. Service factor 1.15
 - 13. Insulation Class H
 - 14. NEMA B
 - 15. FLS Installed in Motor Housing

16. TC/TC Mechanical Seals
17. FM Explosion Proof

2.02 MODIFICATION EQUIPMENT

- A. Provide the following parts for modification of the existing pumps:
 1. NP 3202 discharge base
 2. Sliding bracket
 3. Bolts, gaskets and related hardware
- B. Reconfiguration parts shall be supplied and installed by the local manufacturer's representative:
 1. SHAPE INC, 5115-A Johnson Drive, Pleasanton, CA 94588, Tel: 925-485-9720

2.03 ACCESSORIES

- A. Pump accessories shall be furnished as required and be compatible with each of the submersible pumps and the conditions of their installation.
- B. All accessory hardware including anchor bolts, lifting chain and cable brackets shall be Type 316 stainless steel.
- C. Accessories for each submersible pump and motor (provide for two pumps):
 1. Self-aligning discharge connection and base pedestal for mounting to concrete slab.
 2. Stainless steel guide rails and mounting accessories as recommended by the pump manufacturer for pump removal and installation without the need to enter the wet well.
 3. Intermediate guide bar brackets for guide rails.
 4. Discharge Elbow.
 5. Cable holder.
 6. At least 25 LF of stainless steel lifting chain.
 7. Lifting eye compatible with the pump.
 8. A316 stainless steel anchor bolts as recommended by the pump supplier and any other miscellaneous supplies required to complete the installation.
- D. Pump Supervisory Relay
 1. Pump supervisory relay shall be Flygt MiniCAS, model to match station pumps, no substitutions.
 2. Install pump supervisory relay on interior panel face so that alarm indicators, switches and reset button are visible without opening the dead-front panel.
 3. Provide two (2) pump supervisory relays (one per pump at the new pump station).
 4. Install per manufacturer's directions and the contract Drawings.

2.04 COATINGS

- A. Equipment shall receive final finish coats at the factory. Each coat of paint shall be of the consistency as supplied by the paint manufacturer, or thinned if necessary, and applied in accordance with the manufacturer's written instructions. Work shall be free from "runs",

“bridges”, “shiners”, or other imperfections. Care shall be taken to obtain a uniform, unbroken coating over welds, edges and corners. Weld splatter shall be removed and all welds neutralized with thinner. Blasted surfaces shall be coated within four hours of being sandblasted. All dust shall be removed from surfaces prior to coating.

- B. All surfaces to be coated or painted shall be in the specified condition to receive the material before any coating or painting is performed. Follow manufacturer's instructions. During and after final application of protective coatings, all metal surfaces shall be checked mechanically with an Elcometer, Mikrotest, or other approved dry film thickness gage to insure that the specified dry film thickness has been attained. Coating testing and repair of damages, flawed areas, holidays, or mishaps shall conform to applicable AWWA standards.
- C. Care shall be taken to prevent damage to coated surfaces during shipment. Any coatings damaged during shipment shall be refinished as the original at no extra cost to the Owner.
- D. Coatings shall be guaranteed for a period of one year following the date of final acceptance.

PART 3 - EXECUTION

3.01 MODIFICATION OF EXISTING PUMPS

- A. Contract with manufacturer’s local service provider for existing pumps to be retrofit for new wet well and slide rail installation (Flygt NP type).
 - 1. Remove existing discharge elbow, suction elbow and pump stand.
 - 2. Install discharge base for NP slide rail system, upper guide bar bracket and sliding bracket.
 - 3. Inspect pump seals, gaskets and wear rings and provide an assessment report.

3.02 INSTALLATION

- A. Pumps shall be installed in strict accordance with the manufacturer’s requirements
- B. Anchor bolts for the pump pedestals shall be drilled and epoxied into place after the pumps and discharge piping are set.

3.03 FIELD QUALITY CONTROL

- A. Witnessing: All field testing shall be witnessed by the Engineer. Contractor shall notify the Owner a minimum of 48-hours prior to field testing.
- B. Equipment Performance Test: Test pump operations using automatic level controls as scheduled with the Owner and described herein.
- C. All water and electricity required for field testing shall be provided at Contractor’s sole expense.
- D. Operational Testing:

1. After installation, equipment shall be tested in the presence of the Engineer by an authorized pump manufacturer representative who shall certify, in writing, that the pumps are operating in compliance with these specifications and are free from binding, scraping, overloading, vibration or other defects.
2. Each pumping unit shall be run and monitored for a minimum duration of one (1) hour during the test period. A minimum of 6 pump cycles shall occur during pump testing. Motor running current readings shall be taken for each phase. Coordinate testing with the Owner.
3. The manufacturer's representative shall perform the following:
 - a. Check motor stator and power cables.
 - b. Check seal lubrication.
 - c. Check for proper rotation.
 - d. Check power supply voltage.
 - e. Measure motor operating load and no load current for each phase.
 - f. Check level control operation and sequence.

3.04 MANUFACTURER'S FIELD SERVICES

- A. Contractor shall require manufacturer to inspect system before initial start-up and certify that system has been correctly installed and prepared for start-up as specified in this section.
- B. The manufacturer's service representative shall review recommended operation and maintenance procedures with Owner's personnel.
- C. Local Flygt representative: Jim Merrit, c/o Shape Inc., 5115-A Johnson Drive, Pleasanton, CA 94588, 925-485-9720

END OF SECTION

SECTION 40 92 13

AUTOMATIC VALVES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes the materials and installation of self-contained automatic control valves.
- B. Items of equipment specified herein shall be the end products of a limited number of manufacturers in order to achieve standardization for operation, maintenance, spare parts, and manufacturer's service.

1.02 RELATED WORK

- A. Painting and Coating: 09 90 00
- B. Ductile-Iron Pipe and Fittings: 33 11 13.15
- C. Copper, Brass and Bronze Pipe, Fittings and Appurtenances: 22 11 13
- D. General Piping Requirements: 33 11 00

1.03 SUBMITTALS

- A. Submit manufacturer's data indicating the type and size of vales to be provided.

PART 2 - MATERIALS

2.01 COMPLETE ASSEMBLIES

- A. All valves shall be complete, with all necessary operating appurtenances included in the work under this section.

2.02 INTERIOR LINING AND EXTERIOR COATING

- A. An epoxy coating shall be applied to internal and external ferrous valve surfaces. Coating shall be per AWWA C550. Unless specified otherwise, herein.

2.03 SWING CHECK VALVE

- A. Swing Check Valve shall be Mueller model A-2602-6-02B1 or approved equal.
- B. The check valve shall be swing type lever and spring type, consisting of a cast iron main body and disc and cover, stainless steel hinge pin, steel spring, and ductile iron weight arm. Valve shall have adjustable spring tension to control opening and closing of

clapper. Stuffing box shall be sealed with o-ring gasket. Valve shall meet all applicable parts of AWWA C508 Standard.

- C. The valve shall have flanged end connections with dimensions and drilling that complies with ANSI B16.1, Class 125.
- D. Valve shall have rubber faced clapper disc.
- E. Valve shall be rated for 200 psi working pressure and 400 psi test pressure.
- F. Valve shall be epoxy coated and lined for corrosion resistance.
- G. All valve bolts and nuts shall be stainless steel.

2.04 COMBINATION AIR RELEASE VALVE

- A. Combination air release and vacuum breaker valve shall be A.R.I. model D-020/D-025 or approved equal.
- B. Combination air release valves shall have the following characteristics:
 - 1. Combination air valves shall be heavy-duty “Universal” style single body units incorporating the functions of an air and vacuum valve with an air release valve in a single housing.
 - 2. Combination air valves shall release accumulations of air at high points within a pipeline by exhausting large volumes of air as the pipeline is being filled, and then by releasing accumulated pockets of air while the pipeline is in operation and under pressure. Combination air valves shall also be designed to permit large volumes of air to enter the pipe-line during pipeline drainage.
 - 3. The valve body and cover flange shall be cast or fabricated 316 stainless steel and shall incorporate a “sanitary clamp” to attach the flange to the body at the outlet. Valves that use traditional bolting to attach the cover flange to the body are not acceptable. The flange clamp must be located at the outlet of the body for ease of cleaning and maintenance. Other clamping locations are not acceptable.
 - 4. All non-sealing internal metal components shall be 316 stainless steel. The valve shall incorporate an Air Release orifice of 3/16” for use at 200 psig. No deviation from this orifice size will be allowed. This orifice will be located in the outlet of the valve and shall be drilled in a 316 stainless steel orifice plate that seals against a Buna-N rubber seat. Valves with seals that flex or “roll” will not be acceptable.
 - 5. Flanged or threaded connection as shown on the Drawings.
- C. Provide “short body” or “compact” model for in-vault installation. Provide standard model for above-ground installation.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Automatic control valves shall be installed above ground or within a vault to provide for adjustment, maintenance and repair. Direct burial of a control valve will not be permitted under any circumstance.
- B. Automatic control valves are to be installed with ductile iron piping per Section 33 11 13.15, unless indicated differently on the Drawings.
- C. Prior to purchase of material, inspect valve to confirm valve size, manufacturer, and part number.

3.02 VALVE ADJUSTMENT AND TESTING

- A. All valves installed, replaced, refurbished, or adjusted shall be tested for normal operation.
- B. Valves shall be readjusted if necessary, to operate at the design pressure.

END OF SECTION