

CITY OF SAUSALITO  
MARIN COUNTY, CALIFORNIA



Public Works, Engineering Division  
420 Litho Street  
Sausalito, California 94965  
Phone: (415) 289-4100

**CONTRACT DOCUMENTS**

For the Construction  
of the

**GLEN COURT SEWER REPLACEMENT PROJECT**

**November 2015**

Approved for Construction:

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JONATHON GOLDMAN, P.E. Date  
CITY ENGINEER/DIRECTOR OF PUBLIC WORKS

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ANDREW DAVIDSON, P.E. Date  
SENIOR CIVIL ENGINEER



CITY OF SAUSALITO  
GLEN COURT SEWER REPLACEMENT PROJECT

PERSON RESPONSIBLE FOR SPECIFICATIONS

Rick L. Chan (RLC) (Civil)  
Carollo Engineers, Inc.  
2700 Ygnacio Valley Road, Suite 300  
Walnut Creek, CA 94598  
(925) 932-1710



11/16/2015

Jill E. Shankel (JES) (Civil)  
Carollo Engineers, Inc.  
2700 Ygnacio Valley Road, Suite 300  
Walnut Creek, CA 94598  
(925) 932-1710



11/16/2015



**CITY OF SAUSALITO**  
**GLEN COURT SEWER REPLACEMENT**

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## SECTION 00010

### NOTICE INVITING BIDS

**NOTICE IS HEREBY GIVEN** that the City of Sausalito will receive sealed bids for the performance of the Work shown and described in the Plans, Specifications, and Contract Documents prepared for the **Glen Court Sewer Replacement Project**. Such sealed bids shall be received at the Office of the City Clerk of the City of Sausalito at 420 Litho Street until **2:00 PM December 21, 2015**, at which time they will be publicly opened and read. On a date to be determined later, such bids shall be tabulated and submitted to the City Council for consideration and action consistent with the provisions of Public Contract Code Division 2, Part 3, Chapter 1, Article 4.

**GENERAL DESCRIPTION OF WORK:** Replacement of existing 6-inch sanitary sewer with new 6-inch sanitary sewer using pipe bursting and open cut installation, replacement of existing manholes, replacement of existing lower sewer laterals and installation of cleanouts, construction of shored excavations related to the work, traffic control, storm water pollution prevention, dewatering, bypass pumping, pavement replacement and repair, grading and other miscellaneous work needed to restore areas disturbed by the construction back to original condition.

**PRE-BID MEETING:** Time: **10:00 a.m., Thursday, December 3, 2015**. Location: City of Sausalito Edgewater Room, 420 Litho Street, Sausalito, CA 94965. Submit all questions in writing to Andrew Davidson at [adavidson@ci.sausalito.ca.us](mailto:adavidson@ci.sausalito.ca.us).

**BIDDERS' REQUIREMENTS:** Each Bid shall be made in accordance with the Plans, Specifications and Contract Documents prepared therefor. Submit all questions in writing to Andrew Davidson at [adavidson@ci.sausalito.ca.us](mailto:adavidson@ci.sausalito.ca.us). Copies of Contract Documents are available for public inspection at the City of Sausalito, where they may be obtained for a non-refundable \$50.00 charge. Contract Documents will be mailed for an additional charge of \$10.00 per set. Plans will be released as full sets only, no partial sets will be provided. Digital copies of the plans and specifications will be available on the City website at <http://www.ci.sausalito.ca.us/index.aspx?page=2057>.

Bids shall be submitted only upon proposal forms furnished by the City Engineer. If award is made the award of the Contract will be based on the responsible Bidder whose base Bid as listed in Section 00300, **BID FORM** yields the lowest total Contract price. The City Engineer will review the Bids and provide written notification of the bid results to all Bidders. Notice of award will be sent immediately following bid evaluation.

Bidders shall read and review the Bid Documents, including the full Notice Inviting Bids, Specification Section 00010, carefully and shall familiarize themselves thoroughly with all requirements. Each Bid must conform and be responsive to the invitation, the Plans and Specifications, and all documents comprising the pertinent Contract Documents. Each Bid shall be accompanied by a certified check, cashier's check, cash or bidder's bond, made payable to the City, in an amount not less than ten (10) percent of the Bid. The said check shall be given as a guarantee that the Bidder will execute the Contract in conformity with the form of agreement

contained within the Contract Documents, and will furnish bonds and insurance policies as specified within ten (10) days after notification of the award of the Contract to the successful Bidder. Any Bid not accompanied by a Bid Security may be rejected.

All Bids must be addressed to the City Engineer of the City of Sausalito and shall bear the title or name of the work to be constructed.

The City reserves the right to reject any and all Bids, and to waive any irregularity in any Bid received. The successful Bidder will be required to pay not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which this public work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work shall be paid to all workers employed on this public work. Pursuant to Labor Code, Subsection 1773, the general prevailing rate has been determined by the California Director of the Department of Industrial Relations and copies of such determination are on file in the office of the City Engineer of the City of Sausalito and will be made available to any interested party on request. A copy of these rates shall be posted at the job site by the Contractor. (See California Labor Code sections 1770, 1771, 1772, 1773, 1773.1 and 1773.2.)

Bids will only be accepted from a contractor who is licensed in accordance with the provisions of Chapter 9, Division III of the California Business and Professions Code (BPC). The license required to perform this project is a CLASS "A" (GENERAL ENGINEERING) (BPC Subsection 7000 *et seq.*; Subsection 7028.15).

The time allowed for Substantial Completion of the project is **twenty (20) Consecutive Working Days** after the start date established in the NOTICE TO PROCEED for the commencement of Contract Time. LIQUIDATED DAMAGES for the period of time that any portion of the Work remains unfinished after the time fixed for Substantial Completion will be **Two Thousand Five Hundred Dollars (\$2,500.00) PER CALENDAR DAY.** Bidders should have fully inspected the project site in all particulars and become thoroughly familiar with the terms and conditions of the Contract Documents and local conditions affecting the performance and costs of the work prior to submitting a bid. Submission of a Bid by Bidder warrants that Bidder has visited the site of the Project and is thoroughly familiar with the work required of the Contract Documents.

A City of Sausalito Encroachment Permit shall be required and the Encroachment Permit fee shall not be charged to the successful Bidder. A Sausalito Business License is required prior to mobilization. Information about Business Licenses can be found on the City's website: <http://www.ci.sausalito.ca.us/Index.aspx?page=127>.

The successful Bidder will have the opportunity to enter into a teaming agreement with the City. Teaming consists of a voluntary effort by all parties to develop joint goals and establish a cooperative rather than adversarial atmosphere while executing the Contract. The objective of teaming is effective completion of the work on schedule, within budget, and in accordance with the Contract Documents. Teaming shall commence and be conducted in accordance with industry practice.

Under California Laws and Regulations, the City shall inform all prime contractors of public works, to the extent feasible of relevant public work requirements. Therefore, the City hereby advises all Bidders that the successful Bidder shall:

1. Employ the appropriate number of apprentices on the job site as set forth in California Labor Code 1777.5;
2. Provide worker's compensation coverage, as set forth in California Labor Code Sections 1860 and 1861;
3. Keep and maintain the records of work performed on the public works project, as set forth in California Labor Code Section 1812;
4. Keep and maintain the records required under California Labor Code Section 1776 which shall be subject to inspection pursuant to California Labor Code Section 1776 and California Code of Regulations, Division 1, Chapter 8, Subchapter 3, Article 6, Section 16400 (e); and
5. Be subject to other requirements imposed by law.

The City will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rates on file as aforesaid. The possibility of a wage increase is one of the elements to be considered by the Contractor in determining his/her or its Bid and will not, under any circumstances, be considered as the basis of a claim against the City on the Contract.

Bidders are hereby notified that if the Contract will be entered into or financed by or with the assistance of agencies of the United States, the City must comply with Federal prevailing wage requirements. A copy of the current prevailing rates under Federal law is included in the "Supplementary General Conditions" for this Project if so required by Federal law.

The successful Bidder and its subcontractors shall employ workers which consistently display and demonstrate proper moral, ethical and professional conduct to all fellow workers, employees and representatives of the City and other involved parties.

Pursuant to the provisions of California Labor Code Section 6707, each Bid submitted in response to this Notice to Contractors shall contain, as a Bid item, adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life and limb in trenches and open excavation, which shall conform to applicable safety orders. By listing this sum, the Bidder warrants that its action does not convey tort liability to the City, the Design Consultant, the Construction Manager, and their employees, agents, and subconsultants.

Addenda issued during the time of bidding shall be covered in the Contractor's Bid and shall become part of the Contract Documents.

Bidders shall develop and submit Bids at their own expense. The City will not reimburse any costs associated with the development and submittal of any and all Bids.

Any bid protest must be submitted in writing to the City of Sausalito, 420 Litho Street, Sausalito, CA 94965 by 4:30 p.m. of the 5<sup>th</sup> business day following Bid opening. The initial protest document must identify the protestant and contain a complete statement of the basis for the protest with reference to any portion of the Bid documents which the protestant relies on as the basis of the protest. The above time and content requirements are mandatory, and failure to comply therewith shall constitute a waiver of any further right to pursue a Bid protest, including filing a Government Code claim or legal proceedings. Bid protests shall be acted upon by the City Council.

**ENGINEER'S ESTIMATE:** The Engineer's estimate of construction costs for this project is \$334,400.

**BONDS:** Upon award of the contract, the successful bidder shall furnish a bond for faithful performance in the amount of one hundred percent (100%) of the total bid; it shall also furnish a labor and material bond to secure the payment of all claims of labor and material in the amount of one hundred percent (100%) of the total bid. Such bonds shall be secured from a surety company satisfactory to the City of Sausalito. No bid or bid security may be withdrawn for 60 calendar days after the bids are opened.

Payment and Performance Bonds are required to be filed and approved by the City Engineer before the Contractor begins the Work.

Securities eligible for substitution of Bonds shall be limited to those listed in Government Code Section 16430 or to bank or savings and loan certificates of deposit. Contractor shall be the beneficial owner of any securities so substituted for monies withheld and shall receive any interest or income thereon. Any escrow agreement entered into pursuant to this Section shall contain, as a minimum, the following provisions:

- a) The amount of securities to be deposited.
- b) The terms and conditions of conversion to cash in case of the default of the Contractor; and
- c) The termination of the escrow upon completion of contract.

**RETENTION:** Contract amounts to be paid under this contract will be subject to a ten percent (10%) retention to ensure performance. Pursuant to and subject to the provisions of Public Contract Code (PCC) Subsection 22300, the Contractor shall be entitled to substitute securities for retained monies. The value of any securities so substituted shall be valued by the City's Finance Director, whose decision on the valuation of the securities shall be final.

**CONTRACTOR RESPONSIBILITIES RELATING TO THE DEPARTMENT OF INDUSTRIAL RELATIONS:** 1) 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)]. 2) No contractor or subcontractor may be awarded a contract for Public Works on a Public Works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code

1725.5, 3) This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, and 4) All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement).

By: \_\_\_\_\_  
Lilly Whalen, City Clerk  
City of Sausalito, California

Date: \_\_\_\_\_

**END OF SECTION**

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**SECTION 00100**

**INSTRUCTIONS TO BIDDERS**

**ARTICLE 1 – GENERAL**

The work to be performed is described in the Contract Documents titled, **Glen Court Sewer Replacement Project** dated November 2015 and prepared by **Carollo Engineers** for the City of Sausalito.

All Bidders shall carefully examine the Contract Documents and satisfy themselves as to their sufficiency; and shall not at any time after the submission of the Bid dispute or complain of such Contract Documents and the directions explaining them or interpreting them, nor assert that there is any misunderstanding in regard to the location, extent, nature of amount of work to be performed. The Bidder shall notify the City of any discovered conflicts, errors or discrepancies in the Contract Documents prior to the submission of its Bid. Intended Bidders shall have visited the site of the Work and familiarized themselves with the conditions there existing as well as all other conditions relating to the construction and labor under which the work will be performed and affecting cost, progress or performance of the Work. The submittal of a Bid shall be considered an acknowledgement on the part of the Bidder of its familiarity with conditions at the site of the Work.

Bids for the Work shall be made on the forms contained in the following sections and shall include the following completed documents:

<u>SECTION</u>	<u>TITLE</u>
00300	BID FORM
00410	BID GUARANTY BOND
00420	CERTIFICATION OF BIDDER'S EXPERIENCE AND QUALIFICATIONS
00430	DESIGNATION OF SUBCONTRACTORS
00440	SITE VISIT AFFIDAVIT
00480	NON-COLLUSION AFFIDAVIT
00490	AFFIDAVIT OF SAFETY COMPLIANCE

A complete set of Bid forms shall be placed in an envelope, sealed, and addressed to:

City of Sausalito  
Attn: Lilly Whalen, City Clerk  
420 Litho Street, Sausalito, CA 94965  
Glen Court Sewer Replacement Project

The City reserves the right to postpone the date and time for receiving and/or opening of Bids at any time prior to the date and time established in the Notice Inviting Bids. Postponement notices may be faxed and will subsequently be mailed to planholders of record in the form of addenda.

Addenda may be issued to all planholders during the Bid period. Any and all addenda issued shall become a part of the Contract Documents and shall be fully considered by all Bidders during formation of Bids.

Bids shall give the prices proposed in figures, shall give all other information requested herein, and shall be signed by the Bidder or an authorized representative, including address. By submission of a proposal on the separate forms provided by the City, the Bidder attests that the Bidder has purchased a complete set of these Contract Documents and is aware of its entire contents. Bidder is required to provide a complete Bid on all schedules listed in Section 00300, **BID FORM**.

Bids shall be delivered to the City at the above address before the time set for the opening of Bids as provided in Section 00010, **NOTICE INVITING BIDS**.

After the expiration of the time for submission of Bids, all Bids will be publicly opened, read, declared, and referred to the City Council for action.

## **ARTICLE 2 – BID PRICES**

Bid prices shall include everything necessary for the completion of construction and fulfillment of the Contract. Bid prices shall include all federal, state and local taxes. Costs for developing, submitting, and presenting Bids are the sole responsibility of the Bidder and claims for reimbursement will not be accepted by the City.

If the product of a unit price and an estimated quantity does not equal the extended amount quoted, the unit price shall govern, and the correct product of the unit price and the estimate quantity shall be deemed to be the amount Bid. If the sum of two or more items in a bidding schedule does not equal the total amounts quoted, the individual item amounts shall govern and the correct total shall be deemed to be the amount Bid.

## **ARTICLE 3 – BIDDER’S SIGNATURE AND AUTHORITY**

If the Bid is made by an individual, Bidder’s name, signature, and post office address must be shown; if made by a firm or partnership, a list of the partners, and the signature of at least one of the general partners must be shown; if made by a corporation, the Bid shall show the name of the state under the laws of which the corporation is chartered, the name and post office address of the corporation, and the title of the person who signs on behalf of the corporation. If the Bid is made by a corporation, a certified copy of the bylaws or resolution of the Board of Directors of the corporation shall be furnished showing the authority of the officer signing the Bid to execute contracts on behalf of the corporation. If the Bid is made by a joint venture, the Bid shall be signed by a representative of one of the joint venture firms. Additionally, the Bid shall include a copy of the resolution or agreement empowering the representative to execute the Bid and bind the joint venture.



## **ARTICLE 4 – BID IRREGULARITIES**

Each Bid and the information requested shall be enclosed in a sealed envelope and labeled as specified herein. Bidders are warned against making erasures or alterations of any kind, and Bids which contain omissions, erasures, or irregularities of any kind may be rejected. No oral, telegraphic, electronic (including E-Mail), facsimile, or telephonic bids or modifications will be considered.

## **ARTICLE 5 – MODIFICATION OF BID**

Modification of a Bid already received will be considered only if the modification is received prior to the time established for receiving Bids. Modifications shall be made in writing, executed, and submitted in the same form and manner as the original Bid.

## **ARTICLE 6 – SUBCONTRACTORS AND MAJOR SUPPLIERS**

In accordance with California Public Contracting Code Section 4100, et. Seq., each Bid shall have listed in Section 00430, **DESIGNATION OF SUBCONTRACTORS**, the name, portion of work to be performed, and location of the place of business of each subcontractor who will perform work or labor or render service to the Bidder in or about the construction of the Work or improvement, or of any subcontractor licensed by the State of California who, under subcontract to the Bidder, will specifically fabricate and install a portion of the Work or improvement according to detailed drawings contained in the Contract Documents, in an amount in excess of one-half of one percent of the Bidder's total bid or \$10,000, whichever is greater.

If the Contractor fails to designate in its proposal a subcontractor for any portion of the Work as required above, the Bidder shall be deemed to have agreed to perform such portion of the Work itself and shall not be permitted to subcontract said portion of the Work without the written permission of the City in accordance with applicable law.

## **ARTICLE 7 – BID GUARANTY BOND AND CONTRACT AWARD**

Bids shall be accompanied by one of the following forms of Bidder's Security: Cash or; a certified or cashier's check payable to the City; or a Bidder's Bond (Bid Guaranty Bond) executed by an admitted surety made payable to the City. The Bidder's Security shall be in an amount not less than ten (10) percent of the aggregate of the Bid. Said Bidder's Security shall be a guarantee that the Bidder, if awarded the Work, will within ten (10) days after award: (1) enter into a Contract in specified form, (2) furnish a bond of faithful performance and a labor and material bond, and (3) furnish specified insurance policies. In case of refusal or failure to enter into said Contract or to provide said bonds and insurance policies, the Bidder's Security shall be forfeited to the City, the proceeds therefrom being hereby agreed upon as liquidated damages to the said City on account of the delay in the execution of the Contract and required bonds and the performance of the Work thereunder, and the necessity of accepting a higher or less desirable Bid resulting from such failure or refusal to execute the Contract and the bonds as required.

Upon the execution of the Contract and the approval on behalf of the City of the accompanying bonds and insurance policies, all certified checks that accompany Proposals and that have not heretofore been returned, will be returned, each to its maker.

Award of the Contract will be made within sixty (60) days after the opening of Bids to the lowest responsive, responsible bidder complying with these instructions, Section 00010, **NOTICE INVITING BIDS**, and such other pertinent provisions of the Contract Documents as may apply. The Award of the Contract may be made after the sixtieth (60<sup>th</sup>) day after the opening of the Bids if mutually agreed to by both the City and the successful Bidder in writing. If award is made, it will be based on the lowest responsive, responsible Bid whose base Bid and alternate(s) as listed in Section 00300, **BID FORM**, yields the lowest total Contract price. Selection of any or all alternates shall be at the sole discretion of the City. The City, however, reserves the right to reject any or all Bids, and to waive any informality in Bids received.

Award of contract for the project is subject to:

1. Compliance with the California Environmental Quality Act (“CEQA”) and
2. Initial funding agreement by the State Water Resources Control Board.

#### **ARTICLE 8 – CONTRACTOR’S LICENSE**

Each Bidder shall be licensed in accordance with the provisions of the Contractors License Law of California as stipulated in Section 00010, **NOTICE INVITING BIDS**.

#### **ARTICLE 9 – WORK PERCENTAGES**

The Contractor shall perform with its own organization no less than fifty-one (51) percent of the work.

#### **ARTICLE 10 – COLLUSION**

If the City has reason to believe that collusion exists among Bidders, the City will reject the Bids of the known participants in such collusion and may, at its option, require that all Bidders certify under penalty of perjury, that no collusion has occurred or exists. The City also, at its option, may reject all Bids received. In accordance with Public Contract Code Section 7106, the Contractor shall complete and file with its proposal the Non-Collusion Affidavit in Section 00480. Public Contract Code Section 7106 requires that the affidavit must be duly sworn.

#### **ARTICLE 11 – INTERPRETATIONS**

No oral representations or interpretations will be made to any Bidder as to the meaning of the Contract Documents. Requests for an interpretation shall be made in writing and delivered to the following address at least ten (10) days before the Bids are opened as provided in Section 00010, **NOTICE INVITING BIDS**.

Requests should be made to Andrew Davidson, Senior Civil Engineer, City of Sausalito, 420 Litho Street, Sausalito, CA 94965.

#### **ARTICLE 12 – WITHDRAWAL OF BID**

In accordance with Public Contract Code Sections 5101 and 5103, within five (5) days after the opening of Bids, a Bidder may withdraw its Bid providing the Bidder can establish to the City’s satisfaction that a mistake was made in preparing the Bid. A Bidder desiring to withdraw shall

give written notice to the City, specifying, in detail, how the mistake occurred and how the mistake made the Bid materially different than it was intended to be. Withdrawal will not be permitted for mistakes resulting from errors in judgment or carelessness in inspecting the site of the Work or in reading the Contract Documents.

### **ARTICLE 13 – BID PROTEST**

Any Bid protest must be submitted in writing to the City Manager before 4:30 p.m. on the fifth (5<sup>th</sup>) working day following Bid opening.

- A. The initial protest document must contain a complete statement of the basis for the protest, and all supporting documentation.
- B. The party filing the protest must have actually submitted a Bid for the Work. A subcontractor of a party submitting a Bid for the Work may not submit a Bid protest. A party may not rely on the Bid protest submitted by another Bidder, but must timely pursue its own protest.
- C. The protest must refer to the specific portion of the Bid document which forms the basis for the protest.
- D. The protest must include the name, address and telephone number of the person representing the protesting party.
- E. The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
- F. The City will give the protested Bidder five (5) working days after the receipt of the protest to submit a written response. The responding Bidder shall transmit the response to the protesting Bidder concurrent with delivery to the City.
- G. The procedure and time limits set forth in this paragraph are mandatory and are the Bidder's sole and exclusive remedy in the event of Bid protest. The Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings
- H. If the City determines that a protest is frivolous, the protesting Bidder may be determined to be non-responsible and that Bidder may be determined to be ineligible for future contract awards.

**ARTICLE 15 – BIDDERS CHECKLIST**

This checklist has been prepared and furnished to aid Bidders in including all necessary supporting information with their Bid. Bidder’s submittals shall include, the following, in addition to any other materials which Bidder may wish to submit:

<u>Item</u>	<u>Checked</u>
Bid Form (Section 00300)	_____
Bid Guaranty Bond (Section 00410)	_____
Certification of Bidder’s Experience and Qualifications (Section 00420)	_____
Designation of Subcontractors (Section 00430)	_____
Site Visit Affidavit (Section 00440)	_____
Non-Collusion Affidavit (Section 00480)	_____
Affidavit of Safety Compliance (Section 00490)	_____
Copy of BIDDER'S California State Contractor's License	_____
BIDDER'S proof of registration with the California Department of Industrial Relations	_____

**ARTICLE 16 – CONTRACTOR REGISTRATION**

Contractor and all subcontractors listed on the bid proposal shall be registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. Contractor must provide proof of registration with the California Department of Industrial Relations (DIR) in the form of a PDF extract from DIR Public Works Registration website.

Pursuant to California SB854, Contractor and subcontractor must submit certified payroll records (CPRs) to the Labor Commissioner.

Project is subject to compliance monitoring and enforcement by the DIR.

**END OF SECTION**

**SECTION 00300**

**BID FORM**

---

PROJECT IDENTIFICATION: Glen Court Sewer Replacement Project

THIS BID IS SUBMITTED TO:

City of Sausalito, herein after referred to as OWNER.

**1. Enter Into Agreement**

The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid Price and within the Bid Times indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

**2. BIDDER Acknowledgements**

BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and 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 day of Bid opening. BIDDER will sign and deliver the required number of counterparts of the Agreement with the Bonds and other documents required by the Bidding Requirements within 10 days after the date of OWNER's Notice of Award.

**3. BIDDER's Representations**

In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

- a. BIDDER has examined and carefully studied the Bidding Documents and the following Addenda receipt of all which is hereby acknowledged: (List Addenda by Number)

ADDENDA NO. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- b. BIDDER has visited the Site and become familiar with and is satisfied as to the general and local site conditions that may affect cost, progress, performance and furnishing of the Work.
- c. BIDDER is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress, performance and furnishing of the Work.

- d. BIDDER has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in the Supplementary Conditions.
- e. BIDDER accepts the determination set forth in Paragraph SC-4.02 of the Supplementary Conditions of the extent of the "technical data" contained in such reports and drawings upon which BIDDER is entitled to rely as provided in Paragraph 4.02 of the General Conditions.
- f. BIDDER acknowledges that such reports and drawings are not Contract Documents and may not be complete for BIDDER's purposes.
- g. BIDDER acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site.
- h. BIDDER has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site or otherwise which may affect cost progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by BIDDER and safety precautions and programs incident thereto.

BIDDER does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the times, price and other terms and conditions of the Contract Documents.

- i. BIDDER is aware of the general nature of Work to be performed by OWNER and others at the Site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.
- j. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
- k. BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.

- l. Where conflicts, errors, ambiguities or discrepancies have been discovered in or between Contract Documents and/or other related documents, and where said conflicts, etc., have not been resolved through the interpretations or clarifications by ENGINEER as described in the Instructions to Bidders, because of insufficient time or otherwise, BIDDER has included in the Bid the greater quantity or better quality of Work, or compliance with the more stringent requirement resulting in a greater cost.
- m. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other BIDDER to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other BIDDER or over OWNER.

#### 4. Bid Prices

##### BID SCHEDULE

BID ITEM NO.	DESCRIPTION	EST. QTY.	UNIT	UNIT PRICE	BID PRICE
1	Mobilization and Demobilization	1	LS		
2	Bypass Pumping and Control of Sewage Flow	1	LS		
3	Dewatering	1	LS		
4	Shoring	1	LS		
5	4-inch C900 DR 18 PVC Sanitary Sewer - Open Cut	10	LF		
6	6-inch HDPE Sanitary Sewer - Pipe Burst	307	LF		
7	6-inch C900 DR 18 PVC Sanitary Sewer - Open Cut with Concrete Cap	50	LF		
8	6-inch C900 PVC Sanitary Sewer - Open Cut	50	LF		
9	Lateral Replacement per Detail A/C03	160	LF		
10	One-Way Clean Out per Detail D/C03	8	EA		
11	48" Manhole per Detail C/C03	3	EA		
12	AC Pavement Restoration Per Detail B/C03	975	SF		
13	Traffic Control	1	LS		
14	CCTV of Sewer Mains and Laterals	1	LS		
15	Builder's Risk Insurance	1	LS		
	<b>TOTAL BASE BID (use figures)</b>				

TOTAL BID FOR ALL BID ITEMS (use words)

\_\_\_\_\_ dollars and

\_\_\_\_\_ cents

**5. Completion**

BIDDER agrees that the Work will be substantially completed and ready for final payment in accordance with Section 00700-6.02 of the General Conditions on or before the dates or within the number of calendar days indicated in Section 00800.

BIDDER accepts the provisions of Section 00700 as to liquidated damages in the event of failure to complete the Work within the times specified.

**6. Attached Documents**

The following documents are attached to and made a condition of this Bid:

- a. Bid Guaranty Bond (Section 00410)
- b. Bidder's Experience and Qualifications (Section 00420)
- c. Designation of Subcontractors (Section 00430)
- d. Site Visit Affidavit (Section 00440)
- e. Non-Collusion Affidavit (Section 00480)
- f. Affidavit of Safety Compliance (Section 00490)
- g. Copy of BIDDER'S California State Contractor's License.
- h. Copy of BIDDER'S proof of registration with the California Department of Industrial Relations (DIR) in the form of a PDF extract from DIR Public Works Registration website.

**7. Major Equipment Items – Not Used**

**8. Documents to be submitted prior to Notice to Proceed:**

- a. Agreement (Section 00500)
- b. Bond of Faithful Performance (Section 00610)
- c. Payment Bond (Section 00620)
- d. Escrow Agreement (Section 00630)
- e. General Liability Endorsement (Section 00650)
- f. Auto Liability Endorsement (Section 00651)

**9. Address for Communications**

Communications concerning this Bid shall be addressed to the address of BIDDER indicated below:

\_\_\_\_\_  
\_\_\_\_\_



Name of Bidder: \_\_\_\_\_

## 10. Defined Terms

Terms used in this Bid which are defined in the General Conditions or Instructions will have the meanings indicated in the General Conditions or Instructions.

SUBMITTED on \_\_\_\_\_, 2015.

If BIDDER is:

### An Individual

By \_\_\_\_\_ (SEAL)  
(Individual's name)

doing business as

\_\_\_\_\_

Business address:

\_\_\_\_\_

### A Partnership

By \_\_\_\_\_ (SEAL)  
(Firm name)

\_\_\_\_\_

(General partner)

Business address:

\_\_\_\_\_

### A Corporation

By \_\_\_\_\_ (SEAL)  
(Corporation name)

\_\_\_\_\_

(State of incorporation)

By \_\_\_\_\_ (SEAL)  
(Name of person authorized to sign)

\_\_\_\_\_

(Title)

(Corporate Seal)

Name of Bidder: \_\_\_\_\_

Attest

\_\_\_\_\_  
(Secretary)

Business address:

\_\_\_\_\_  
\_\_\_\_\_

A Joint Venture

By \_\_\_\_\_ (SEAL)  
(Name)

\_\_\_\_\_  
(Address)

By \_\_\_\_\_ (SEAL)  
(Name)

\_\_\_\_\_  
(Address)

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

**END OF SECTION**

**SECTION 00410**

**BID GUARANTY BOND**  
(To Accompany Bid)

KNOW ALL PERSONS BY THESE PRESENTS:

THAT \_\_\_\_\_, hereinafter called the principal, and \_\_\_\_\_, hereinafter called the Surety, are jointly and severally held and firmly bound unto the City of Sausalito, Sausalito, California, a public entity, hereinafter called the Obligee, each in the penal sum of ten percent of the total amount of the Base Bid Proposal of the Principal for the Work, this sum not to exceed \_\_\_\_\_ dollars of lawful money of the United States for the payment whereof unto the Obligee, the Principal and Surety jointly and severally bind themselves forever.

WHEREAS, the Principal is herewith submitting its offer for the fulfillment of Obligee's Contract for:

**Glen Court Sewer Replacement Project**

NOW, THEREFORE, the condition of this obligation is such that if the Principal is awarded the Contract, and if the Principal within the time specified in the proposal for such Contract enters into, executes and delivers to the Obligee an agreement in the form specified in the Contract Documents complete with evidences of insurance specified in the Contract Documents, and if the Principal within the time specified in the proposal gives to the Obligee the payment and performance bonds specified in the Contract Documents, then this obligation shall be void; otherwise, the Principal and Surety will pay unto the Obligee the difference in money between the total amount of the proposal of the Principal and the amount for which the Obligee legally contracts with another party to fulfill the Contract if the latter amount be excess of the former, but in no event shall the Surety's liability exceed the penal sum hereof.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable under this obligation as Principal, and that nothing of any kind or nature whatsoever that will not discharge the Principal shall operate as a discharge or a release of liability of the Surety.

IT IS HEREBY FURTHER DECLARED AND AGREED that this obligation shall be binding upon and inure to the benefit of the Principal, the Surety and the Obligee and their respective heirs, executors, administrators, successors and assigns.

SIGNED AND SEALED THIS \_\_\_\_\_ day of \_\_\_\_\_, 2015.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**END OF SECTION**

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**SECTION 00420**

**CERTIFICATION OF BIDDER'S  
EXPERIENCE AND QUALIFICATIONS**

(To Accompany Bid)

The undersigned Bidder certifies that it is, at the time of bidding, and shall be, throughout the period of the Contract, licensed under the provisions of Chapter 9, Division 3, of the Business and Professions Code of the State of California, to do the type of work contemplated in the Contract Documents. Bidder shall further certify that it is skilled and regularly engaged in the general class and type of work called for in the Contract Documents.

The Bidder represents that it is competent, knowledgeable, and has special skills on the nature, extent, and inherent conditions of the work to be performed. Bidder further acknowledges that there are certain peculiar and inherent conditions existent in the construction of the particular facilities which may create, during the construction program, unusual or peculiar unsafe conditions hazardous to persons and property. Bidder expressly acknowledges that it is aware of such peculiar risks and that it has the skill and experience to foresee and to adopt protective measures to adequately and safely perform the construction work with respect to such hazards.

**ARTICLE 1 – ESSENTIAL REQUIREMENTS FOR QUALIFICATION**

If the answer to any of questions 1 through 4 is “no,” or if the answer to any of questions 5 through 8 is “yes”, the Bidder will be disqualified from being awarded the Contract.

1. Bidder possesses a valid and current California Contractor’s license for the project for which it intends to submit a Bid.  
 Yes       No
2. Bidder will comply with and provide all insurance as defined in Section 00800-Article 2, **INDEMNITY AND INSURANCE**.  
 Yes       No
3. Bidder has current Workers’ Compensation insurance policy as required by the Labor Code or is legally self-insured pursuant to Labor Code section 3700 et. seq.  
 Yes       No
4. Bidder has registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.  
 Yes       No
5. Has your contractor’s license been revoked at any time in the last five (5) years?  
 Yes       No
6. Has a surety firm completed a contract on your behalf, or paid for completion because your firm was default terminated by the project owner within the last five (5) years?  
 Yes       No

Name of Bidder: \_\_\_\_\_

7. At the time of submitting this qualification form, is your firm ineligible to bid on or be awarded a public works contract, or perform as a subcontractor on a public works contract, pursuant to either Labor Code section 1777.1 or Labor Code section 1777.7?  
 Yes       No
8. At any time during the last five (5) years, has your firm, or any of its owners or officers been convicted of a crime involving the awarding of a contract of a government construction project, or the bidding or performance of a government contract?  
 Yes       No

**ARTICLE 2 – PROJECT EXPERIENCE**

The Bidder shall list below at least five (5) projects completed in the last five (5) years of at least \$700,000 in Contract Amount involving construction of sewer pipelines and manholes that indicate the Bidder's experience as a Contractor. If the Bid is submitted by a Joint Venture, list at least four (4) completed projects. It is acceptable to submit this information on other forms as long as the information required below is included. Failure to provide this information with the Bid may render the Bid non-responsive and may be the basis for rejection of the Bid.

1. Project Name: \_\_\_\_\_  
Owner: \_\_\_\_\_  
Construction Cost: \$ \_\_\_\_\_  
Construction Time: \_\_\_\_\_ Calendar Days  
Owner's Representative: \_\_\_\_\_  
Owner's Telephone No: (\_\_\_\_) \_\_\_\_\_  
Date of Substantial Completion: \_\_\_\_\_
2. Project Name: \_\_\_\_\_  
Owner: \_\_\_\_\_  
Construction Cost: \$ \_\_\_\_\_  
Construction Time: \_\_\_\_\_ Calendar Days  
Owner's Representative: \_\_\_\_\_  
Owner's Telephone No: (\_\_\_\_) \_\_\_\_\_  
Date of Substantial Completion: \_\_\_\_\_

Name of Bidder: \_\_\_\_\_

3. Project Name: \_\_\_\_\_

Owner: \_\_\_\_\_

Construction Cost: \$ \_\_\_\_\_

Construction Time: \_\_\_\_\_ Calendar Days

Owner's Representative: \_\_\_\_\_

Owner's Telephone No: (\_\_\_\_) \_\_\_\_\_

Date of Substantial Completion: \_\_\_\_\_

4. Project Name: \_\_\_\_\_

Owner: \_\_\_\_\_

Construction Cost: \$ \_\_\_\_\_

Construction Time: \_\_\_\_\_ Calendar Days

Owner's Representative: \_\_\_\_\_

Owner's Telephone No: (\_\_\_\_) \_\_\_\_\_

Date of Substantial Completion: \_\_\_\_\_

5. Project Name: \_\_\_\_\_

Owner: \_\_\_\_\_

Construction Cost: \$ \_\_\_\_\_

Construction Time: \_\_\_\_\_ Calendar Days

Owner's Representative: \_\_\_\_\_

Owner's Telephone No: (\_\_\_\_) \_\_\_\_\_

Date of Substantial Completion: \_\_\_\_\_

**ARTICLE 3 – SAFETY QUALIFICATION CRITERIA**

The following information will be used to determine if you meet the minimum safety requirements for this Project. To qualify to bid and be awarded the Project, the Contractor's three year average Workers' Compensation Experience Modification (EMR) must not be greater than 1.1 (110%). The Bidder shall list its Experience Modification Rate for the last three (3) complete years (available from your insurance carrier). If the Bidder's EMR is greater than 1.1 (110%), Contractor may include an explanation of the factors that elevated its EMR. The City will

Name of Bidder: \_\_\_\_\_

evaluate that information as part of its determination of the Bidder's responsibility for purposes of the award of the contract.

<u>Year</u>	<u>EMR</u>
_____	_____
_____	_____
_____	_____

Three Year Average = \_\_\_\_\_

To verify the above information, the City will contact the Bidder's Workers' Compensation Insurance carrier. The Bidder shall authorize its carrier to release this information. Failure to release this information will result in the Bid being non-responsive and result in automatic disqualification of the Bid.

Worker's Compensation Insurance Company: \_\_\_\_\_

Contact Person for Insurance Company: \_\_\_\_\_

Telephone Number: ( \_\_\_\_\_ ) \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2015.

\_\_\_\_\_  
Name of Bidder

\_\_\_\_\_  
Contractor's License No.

\_\_\_\_\_  
Expiration Date

\_\_\_\_\_  
Signature of Bidder

\_\_\_\_\_  
Title of Signatory

**END OF SECTION**



**SECTION 00430**

**DESIGNATION OF SUBCONTRACTORS**

(To Accompany Bid)

In accordance with California Public Contract Code, Section 4100 et. seq., as amended, the following is submitted concerning subcontractors: Each Bidder shall set forth below (a) name and the location of the place of business of each subcontractor who will perform work or labor, fabricate a portion of the Work or improvement according to the Contract Documents, or render service to the Contractor in or about the construction of the Work in an amount in excess of one-half (1/2) of one percent (1%) of the Contractor's total bid or \$10,000, whichever is greater; and (b) the portion of the Work (type and trade) which will be done by each such subcontractor.

If a Contractor fails to specify a subcontractor or, if a Contractor specifies more than one subcontractor for the same portion of work to be performed under the Contract in excess of one-half (1/2) of one percent (1%) of the Contractor's total bid for any portion of the Work as above stated, the Contractor agrees that he/she is fully qualified to perform that portion himself/herself, and that the Contractor shall perform that portion himself/herself. Subcontractor work for which no subcontractor was designated in the original Bid and which is in excess of one-half (1/2) of one percent (1%) of the total Contract Price, will be allowed only with written consent of the City in accordance with applicable law. The Contractor shall provide to the City the license number of each listed subcontractor within ten (10) days of issuance of the Notice to Proceed.

<u>Name of Subcontractor</u>	<u>Business Location</u>	<u>Description of Work to Perform</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**END OF SECTION**

Name of Bidder: \_\_\_\_\_

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Name of Bidder: \_\_\_\_\_

**SECTION 00440**

**SITE VISIT AFFIDAVIT TO BE EXECUTED  
BY BIDDER, NOTARIZED AND SUBMITTED WITH BID  
(To Accompany Bid)**

State of California

County of \_\_\_\_\_

\_\_\_\_\_, being first duly sworn, deposes and says that he or she  
(Contractor's Authorized Representative)

is \_\_\_\_\_ of \_\_\_\_\_  
(Title of Representative) (Contractor's Legal Name)

the party making the foregoing Bid, has visited the Project site as described in the Contract Documents and has examined and familiarized themselves with the existing conditions, as well as all other conditions relating to the construction which will be performed. The submittal of a Bid shall be considered an acknowledgment on the part of the Bidder of familiarity with conditions at the site of the Work and that the site examination has provided adequate and sufficient information related to existing conditions which may affect cost, progress or performance of the Work.

\_\_\_\_\_  
Signature of Authorized Representative

\_\_\_\_\_  
Type/Print Name of Bidder

\_\_\_\_\_  
Type/Print Representative's Name

\_\_\_\_\_  
Type/Print Title

\_\_\_\_\_  
Date

(Certificate of Acknowledgment to be executed by Notary on following page)

Name of Bidder: \_\_\_\_\_

State of California

County of \_\_\_\_\_

On \_\_\_\_\_, before me, \_\_\_\_\_ the  
(Date) (Name and Title of Officer)

undersigned, a notary public in and for said state, personally appeared

\_\_\_\_\_,  
(Name(s) of person(s) signing above document)

personally known to me       proved to me on the basis of satisfactory evidence  
(check appropriate box)

to be the person whose name is subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity, and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

\_\_\_\_\_  
Notary Public

**END OF SECTION**

Name of Bidder: \_\_\_\_\_

**SECTION 00480**

**NON-COLLUSION AFFIDAVIT TO BE EXECUTED  
BY BIDDER, NOTARIZED AND SUBMITTED WITH BID  
(To Accompany Bid)**

\_\_\_\_\_, being first duly sworn, deposes and says that he or she  
(Contractor's Authorized Representative)

is \_\_\_\_\_ of \_\_\_\_\_ the party making the foregoing Bid;  
(Title of Representative) (Contractor's Name)

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

Subscribed and sworn to before me this

\_\_\_\_\_ day of \_\_\_\_\_, 2015

Notary Public in and for the State of California

Public Contract Code Section 7106  
Code of Civil Procedure Section 2015.5

**END OF SECTION**

Name of Bidder: \_\_\_\_\_

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**SECTION 00490**

**AFFIDAVIT OF SAFETY COMPLIANCE TO BE EXECUTED  
BY BIDDER, NOTARIZED AND SUBMITTED WITH BID  
(To Accompany Bid)**

**Glen Court Replacement Project**

The Contractor agrees in accordance with the requirements of Section 00700-4.07, **SAFETY**, that for purposes of California Labor Code Section 6400 and related provisions of law, the Contractor, the Contractor's privities and any other entities acting pursuant to this Contract will be "employers" responsible for furnishing employment and a place of employment that is safe and healthful for the employees, if any, of such entities acting pursuant to this Contract and that the City will not be responsible for having hazards corrected and/or removed at the location where the Work under the Contract is to be performed.

The Contractor hereby acknowledges City concerns regarding safety at its facility and at the Project worksite. The Contractor shall conduct its operations to eliminate or reduce hazards and risks associated with Contractor's activities, to prevent accidents and injuries, and to prevent property damage. Therefore, the Contractor is fully responsible for and shall be in compliance with all of the most current safety, health and environmental regulations (federal, state and local). Non-compliance with these regulations may result in suspension or termination of work in progress. The Contractor's Safety Programs must accomplish the foregoing objectives. The Contractor certifies that its Safety Programs comply and will satisfy these requirements. The Contractor also certifies that each Subcontractor and Sub-subcontractors and other parties with which it has agreements to perform work on the Project worksite will also comply and will satisfy these requirements.

Parts A, B, C and D of the attached Contractor Safety Operations Requirements are not required to be completed and submitted with the Bid. The completed forms shall be submitted for the City's review with the Contractor's Safety Program prior to commencement of work on the Project as required in Section 00700-4.07B, **Safety Program**. The Contractor certifies that it can furnish satisfactory evidence of compliance with the elements identified in the attached Contractor Safety Operations Requirements and the Contractor's Safety Program. The Contractor further acknowledges that its Subcontractors and Sub-subcontractors will provide all Safety Compliance documents to Contractor in accordance with this Section 00490, **AFFIDAVIT OF SAFETY COMPLIANCE** and Section 00700-4.07, **SAFETY**.

Name of Bidder: \_\_\_\_\_

The Contractor acknowledges it has read the City's Confined Space Entry Program included in Appendix B, understands the existing facilities identified as confined spaces therein and will comply with the safety considerations applicable to this Project.

Executed On: \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name of Bidder

\_\_\_\_\_  
Name (Print)

\_\_\_\_\_  
Title

*(Attach a Certificate of Acknowledgement for the Notary to the Affidavit)*



Name of Bidder: \_\_\_\_\_

**CERTIFICATE OF ACKNOWLEDGMENT**

State of California )  
 )  
County of \_\_\_\_\_ )

On \_\_\_\_\_ before me, \_\_\_\_\_,  
*Date Name, Notary Public*

personally appeared \_\_\_\_\_,  
*Name, Title of Officer*

personally known to me - OR - proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to within the instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and official seal.

\_\_\_\_\_  
Signature of Notary

Name of Bidder: \_\_\_\_\_

**CONTRACTOR SAFETY OPERATIONS REQUIREMENTS**  
**(To be submitted with Contractor’s Safety Program prior to commencing work)**

**PART A - SAFETY PROGRAMS**

Please indicate below whether your firm has the following written safety programs. If any of the programs listed do not apply to your operations or this project, please make note of this in the “Comments” column. Include any information that you think would be helpful to us in making this assessment. Those programs that are indicated as mandatory must be available for review before commencing work on this Project. Other safety programs may be requested if it is later determined that they are applicable to the Project, and as such, must be made available for review upon request, at no additional charge to the City.

Program		Written Program		Program meets Cal/OSHA Criteria		Sub will Provide	Project Employees Trained		Training Documented		Comments
		Mandatory	Name	Yes	No		Yes	No	Yes	No	
YES	Injury and Illness Prevention										
YES	Hazard Communication										
YES	Confined Space Operations										
	Respiratory Protection										
YES	Emergency Response										
YES	Hearing Conservation										
YES	Lockout/Tagout										
YES	New Employee Orientation										
YES	Excavation Safety										
YES	Code of Safe Practices										
YES	Personal Protective Equipment (PPE)										
YES	Drugs/Alcohol										
YES	Traffic Control Safety										
YES	Fall Prevention Plan <sup>1</sup>										

<sup>1</sup> If conventional fall protection measures cannot be used.

Name of Bidder: \_\_\_\_\_

**PART B - SAFETY EQUIPMENT**

Identify what safety equipment will be available and used for this Project.

<b>Type</b>	<b>Description / Comments</b>
<input type="checkbox"/> Gas Detectors	
<input type="checkbox"/> Ventilation Equipment	
<input type="checkbox"/> Approved Harnesses and Lanyards	
<input type="checkbox"/> Mechanical Hoists	
<input type="checkbox"/> Fire Extinguishers	
<input type="checkbox"/> First Aid Kits	
<input type="checkbox"/> Respirators	
<input type="checkbox"/> Hard Hats	
<input type="checkbox"/> Hearing Protection	
<input type="checkbox"/> Safety Goggles	
<input type="checkbox"/> Steel Toed Footwear	
<input type="checkbox"/> Hand Protection	
<input type="checkbox"/> Fall Protection	
<input type="checkbox"/> Confined Space Rescue Equipment	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

Name of Bidder: \_\_\_\_\_

**PART C - SPECIALIZED TRAINING AND CERTIFICATION**

Identify the areas of specialized training or certification that will have been completed by employees who will be assigned to this Project. Be prepared to provide documentation as requested.

<input type="checkbox"/> [ ]	CPR / First Aid	<input type="checkbox"/> [ ]	Fork Lift Operation
<input type="checkbox"/> [ ]	Cranes / Hoists Operation	<input type="checkbox"/> [ ]	Heavy Equipment Operation
<input type="checkbox"/> [ ]	Powder-Actuated Tools Use	<input type="checkbox"/> [ ]	Confined Space Operations and Rescue
<input type="checkbox"/> [ ]	Respirators	<input type="checkbox"/> [ ]	Trenching and Shoring Competent Person
	<input type="checkbox"/> [ ] Air-Supplying	<input type="checkbox"/> [ ]	Welding
	<input type="checkbox"/> [ ] Air-Purifying	<input type="checkbox"/> [ ]	Asbestos Abatement
<input type="checkbox"/> [ ]	Scaffolding	<input type="checkbox"/> [ ]	Flagging
<input type="checkbox"/> [ ]	Traffic Control		

**4 PART D – JOB SITE SAFETY PRACTICES**

1. Name of person who will have responsibility for job site safety?

\_\_\_\_\_

2. Who will be responsible for conducting and documenting accident investigations?

\_\_\_\_\_

Does your company perform near-miss investigations? \_\_\_\_\_  
Please provide sample copy of investigation forms.

3. How often are job site safety audits or inspections performed, \_\_\_\_\_  
and by whom? \_\_\_\_\_

4. Does the person who is responsible for job site safety have authority to take immediate action to correct unsafe conditions of work practices? \_\_\_\_\_

5. Who will be designated the competent person for excavation safety on the project?

\_\_\_\_\_

Provide substantiation of training for the competent person.

6. How often are job site tailgate or toolbox safety meetings held? \_\_\_\_\_

7. Briefly describe how you will ensure that workers comply with safety programs and Cal/OSHA requirements? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. Please list any Cal/OSHA citations and penalties you have received in the last three years.

\_\_\_\_\_

\_\_\_\_\_

9. Have there been any on-the-job fatalities at any job site managed by the Contractor in the last five years? \_\_\_\_\_ If yes, please explain.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Does your company have a safety incentive program? \_\_\_\_\_

If yes, please explain. \_\_\_\_\_

\_\_\_\_\_

Name of Bidder: \_\_\_\_\_

**5 PART E – EVALUATION WORKSHEET**

**(FOR USE BY THE CITY ONLY)**

<b>Item</b>	<b>Mandatory Program</b>	<b>Contractor has Written Program</b>	<b>Contractor States Program Meets Cal/OSHA Criteria</b>	<b>Comments</b>
Part A: Safety Programs				
Part B: Safety Equipment				
Part C: Training & Certification				
Part D: Job Site Safety Practice				
Responsible Person Named				
Accident Investigations				
Worksite Safety Inspections				
Competent Person				
Safety Meetings				
Compliance w/ Safety Requirements				
Cal/OSHA Citations/Penalties				
Fatalities				
Safety Incentives				

**END OF SECTION**

**SECTION 00500**

**AGREEMENT FOR THE CONSTRUCTION OF  
Glen Court Sewer Replacement**

THIS AGREEMENT, made and concluded, in triplicate, this \_\_\_\_ day of \_\_\_\_\_, 2015, between the CITY OF SAUSALITO ("City") and \_\_\_\_\_ ("Contractor").

The City and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

**W I T N E S E T H:**

1. That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the City, and under the conditions expressed in the two bonds, bearing even date with these presents, Contractor shall at his/her own proper cost and expense, to do all the Work and furnish all the materials necessary to construct and complete in good workmanlike and substantial manner the project entitled: Glen Court Sewer Replacement in strict conformity with the Contract Documents prepared therefore, which said Contract Documents are hereby specially referred to and by said reference made a part hereof.
2. Contractor hereby agrees to complete the Work in its entirety in accordance with the Contract Documents for the sum of \_\_\_\_\_ (\$\_\_\_\_\_) (the "Contract Sum") computed in accordance with Contractor's accepted proposal dated \_\_\_\_\_, 2015, which accepted proposal is incorporated herein by reference thereto as if herein fully set forth. Compensation shall be based upon any lump sum bid items plus the unit prices stated in the Bid Schedule times the actual quantities or units of work and materials performed or furnished. The further terms, conditions, and covenants of this Agreement are set forth in the Contract Documents, each of which is by this reference made a part hereof. Payments are to be made to the Contractor in accordance with the provisions of the Contract Documents and the Technical Specifications in legally executed and regularly issued warrants of the City, drawn on the appropriate fund or funds as required by law and order of the City.
3. City hereby promises and agrees with the Contractor to employ, and does hereby employ, the Contractor to provide the materials and to do the Work according to the terms and conditions herein contained and referred to, for the prices aforesaid, and hereby contracts to pay the same at the time, in the manner and upon the conditions above set forth; and the parties for themselves, their heirs, executors, administrators, successors and assigns, do hereby agree to the full performance of the covenants herein contained.

4. The Contractor and any subcontractor performing or contracting any work shall comply with all applicable provisions of the California Labor Code for all workers, laborers and mechanics of all crafts, classifications or types, including, but necessarily limited to the following:
  - (a) The Contractor shall comply with all applicable provisions of Sections 1810 to 1815, inclusive, of the California Labor Code relating to working hours. The Contractor shall, as a penalty to the City, forfeit the sum of twenty-five dollars (\$25) for each worker employed in the execution of the Contract by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one calendar week, unless such worker receives compensation for all hours worked in excess of eight (8) hours at not less than 1-1/2 times the basic rate of pay.
  - (b) Pursuant to the provision of California Labor Code, Section 1770 et seq., the Contractor and any subcontractor under him shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations. Pursuant to the provisions of California Labor Code Section 1773.2, the Contractor is hereby advised that copies of the prevailing rate of per diem wages and a general prevailing rate for holidays, Saturdays and Sundays and overtime work in the locality in which the work is to be performed for each craft, classification, or type of worker required to execute the Contract, are on file in the office of the City, which copies shall be made available to any interested party on request. The Contractor shall post a copy of said prevailing rate of per diem wages at each job site.
  - (c) As required by Section 1773.1 of the California Labor Code, the Contractor shall pay travel and subsistence payments to each worker needed to execute the Work, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with this Section.
  - (d) To establish such travel and subsistence payments, the representative of any craft, classification, or type of workman needed to execute the contracts shall file with the Department of Industrial Relations fully executed copies of collective bargaining agreements for the particular craft, classification or type of work involved. Such agreements shall be filed within ten (10) days after their execution and thereafter shall establish such travel and subsistence payments whenever filed thirty (30) days prior to the call for bids.
  - (e) The Contractor shall comply with the provisions of Section 1775 of the California Labor Code and shall, as a penalty to the City, forfeit up to fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rate of per diem wages for each craft, classification, or type of worker needed to execute the Contract. The Contractor shall pay each worker an amount equal to the difference between the prevailing wage rates and the amount paid worker for each calendar day or portion thereof for which a worker was paid less than the prevailing wage rate. Contractor is required to pay all applicable penalties and back wages in the event of violation of prevailing wage law, and Contractor and any subcontractor shall fully comply with California Labor Code Section 1775, which is incorporated by this reference as though fully set forth herein.
  - (f) As required under the provisions of Section 1776 of the California Labor Code, Contractor and each subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Said payroll shall be certified and shall be



available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

- (1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.
- (2) A certified copy of all payroll records enumerated in Paragraph 4(f), herein, shall be made available for inspection or furnished upon request to the City, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.
- (3) A certified copy of all payroll records enumerated in Paragraph 4(f), herein, shall be made available upon request by the public for inspection or for copies thereof; provided, however, that a request by the public shall be made through the City, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to Paragraph 4(e) herein, the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal offices of the Contractor.

The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

Each Contractor shall file a certified copy of the records, enumerated in Paragraph 4(f) with the entity that requested the records within ten (10) days after receipt of a written request. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the City, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the Contractor awarded the Contract or performing the Contract shall not be marked or obliterated. The Contractor shall inform the City of the location of the records enumerated under Paragraph 4(f) including the street address, city and county, and shall, within five (5) working days, provide a notice of change of location and address. The Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects the Contractor must comply with this Paragraph 4(f). In the event that the Contractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or the City, forfeit \$25.00 dollars for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. Responsibility for compliance with Paragraph 4(f) lies with the Contractor.

- (g) The Contractor and any subcontractors shall, when they employ any person in any apprenticeable craft or trade, apply to the joint apprenticeship committee administering the apprenticeship standards of the craft or trade in the area of the construction site for a certificate approving the Contractor or subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected; and shall comply with all other requirements of Section

1777.5 of the California Labor Code. The responsibility of compliance with California Labor Code Section 1777.5 during the performance of this Contract rests with the Contractor. Pursuant to California Labor Code Section 1777.7, in the event the Contractor willfully fails to comply with the provisions of California Labor Code Section 1777.5, the Contractor shall be denied the right to bid on any public works contract for up to three (3) years from the date noncompliance is determined and be assessed civil penalties.

- (h) In accordance with the provisions of Article 5, Chapter 1, Part 7, Division 2 (commencing with Section 1860), and Chapter 4, Part 1, Division 4 (commencing with Section 3700) of the California Labor Code, the Contractor is required to secure the payment of compensation to its employees and for that purpose obtain and keep in effect adequate Workers' Compensation Insurance. If the Contractor, in the sole discretion of the City satisfies the City of the responsibility and capacity under the applicable Workers' Compensation Laws, if any, to act as self-insurer, the Contractor may so act, and in such case, the insurance required by this paragraph need not be provided.

The Contractor is advised of the provisions of Section 3700 of the California Labor Code, which requires every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code and shall comply with such provisions and have Employer's Liability limits of \$1,000,000 per accident before commencing the performance of the Work of this Contract. Contractor and its subcontractors shall comply with the provisions of Section 3700 of the Labor Code, including Longshoremen's and Harbor Workers' Compensation and Jones Act coverages, if applicable, before commencing the performance of the work of this contract.

Contractor shall not commence work until the Contractor submits written evidence that it has obtained full Workers' Compensation Insurance coverage for all persons whom it employs or may employ in carrying out the Work under this Contract. This insurance shall be in accordance with the requirements of the most current and applicable state Workers' Compensation Insurance Laws. In accordance with the provisions of Section 1861 of the California Labor Code, the Contractor in signing this agreement certifies to the City as true the following statement: "I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the Work of this Contract." A subcontractor is not allowed to commence work on the project until verification of Workers' Compensation Insurance coverage has been obtained and verified by the Contractor and submitted to the Construction Manager for the City's review and records.

- (i) In accordance with the provisions of Section 1727 of the California Labor Code, the City, before making payment to the Contractor of money due under a contract for public works, shall withhold and retain therefrom all wages and penalties which have been forfeited pursuant to any stipulation in the Contract, and the terms of Chapter 1, Part 7, Division 2 of the California Labor Code (commencing with Section 1720). But no sum shall be withheld, retained or forfeited, except from the final payment, without a full investigation by either the Division of Labor Standards Enforcement or by the City.

5. It is further expressly agreed by and between the parties hereto that should there be any conflict between the terms of this Agreement and the bid proposal of Contractor, then this Agreement shall control, and nothing herein contained shall be considered as an acceptance of the terms of Contractor's proposal conflicting herewith.
6. The Contractor agrees to provide and maintain insurance coverage, and to indemnify and save harmless the parties named and in the manner set forth in Section 00800-Article 2, **INDEMNITY AND INSURANCE**, of the Supplementary General Conditions of the Specifications.

The duty of Contractor to indemnify and save harmless, as set forth herein, shall include a duty to defend as set forth in Section 2778 of the California Civil Code; provided, however, that nothing herein shall be construed to require Contractor to indemnify against any responsibility or liability in contravention of Section 2782 of the California Civil Code.

7. The Contractor shall diligently prosecute the Work so that it shall be substantially completed within the time specified in Section 00800-1.01, **TIME ALLOWED FOR COMPLETION**.
8. Except as otherwise may be provided herein, Contractor hereby expressly guarantees for two (2) full years from the date of the Substantial Completion of the Work under this Agreement and acceptance thereof by the City, to repair or replace any part of the Work performed hereunder which constitutes a defect resulting from the use of inferior or defective materials, equipment or workmanship. If, within said period, any repairs or replacements in connection with the Work are, in the opinion of the City, rendered necessary as the result of the use of inferior or defective materials, equipment or workmanship, Contractor agrees, upon receipt of notice from the City, and without expense to the City, to promptly, and in no event more than ten (10) days, after receipt of written notice from City repair or replace such material or workmanship and/or correct any and all defects therein. If Contractor, after such notice, fails to proceed promptly to comply with the terms of this guarantee, the City may perform the work necessary to effectuate such correction and recover the cost thereof from the Contractor or its sureties.

In special circumstances where a particular item of work or equipment is placed in continuous service before substantial completion of the Work, the correction period for that item may start to run from an earlier date. This date shall be agreed upon by the Contractor and the City on or before the item is placed in continuous service.

Any and all other special guarantees which may be applicable to definite parts of the Work under this Agreement shall be considered as an additional guarantee and shall not reduce or limit the guarantee as provided by Contractor pursuant to this paragraph during the first year of the life of such guarantee.

9. The Contractor shall provide, on the execution of this Agreement, a good and sufficient corporate surety bond in the penal sum of one hundred percent (100%) of amount bid, which bond shall be on the form provided by the City in Section 00610, **BOND OF FAITHFUL PERFORMANCE**, and be conditioned upon the faithful performance of all Work required to be performed by the Contractor under this Agreement. Said bond shall be liable for any and all penalties and obligations which may be incurred by Contractor under this Agreement. The surety bond shall be issued by a corporate surety authorized to conduct business in California. At its discretion, the City may request that a certified

copy of the certificate of authority of the insurer issued by the Insurance Commissioner of the State of California be submitted by the surety to the City. At its discretion, the City may also require the insurer to provide copies of its most recent annual statement and quarterly statement filed with the Department of Insurance pursuant to Article 10 (commencing with Section 900) of Chapter 1 of Part 2 of Division 1 of the Insurance Code.

10. In addition to the bond required under Paragraph 9, hereof, Contractor shall furnish a good and sufficient corporate surety bond in the penal sum of one hundred percent (100%) of amount of bid, which bond shall be on the form provided by the City in Section 00620, **PAYMENT BOND**, and conform strictly with the provisions of Chapter 7, Title 15, Part 4, Division 3, of the Civil Code of the State of California, and all amendments thereto. The corporate surety bond shall be issued by a corporate surety authorized to conduct business in California. At its discretion, the City may request that a certified copy of the certificate of authority of the insurer issued by the Insurance Commissioner of the State of California be submitted by the surety to the City. At its discretion, the City may also require the insurer to provide copies of its most recent annual statement and quarterly statement filed with the Department of Insurance pursuant to Article 10 (commencing with Section 900) of Chapter 1 of Part 2 of Division 1 of the Insurance Code.
11. The Contractor may substitute securities for the amounts retained by the City to ensure performance of the Work in accordance with the provisions of Section 22300 of the Public Contract Code.
12. The Contractor shall be provided the time period specified in Section 01300-1.03, **MATERIAL AND EQUIPMENT SUBSTITUTIONS**, for submission of data substantiating a request for a substitution of an "or equal" item.
13. As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the Contract involves the excavation of any trench or trenches five feet or more in depth, the Contractor shall submit in advance of excavations, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards established by the Construction Safety Orders of the Division of Industrial Safety in Title 8, Subchapter 4, Article 6, California Code of Regulations, the plan shall be prepared by a registered civil or structural engineer employed by the Contractor, and all costs therefore shall be included in the price named in the Contract for completion of the Work as set forth in the Contract Documents. Nothing in this Section shall be deemed to allow the use of a shoring, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this Section shall be construed to impose tort liability on the City, the Design Consultant, Construction Manager nor any of their agents, consultants, or employees. The City's review of the Contractor's excavation plan is only for general conformance to the California Construction Safety Orders.

Prior to commencing any excavation, the Contractor shall designate in writing to the Construction Manager the competent person(s) with the authority and responsibilities designated in the Construction Safety Orders.

14. In accordance with Section 7104 of the Public Contract Code, whenever any work involves digging trenches or other excavations that extend deeper than four feet below the surface, the provisions of Section 00700-7.02, **DIFFERING SITE CONDITIONS**, shall apply.
15. In accordance with Section 7103.5 of the Public Contract Code, the Contractor and subcontractors shall conform to the following requirements. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or subcontractor offers and agrees to assign to the City all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act [Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code], arising from purchases of goods, materials or services pursuant to this Contract or the subcontract. Such assignment shall be made and become effective at the time the City tenders final payment to the Contractor, without further acknowledgment by the parties.
16. In accordance with Section 4552 of the Government Code, the Contractor shall conform to the following requirements. In submitting a Bid to the City, the Contractor offers and agrees that if the Bid is accepted, it will assign to the City all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act [Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code], arising from purchase of goods, materials, or services by the Contractor for sale to the City pursuant to the Bid. Such assignment shall be made and become effective at the time the City tenders final payment to the Contractor.
17. Pursuant to Public Contract Code Section 7100, the acceptance by the Contractor of an undisputed payment made under the terms of the Contract shall operate as, and shall be, a release to the City, and their duly authorized agents, from all claim of and/or liability to the Contractor arising by virtue of the Contract related to those amounts. Disputed contract claims in stated amounts may be specifically excluded by the Contractor from the operation of the release.
18. In accordance with California Business and Professions Code Section 7030, the Contractor is required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within 10 years of the date of the alleged violation. Any questions concerning the Contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, California 95826.
19. The acceptance of each payment made to Contractor under this Agreement shall constitute a warranty that all subcontractors, laborers and material suppliers on the Project have been paid for all work, material, labor provisions, provender, equipment, or other supplies and efforts made toward the construction of improvements.
20. **INDEMNIFICATION.** Contractor shall indemnify, defend with counsel acceptable to Owner, and hold harmless to the full extent permitted by law, the City and its officers, officials, employees, agents and volunteers, Design Consultant and all of their respective agents and employees; (collectively "the Indemnified Parties") in accordance with the requirements of Section 00800-2.01E, **Indemnification**.

21. **SEVERABILITY.** If any term or portion of this Agreement is held to be invalid, illegal, or otherwise enforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.
22. **LICENSE.** Contractor's attention is directed to Business and Professions Code Sections 7000 et seq. concerning the licensing of contractors. At the time Contractor enters into this Contract and all times Contractor is performing the Work, Contractor shall have a valid license issued by the Contractors State License Board in the classification stated in the Special Provisions. All bidders and subcontractors shall be licensed in accordance with the laws of this State and any contractor or subcontractor not so licensed is subject to penalties imposed by such laws.

CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD WHICH HAS JURISDICTION TO INVESTIGATE COMPLAINTS AGAINST CONTRACTORS IF A COMPLAINT REGARDING A PATENT ACT OR OMISSION IS FILED WITHIN FOUR YEARS OF THE DATE OF THE ALLEGED VIOLATION. A COMPLAINT REGARDING A LATENT ACT OR OMISSION PERTAINING TO STRUCTURAL DEFECTS MUST BE FILED WITHIN 10 YEARS OF THE DATE OF THE ALLEGED VIOLATION. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P.O. BOX 26000, SACRAMENTO, CALIFORNIA 95826.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

CONTRACTOR

By: \_\_\_\_\_

Title: \_\_\_\_\_

THE CITY OF SAUSALITO

By: \_\_\_\_\_

Lilly Whalen, City Clerk  
City of Sausalito, California

ATTEST:

By: \_\_\_\_\_

City Counsel

**END OF SECTION**

SECTION 00610

BOND OF FAITHFUL PERFORMANCE

BOND NO. \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the City Council of the City of Sausalito (hereinafter referred to as "City") has awarded to \_\_\_\_\_, (hereinafter referred to as the "Contractor") an agreement (the "Contract") for construction of the **Glen Court Sewer Replacement Project** (hereinafter referred to as the "Project").

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

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

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

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

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

As a condition precedent to the satisfactory completion of the Project, unless otherwise provided for in the Contract Documents, the above obligation shall hold good for a period of one (1) year after the acceptance of the work by City, during which time Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the City from loss or damage resulting from or caused by defective materials or faulty workmanship. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the City's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

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

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

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

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



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

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

(Corporate Seal)

\_\_\_\_\_  
Contractor/ Principal

By \_\_\_\_\_

Title \_\_\_\_\_

(Corporate Seal)

\_\_\_\_\_  
Surety

By \_\_\_\_\_

Attorney-in-Fact

(Attach Attorney-in-Fact Certificate)

Title \_\_\_\_\_

**SIGNATURES OF THOSE SIGNING FOR SURETY MUST BE NOTARIZED, AND EVIDENCE OF CORPORATE AUTHORITY ATTACHED.**

The rate of premium on this bond is \_\_\_\_\_ per thousand. The total amount of premium charges, \$\_\_\_\_\_.

(The above must be filled in by corporate attorney.)

**THIS IS A REQUIRED FORM**

Any claims under this bond may be addressed to:

(Name and Address of Surety)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

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---

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

---

**END OF SECTION**

**SECTION 00620**

**PAYMENT BOND**

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the City Council of the City of Sausalito (hereinafter referred to as "City") has awarded to \_\_\_\_\_, (hereinafter referred to as the "Contractor") an agreement (the "Contract") for construction of:

Glen Court Sewer Replacement Project (hereinafter referred to as the "Project").

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

WHEREAS, the Contractor is required by the Contract Documents to furnish a bond to secure payment for all work, labor, materials, equipment or services furnished in connection with the Construction Contract;

NOW, THEREFORE, CONTRACTOR, as principal, and \_\_\_\_\_ (hereinafter referred to as "Surety"), as surety, are held and firmly bound unto City, as defined herein, in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States, for the payment of which sum well and truly to be made as provided in this Payment Bond.

1. CONTRACTOR and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to CITY to pay for work, labor, materials, equipment, services, or other items furnished for use and actually used in the performance of the Construction Contract, which is incorporated herein by reference.
2. With respect to CITY, this obligation shall be null and void if CONTRACTOR:
  - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
  - 2.2 Defends, indemnifies and holds CITY harmless from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for work, labor, materials, equipment, services or other items furnished for use in the performance of the Construction Contract, provided CITY has promptly notified CONTRACTOR and Surety (at the address described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to CONTRACTOR and Surety.
3. With respect to Claimants, this obligation shall be null and void if CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
  - 4.1 Claimants who are employed by or have a direct contract with CONTRACTOR have given notice to Surety (at the address described below) and sent a copy, or notice thereof, to CITY, stating that a claim is being made under this Payment Bond and, with substantial accuracy, the amount of the claim.
  - 4.2 Claimants who do not have a direct contract with the CONTRACTOR:
    - 4.3. Have furnished written notice to CONTRACTOR and sent a copy, or notice thereof, to CITY, as required by and conforming with Civil Code sections 3252 and 3091; and
    - 4.4. Not having been paid within 30 days of sending the required notice, have sent a written notice to Surety (at the address described below) and sent a copy to the CITY, stating that a claim is being made under this Payment Bond and enclosing a copy of the previous written notice furnished to CONTRACTOR.

5. When the Claimant has satisfied the conditions of Paragraph 4, Surety shall promptly and at Surety's expense take the following actions:
  - 5.1 Send an answer to the Claimant, with a copy to CITY, within 20 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
  - 5.2 Pay or arrange for payment of any undisputed amounts.
6. Surety's total obligation shall not exceed the amount of this Payment Bond, and the amount of this Payment Bond shall be credited for any payments made in good faith by Surety.
7. Amounts owed by CITY to CONTRACTOR under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under the Performance Bond. By CONTRACTOR furnishing and CITY accepting this Payment Bond, they agree that all funds earned by CONTRACTOR in the performance of the Construction Contract are dedicated to satisfy obligations of CONTRACTOR and Surety under this Bond, subject to the CITY'S priority to use the funds for the completion of the work or the satisfaction of CITY'S claims, including liquidated damages, under the Construction Contract.
8. Surety shall not be liable to CITY, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Construction Contract. CITY shall not be liable for payment of any costs or expenses of any Claimants under this Payment Bond, and shall have under this Payment Bond no obligation to make payments to, give notices on behalf of, or otherwise have any obligation to Claimants under this Payment Bond.
9. Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
10. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction. The prevailing party in any such action shall be entitled to recover its attorneys' fees, to be taxed as costs.
11. Notice to Surety, City or Contractor shall be mailed or delivered to the address shown on the signature page.
12. This Payment Bond has been furnished to comply with Civil Code sections 3247 through 3252. Any provision in this Payment Bond conflicting with those statutory requirements shall be deemed deleted and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Payment Bond shall be construed as a statutory bond and not as a common law bond.
13. Upon request by any person or entity appearing to be a potential beneficiary of this Payment Bond, the Contractor shall promptly furnish a copy of this Payment Bond or shall permit a copy to be made.
14. DEFINITIONS
  - 14.1 Claimant: An individual or entity identified in California Civil Code sections 3181 or 3248.
  - 14.2 Construction Contract: The agreement between CITY and CONTRACTOR identified above, including all Contract Documents and changes thereto.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their seals this \_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to the authority of its governing body.

(Corporate Seal)

\_\_\_\_\_  
Contractor/ Principal

By \_\_\_\_\_

Title \_\_\_\_\_

(Corporate Seal)

\_\_\_\_\_  
Surety

By \_\_\_\_\_  
Attorney-in-Fact

(Attach Attorney-in-Fact Certificate)

Title \_\_\_\_\_

SIGNATURES OF THOSE SIGNING FOR SURETY MUST BE NOTARIZED, AND EVIDENCE OF CORPORATE AUTHORITY ATTACHED.

The rate of premium on this bond is \_\_\_\_\_ per thousand. The total amount of premium charges, \$ \_\_\_\_\_.

(The above must be filled in by corporate attorney.)

**THIS IS A REQUIRED FORM**

Any claims under this bond may be addressed to:

(Name and Address of Surety) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(Name and Address of Agent or \_\_\_\_\_

Representative for service of  
process in California, if different \_\_\_\_\_  
from above)

\_\_\_\_\_

(Telephone number of Surety and \_\_\_\_\_

Agent or Representative for service of process in California

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**SECTION 00630**

**ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION  
Glen Court Sewer Replacement Project**

This Escrow Agreement is made and entered into by and between; the City of Sausalito, whose address is 420 Litho Street, Sausalito, CA 94965; hereinafter called "City", and \_\_\_\_\_  
(Contractor)

whose address is \_\_\_\_\_  
hereinafter called "Contractor", and \_\_\_\_\_  
(Escrow Agent)

whose address is \_\_\_\_\_  
hereinafter called "Escrow Agent."

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

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities which meet the requirements set forth in said Section 22300, with Escrow Agent, as a substitute for retention earnings required to be withheld by the City pursuant to the Construction Contract entered into between the City and Contractor for \_\_\_\_\_ in the amount of \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the City shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the City within ten (10) days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the City and Contractor. Securities shall be held in the name of the City, and shall designate the Contractor as the beneficial Owner.
2. The City shall make progress payments to Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.
3. When the City makes payment of retentions earned directly to the Escrow Agent the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this Contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the City pays the Escrow Agent directly.
4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of the City. These expenses and payment terms shall be determined by the City, Contractor, and Escrow Agent.
5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the City.
6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization

from the City to the Escrow Agent that the City consents to the withdrawal of the amount sought to be withdrawn by Contractor.

7. The City shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven (7) days' written notice to the Escrow Agent from the City of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the City.
8. Upon receipt of written notification from the City certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.
9. Escrow Agent shall rely on the written notifications from the City and the Contractor pursuant to Sections (5) to (8), inclusive, of this Agreement, and the City and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.
10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the City and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:



On Behalf of the City:

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

On Behalf of Escrow Agent:

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

On Behalf of Contractor:

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

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

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

City:

Contractor:

\_\_\_\_\_

Title

\_\_\_\_\_

Title

\_\_\_\_\_

Name

\_\_\_\_\_

Name

\_\_\_\_\_

Signature

\_\_\_\_\_

Signature

**END OF SECTION**

**SECTION 00650**

**GENERAL LIABILITY ENDORSEMENT (FORM A-1)**

THE CITY OF SAUSALITO (City)  
420 Litho Street  
Sausalito, CA 94965

**Glen Court Sewer Replacement Project**

**1 ARTICLE 1 – POLICY INFORMATION**

- 1. Insurance Company: \_  
Policy Number: \_\_\_\_\_
- 2. Policy Term (From) \_\_ (To) \_\_  
Endorsement Effective Date: \_\_\_\_\_
- 3. Named Insured: \_\_\_\_\_
- 4. Address of Named Insured: \_\_\_\_\_
- 5. Limit of Liability Any One Occurrence / Aggregate  
\$ \_\_\_\_\_
- 6. Deductible or Self-Insured Retention (Nil unless otherwise specified)  
\$ \_\_\_\_\_

**2 ARTICLE 2 – POLICY AMENDMENTS**

This endorsement is issued in consideration of the policy premium. Notwithstanding any inconsistent statement in the policy to which this endorsement is attached or any other endorsement attached thereto it is agreed as follows:

- 1. **INSURED.** The City, the Design Consultant, the Construction Manager, City Engineer, and each of their officers, partners, employees, and agents are included as additional insureds with regard to damages and defense of claims arising from: (a) activities performed by or on behalf of the Named Insured, (b) products and completed operations of the Named Insured, or (c) premises owned, leased or used by the Named Insured.

2. **CONTRIBUTION NOT REQUIRED.** As respects: (a) work performed by the Named Insured for or on behalf of the City; or (b) products sold by the Named Insured to the City; or (c) premises leased by the Named Insured from the City, the insurance afforded by this policy shall be primary insurance as respects the City, the Design Consultant and the Construction Manager, and each of their officers, employees, and agents; or stand in an unbroken chain of coverage excess of the Named Insured's scheduled underlying primary coverage. In either event, any other insurance maintained by the City, the Design Consultant and the Construction Manager and each of their officers, employees, and agents shall be excess of this insurance and shall not contribute with it.
3. **SCOPE OF COVERAGE.** The policy: (1) if primary, affords coverage at least as broad as Insurance Services Office Commercial General Liability Coverage (occurrence form CG 0001, Edition 1987); or (2) if excess, affords coverage which is at least as broad as the primary insurance forms referenced in the preceding Section (1).
4. **SEVERABILITY OF INTEREST.** The insurance afforded by this policy applies separately to each insured who is seeking coverage or against whom a claim is made or a suit is brought, except with respect to the Company's limit of liability.
5. **PROVISIONS REGARDING THE INSURED'S DUTIES AFTER ACCIDENT OR LOSS.** Any failure to comply with reporting provisions of the policy shall not affect coverage provided to the City, the Design Consultant and the Construction Manager and each of their officers, employees, and agents.
6. **CANCELLATION NOTICE.** The insurance afforded by this policy shall not be suspended, voided, canceled, reduced in coverage or in limits except after thirty (30) days' prior notice by certified mail return receipt requested has been given to the City. Such notice shall be addressed as shown in the heading of this endorsement.

**3 ARTICLE 3 – INCIDENT AND CLAIM REPORTING PROCEDURE**

Incidents and claims are to be reported to the insurer at:

Attn: \_\_\_\_\_

\_\_\_\_\_  
*(Title)*

\_\_\_\_\_  
*(Department)*

\_\_\_\_\_  
*(Company)*

\_\_\_\_\_  
*(Street Address)*

\_\_\_\_\_  
*(Agency)*

\_\_\_\_\_  
*(State)*

\_\_\_\_\_  
*(Zip Code)*

\_\_\_\_\_  
*(Telephone Number)*

**4 ARTICLE 4 – SIGNATURE OF INSURER OR UNDERWRITER**

I, \_\_\_\_\_ (print/type name), warrant that I have authority to bind the below listed insurance company and by my signature hereon do so bind this company. By signature below, the surety warrants that if requested by the City, it will furnish a certified copy of the certificate of authority issued by the Insurance Commissioner of the State of California.

Signature of: \_\_\_\_\_  
Insurer or Underwriter

(original signature required on endorsement furnished to the City)

ORGANIZATION: \_\_\_\_\_ TITLE: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_ TELEPHONE: ( ) \_\_\_\_\_

**END OF SECTION**

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**SECTION 00651**

**AUTO LIABILITY ENDORSEMENT (FORM B-1)**

CITY OF SAUSALITO ("City")  
420 Litho Street  
Sausalito, CA 94965

**Glen Court Sewer Replacement Project**

**1 ARTICLE 1 – POLICY INFORMATION**

1. Insurance Company: \_\_\_\_\_

Policy Number: \_\_\_\_\_

2. Policy Term (From) \_\_\_\_\_ (To) \_\_\_\_\_

Endorsement Effective Date:

3. Named Insured: \_\_\_\_\_

4. Address of Named Insured: \_\_\_\_\_

5. Limit of Liability Any One Occurrence / Aggregate

\$ \_\_\_\_\_

6. Deductible or Self-Insured Retention (Nil unless otherwise specified)

\$ \_\_\_\_\_

**2 ARTICLE 2 – POLICY AMENDMENTS**

This endorsement is issued in consideration of the policy premium. Notwithstanding any inconsistent statement in the policy to which this endorsement is attached or any other endorsement attached thereto it is agreed as follows:

- INSURED.** The City, the Design Consultant, the Construction Manager, City Engineer, and each of their officers, partners, employees, and agents are included as additional insureds with regard to damages and defense of claims arising from ownership, operation, maintenance, use, loading or unloading of any auto owned, leased, hired, or borrowed by the Named Insured, regardless of whether liability is attributable to the Named Insured or a combination of the Named Insured and the City, the Design Consultant and the Construction Manager and each of its officers, employees, and agents.

- 2. **CONTRIBUTION NOT REQUIRED.** As respects work performed by the Named Insured for or on behalf of the City, the insurance afforded by this policy shall: (a) be primary insurance as respects the City, the Design Consultant, and the Construction Manager and each of their officers, employees, and agents; or (b) stand in an unbroken chain of coverage excess of the Named Insured’s primary coverage. In either event, any other insurance maintained by the City, the Design Consultant and the Construction Manager and each of their officers, employees, and agents shall be excess of this insurance and shall not contribute with it.
- 3. **SCOPE OF COVERAGE.** The policy affords coverage to the Named Insured, which is at least as broad as Insurance Services Office form number CA 0001 (Ed. 1/87) covering automobile liability, Code 1 (“any auto”).
- 4. **SEVERABILITY OF INTEREST.** The insurance afforded by this policy applies separately to each insured who is seeking coverage or against whom a claim is made or a suit is brought, except with respect to the Company's limit of liability.
- 5. **PROVISIONS REGARDING THE INSURED'S DUTIES AFTER ACCIDENT OR LOSS.** Any failure to comply with reporting provisions of the policy shall not affect coverage provided to the City, the Design Consultant and the Construction Manager and each of their officers, employees, and agents.
- 6. **CANCELLATION NOTICE.** The insurance afforded by this policy shall not be suspended, voided, canceled, reduced in coverage or in limits except after thirty (30) days' prior notice by Certified Mail Return Receipt requested has been given to the City. Such notice shall be addressed as shown in the heading of this endorsement.

**3 ARTICLE 3 – INCIDENT AND CLAIM REPORTING PROCEDURE**

Incidents and claims are to be reported to the insurer at:

Attn: \_\_\_\_\_

*(Title)* *(Department)*

\_\_\_\_\_

*(Company)*

\_\_\_\_\_

*(Street Address)*

\_\_\_\_\_

*(Agency)* *(State)* *(Zip Code)*

\_\_\_\_\_

*(Telephone Number)*



**4 ARTICLE 4 – SIGNATURE OF INSURER OR UNDERWRITER**

I, \_\_\_\_\_ (print/type name), warrant that I have authority to bind the below listed insurance company and by my signature hereon do so bind this company. By signature below, the surety warrants that if requested by the City, it will furnish a certified copy of the certificate of authority issued by the Insurance Commissioner of the State of California.

Signature of: \_\_\_\_\_  
Insurer or Underwriter

(original signature required on endorsement furnished to the City)

ORGANIZATION: \_\_\_\_\_ TITLE: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_ TELEPHONE: ( ) \_\_\_\_\_

**END OF SECTION**

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## SECTION 00700

### GENERAL CONDITIONS

#### 1 ARTICLE 1 - GENERAL

##### 1.01 CONTRACT AGREEMENT

A Bidder to whom award is made shall execute a written Agreement and required supplementary documents and submit them to the City within ten (10) days after the Notice of Award has been received by the Bidder at the address given in Section 00300, **BID FORM**. The Agreement shall be made in the form adopted by the City and incorporated in Section 00500, **AGREEMENT**.

If the lowest responsive, responsible Bidder to whom award is made fails to enter into the Contract, as herein provided, the Bidder's Security will become the property of the City, and an award may be made to the next lowest responsive, responsible Bidder, and such Bidder shall fulfill every stipulation embraced herein as if it were the party to whom the first award was made. A corporation, partnership, or joint venture to which an award is made will be required, before the Agreement is finally executed, to furnish evidence of its corporate existence and evidence that the officer signing the Agreement and bonds for the corporation is duly authorized to do so in the form as stated in Section 00100-Article 3, **BIDDER'S SIGNATURE AND AUTHORITY**.

In the event the Contractor is a joint venture of two or more contractors, the grants, covenants, provisos and claims, rights, power, privileges and liabilities of the Contract shall be construed and held to be several as well as joint. Any notice, order, direct request or any communication required to be or that may be given by the City or the Construction Manager to the Contractor under this Contract, shall be well and sufficiently given to all persons being the Contractor if given to any one or more of such persons. Any notice, request or other communication given by any one of such persons to the City or the Construction Manager under this Contract shall be deemed to have been given by and shall bind all persons being the Contractor.

If any part of the Work to be done under this Contract is subcontracted, the subcontract shall be in writing and shall provide that all work to be performed thereunder shall be performed in accordance with the terms of the Agreement. The subcontracting of any or all of the work to be done will in no way relieve the Contractor of any part of its responsibility under the Contract. Certified copies of subcontract agreements will be provided by the Contractor to the City upon request.

Equipment supplied under this Contract shall be furnished in accordance with a written agreement, and such agreement shall provide that any equipment supply shall be performed in accordance with the terms of the Contract Documents. Certified copies of agreements for equipment supply will be provided by the Contractor to the City upon request.

The Contractor shall not assign, transfer, convey, or otherwise dispose of the Contract, or its right, title, or interest therein, or its power to execute such Contract, to any other person, firm, or corporation without previous consent in writing of the City.

## **1.02 WRITTEN NOTICE AND SERVICE THEREOF**

Any notice to any party relative to any part of this Contract shall be in writing and considered delivered and the service thereof completed as follows:

when said notice is posted deposited in the U.S. Mail, postage prepaid, to said party at its last given address, notice will be effective two business days after mailing;

or if delivered in person to the said party or its authorized representative of the Work, notice will be effective upon delivery;

or if sent by facsimile to the said party or its authorized representative at a fax number provided in connection with the Project, notice will be effective upon receipt.

## **1.03 RIGHTS OF ACTION**

No right of action shall accrue upon or by reason of this Agreement to or for the use or benefit of anyone other than the parties to this Agreement. The parties to this Agreement are the Contractor and the City.

## **1.04 PLANS AND SPECIFICATIONS**

The Contract Documents are complementary; what is called for by one is as binding as if called for by all. It is the intent of the Drawings and Specifications to describe a functionally complete and operable Project (and all parts thereof) to be constructed in accordance with the requirements of the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the requirements of the Contract Documents or from prevailing custom or trade usage as being required to produce this intended result will be furnished and performed whether or not specifically called for. When words or phrases that have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. The intent of the Drawings specifically includes the intent to depict construction that complies with all applicable laws, codes and standards. Subject to applicable law, including but not limited to California Public Contract Code Section 4100 *et seq.*, and the terms of this Contract governing subcontracting, the Divisions and Sections of the Specifications and 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.

Reasonably implied parts of the Work shall be performed as “incidental work” even though absent from the Drawings and Specifications. “Incidental” work shall be performed by Contractor without extra cost to the City. Incidental work includes any work not shown on Drawings nor described in the Specifications, which is necessary or

required to make each installation satisfactory, legally operable, functional, consistent with the intent of the Drawings and Specifications or the requirements of the Contract Documents. Incidental work shall be treated as if fully described in Specifications and shown on Drawings, and expense thereof shall be included in the Bid Price. Incidental work includes, but is not limited to, tasks required to be performed under Division 1 **GENERAL REQUIREMENTS** of the Specifications.

Upon Notice to Proceed, the Contractor may obtain from the City, free of charge, two (2) copies of the conformed Plans (half-size) and Specifications. The Contractor may also obtain from the City, free of charge, two (2) sets of full-size prints of the Plans. Additional sets of the Plans and Specifications may be procured at the cost of printing and binding. The Owner will also provide one electronic copy of the conformed Plans and Specifications upon receipt of an executed release from the Contractor. The Owner will furnish the release form at the Contractor's request.

Both the Plans and Specifications will be conformed by incorporating all addenda which may have been issued during the bid period to the original bid documents. These "Issued for Construction" documents will be provided no later than the date of the Notice to Proceed. The "Issued for Construction" documents will be produced for the convenience and efficiency of all parties involved with construction. In the event of a discrepancy or failure to include a specific item of any addendum, the addendum as issued during the bid period shall take precedence over the "Issued for Construction" documents.

The Contractor shall keep on the work site a copy of the Plans and Specifications and shall at all times give the Construction Manager access thereto. Any Drawings included in the Specifications shall be regarded as part thereof and of the Contract. Anything mentioned in these Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in these Specifications, shall be of like effect as though shown or mentioned in both. The Construction Manager will furnish from time to time such drawings, plans, profiles, and information, as it may consider appropriate for the Contractor's guidance. Unless otherwise provided in the Contract Documents, it shall be the duty of the Contractor to see that all provisions are complied with in detail irrespective of the inspections given the work during its progress by the authorized official or its representatives. Any failure on the part of the Contractor to observe the Contract Documents will be sufficient cause for the rejection of the work at any time before its acceptance.

Wherever reference specifications are referred to in these Specifications without designation of year, the reference is to the current or revised specification effective at the time of the City receiving bids, unless otherwise referenced in Section 01060, **REGULATORY REQUIREMENTS AND PERMITS**.

## **1.05 APPLICABILITY OF ALL PARAGRAPHS OF SPECIFICATIONS**

The Technical Specifications are presented in paragraphs for convenience. However, this presentation does not necessarily delineate trades or limits of responsibility. All paragraphs of the Plans and Specifications are interdependent and applicable to the Project as a whole.

The Specifications and all notes on the Drawings are directed to the Contractor and all Work shall be performed by the Contractor even though phrases such as "the Contractor shall" or "shall be done by the Contractor" are omitted. Where terms such as "approved," "acceptable," "favorably reviewed," "review," "selected," "directed," "equivalent," "equal," or "satisfactory" are used, it shall mean by or to the Construction Manager and/or Design Consultant.

## **1.06 CONTRACT INTERPRETATION BY THE CONSTRUCTION MANAGER**

Any discrepancies found between the Contract Documents and site conditions or any inconsistencies or ambiguities in the Contract Documents shall be immediately reported, in writing, to the Construction Manager. Questions regarding the meaning and intent of the Contract Documents shall be referred in writing by the Contractor to the Construction Manager with a Request for Information. The Construction Manager shall respond to the Contractor in writing with a decision within fifteen (15) days of receipt of the request, or if it is necessary to extend this period, the Construction Manager shall notify the Contractor in writing as to when a decision will be provided.

Work done by the Contractor after its discovery of such discrepancies, inconsistencies or ambiguities without such notice and prior to response from the Construction Manager shall be done at the Contractor's risk.

## **1.07 ORDER OF PRECEDENCE**

In resolving inconsistencies among two or more sections of the Contract Documents, precedence shall be given in the following order:

1. Addenda, Supplemental Agreements and Change Orders, the one dated more recently having precedence over another dated earlier.
2. Agreement (Section 00500).
3. Permits.
4. General Requirements (Sections 01000-01999).
5. Supplementary General Conditions (Section 00800).
6. Instructions to Bidders (Section 00100).
7. General Conditions (Section 00700).
8. Project Plans.
9. Technical Specifications (Section 02000 and all others following).
10. Typical Details.

11. Reference/Standard Specifications.
12. Reference/Standard Plans.

Figure dimensions on Drawings shall govern over scaled dimensions, and detailed Drawings shall govern over general or standard Drawings.

## **1.08 BONDS**

The successful Bidder shall, at the time of signing the Agreement, furnish the Bond of Faithful Performance (Section 00610) and the Payment Bond (Section 00620) executed by an admitted surety authorized to conduct business in California and be made payable to the "City of Sausalito."

The Payment Bond shall be in amount equal to one hundred percent (100%) of the Contract Price and shall be for payment of just claims for materials, equipment, labor and subcontractors employed by the Contractor thereon.

The Bond of Faithful Performance shall be in an amount equal to one hundred (100%) percent of the Contract Price and shall be for the faithful performance of the Contract, and for the fulfillment of such other requirements as may be provided by Law. The performance bond shall remain in effect to guarantee the repair and replacement of defective equipment, materials, and workmanship, and payment of damages sustained by the City on account of such defects, discovered within two (2) years after final acceptance by the City, for the Work performed under the Contract which, shall remain in effect for a period of two (2) years, to guarantee the repair and replacement, and payments for damages.

Attorneys-in-fact, who sign bid bonds or contract bonds, must file with each bond a notarized and effectively dated copy of their power of attorney as required on bond forms supplied by the City for Contractor use in Sections 00610 and 00620.

The surety company shall familiarize itself with all of the conditions and provisions of this Contract, and it waives the right of special notification of any change or modification of this Contract or of extension of time, or of decreased or increased work, or of the cancellation of the Contract, or of any other act or acts by the City or its authorized agents under the terms of this Contract; and failure to so notify the aforesaid surety companies of changes shall not relieve the surety companies of their obligations under this Contract.

## **1.09 PENALTY FOR COLLUSION**

If, at any time, it is found that the person, firm, or corporation to whom the Contract has been awarded has, in presenting any Bid or Bids, colluded with any other party or parties, then the Contract may at the City's sole election be declared null and void, and the Contractor and its sureties shall be liable for loss or damage which the City may suffer thereby, and the City may advertise for new Bids.

## **1.10 RIGHTS AND REMEDIES**

The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to, and not a limitation of, any duties, obligations, rights, and remedies otherwise imposed or available by law.

No action or failure to act by the City, the Design Consultant, or the Construction Manager shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

## **2 ARTICLE 2 - CONTRACT ADMINISTRATION**

### **2.01 ADMINISTRATION OF THE CONTRACT**

The City's Representative, the Construction Manager, and the Design Consultant will provide administration of the Contract as hereinafter described. These parties are designated in Section 00800-1.05, **CONTRACT ADMINISTRATION**. If the status of any of the above parties should change, the City will provide written notice to the Contractor of such change.

In case of the termination of the employment of the Design Consultant or the Construction Manager, the City shall appoint a Design Consultant or a Construction Manager whose status under the Contract Documents shall be that of the former Design Consultant or Construction Manager, respectively.

### **2.02 CITY'S REPRESENTATIVE**

- A. General - The City's Representative has the authority to act on behalf of the City on change orders, progress payments, Contract decisions, acceptability of the Contractor's work, and early possession.
- B. Change Orders - The City's Representative has the authority to accept or reject Change Orders and cost proposals submitted by the Contractor or as recommended by the Construction Manager to the extent that budget for such costs has been approved by the City Council. Any Change Order or cost proposal that, taking into account the total of the Contract Price and the cost of all approved Change Orders and other costs, will exceed the budget approved by the City Council, shall require subsequent City Council approval before it can be authorized.
- C. Progress Payments - The City's Representative has the authority to accept or reject requests for progress payments which have been submitted by the Contractor and recommended by the Construction Manager.
- D. Contract Decisions - Should the Contractor disagree with the Construction Manager's decision with respect to the Contract, the Contractor may appeal to the City's Representative in accordance with the provisions of the Contract.



- E. Acceptability of Work - The City's Representative has the authority to make the final determination of the acceptability of the Work. The City's Representative also has the authority to accept or reject the Design Consultant's recommendations regarding retention of defective work as provided.

## 2.03 CONSTRUCTION MANAGER

- A. General - The Construction Manager is a representative of the City employed to act as advisor and consultant to the City in construction matters related to the Contract. The term Construction Manager may include more than one individual to perform Contract administration and construction observation. Hereinafter, the term Construction Manager includes any and all designated representatives working under the direction of the Construction Manager.

All instructions to the Contractor and all communications from the Contractor to the City or the Design Consultant shall be forwarded through the Construction Manager. The Construction Manager will have authority to act on behalf of the City only to the extent provided in the Contract Documents. The City has delegated its authority to the Construction Manager to make initial decisions regarding questions which may arise as to the quality or acceptability of materials furnished and work performed, and as to the manner of performance and rate of progress of the work under the Contract. The Construction Manager shall interpret the intent and meaning of the Contract and shall make initial decisions with respect to the Contractor's fulfillment of the Contract and the Contractor's entitlement to compensation. The Contractor shall look initially to the Construction Manager in matters relating to the Contract.

The Construction Manager's authority to act under Section 00700-2.01, **ADMINISTRATION OF THE CONTRACT**, and any decision made by it in good faith either to exercise or not to exercise such authority, shall not be interpreted or construed as control or responsibility of any of the work performed under this Contract.

- B. Representative - The Construction Manager will observe the progress, quality, and quantity of the Work to determine, in general, if the Work is proceeding in accordance with the provisions of the Contract Documents. The Construction Manager shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work.

In accordance with the provisions detailed elsewhere in these General Conditions, the Construction Manager will make decisions relative to all matters of interpretation or execution of the Contract Documents.

- C. Observation and Inspections of Construction - The Construction Manager shall observe the construction and shall have the authority to reject work and materials which do not conform to the Contract Documents, and to require special inspection or testing.

Observation and inspection by an inspector is not an authorization to revoke, alter, or waive any requirements of the Specifications. Observation and inspection is the authorization to call the attention of the Contractor to any failure of the Work, materials or workmanship to conform to the Contract Documents. The inspector shall have this authority including the ability to reject materials or, in any emergency, suspend the Work. The Contractor may appeal any such issue which it disagrees with to the Construction Manager for decision. If the decision of the Construction Manager is not satisfactory to the Contractor, the Contractor may appeal such decision to the City's Representative.

- D. Acceptability of the Work - The Construction Manager has the authority to make a recommendation as to the acceptability of the Work.
- E. Change Orders - The Construction Manager has the authority to initiate Change Orders; to reject Change Orders proposed by the Contractor or Design Consultant; to negotiate and recommend acceptance of Change Orders; or to order minor changes in the Work at no cost to the City that do not affect the schedule or quality of the Work..
- F. Construction Schedule - The Construction Manager has the authority to review and recommend acceptance of the Progress Schedule submitted by the Contractor at the start of the Work and subsequent significant revisions for conformance to the specified sequence of work and logic.
- G. Progress Payments - The Construction Manager has the authority to recommend acceptance or rejection of requests for progress payments which have been submitted by the Contractor.
- H. Final Payment - The Construction Manager, with the assistance of the Design Consultant, will conduct inspections to determine the dates of Substantial Completion of the Work and final completion of the Work, and will receive and forward to the City, for the City's review, written warranties, and related documents required by the Contract and assembled by the Contractor.

## **2.04 DESIGN CONSULTANT**

- A. General - The Design Consultant will have the authority to act on behalf of the City only to the extent provided in the Contract Documents.
- B. Interpretations - The Design Consultant has the authority to be the initial interpreter of the technical requirements of the Contract Documents. Either party to the Contract may make written request to the Construction Manager for interpretations necessary for the proper execution or progress of the Work. The Construction Manager shall refer such written requests to the Design Consultant, who will render such interpretations. Where the Contractor has requested an interpretation from the Construction Manager, or been notified by the Construction Manager that such interpretation has been requested by the City, any work done before receipt of such interpretations, if not in accordance with same, shall be removed and replaced or adjusted as directed by the Construction Manager without additional expense to the City.

- C. Acceptability of the Work - The Design Consultant has the authority to make a recommendation as to the acceptability of the Work. The Design Consultant has the authority to recommend acceptance of defective work.
- D. Submittal - The Design Consultant shall receive, through the Construction Manager, shop drawings, product data and samples for review in accordance with Section 01300, **SUBMITTALS**.

The Design Consultant has the authority to review and take other appropriate action upon the Contractor's submittal such as shop drawings, product data and samples, but only for conformance with the design concept of the Work and the information given in the Contract Documents.

### **3 ARTICLE 3 - CITY**

#### **3.01 GENERAL**

The City, acting through the City's Representative or the Construction Manager, shall have the authority to act as the sole judge of the Work and materials with respect to both quantity and quality as set forth in the Contract.

#### **3.02 ATTENTION TO WORK**

The City's, Construction Manager's and Design Consultant's representatives are designated in Section 00800-1.05, **CONTRACT ADMINISTRATION**. The Construction Manager's designated representative will normally be available at the site of the Work. An alternate representative will be designated when the designated Construction Manager's representative is not available at the site of the Work.

#### **3.03 OBSERVATION AND INSPECTION**

In addition to the Construction Manager's designated representative, the City may provide one or more inspectors to the Construction Manager to observe the work and with the same authority as provided for in Section 00700-2.03C, **Observation and Inspections of Construction**.

Separate and independent from the observations and inspections above, the project may be inspected by Building Officials for code compliance. Such inspectors shall have the authority provided to them by local jurisdiction.

#### **3.04 CITY'S RIGHT TO USE OR OCCUPY**

The City reserves the right, prior to Substantial Completion, to occupy, or use, any completed part or parts of the Work, providing these areas have been approved for occupancy by the City. The exercise of this right shall in no way constitute an acceptance of such parts, or any part of the Work, nor shall it in anyway affect the dates and times when progress payments shall become due from the City to the Contractor or in any way prejudice the City's rights in the Contract, or any bonds guaranteeing the same. The Contract shall be deemed completed only when all the Work contracted has been duly and properly performed and accepted by the City.

Prior to such occupancy or use, the City and Contractor shall agree in writing regarding the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents.

In exercising the right to occupy or use completed parts of the Work prior to the Substantial Completion thereof, the City shall not make any use which will materially increase the cost to the Contractor, without increasing the Contract Price, nor materially delay the completion of the Contract, without extending the time for completion.

The part or parts of the Work, if any, which the City anticipates the use or occupancy of prior to Substantial Completion are listed below:

- None

Failure to include a part of the Work in the above referenced section, shall not limit the City's right to use or occupy parts of the Work not listed.

### **3.05 CITY'S RIGHT TO CARRY OUT THE WORK**

If the Contractor should neglect to prosecute the Work properly or fail to perform any provision of the Contract, and fails within five days after receipt of written notice from the City to commence and continue correction of such neglect or deficiency with diligence and promptness, the City may, and without prejudice to any other remedy, make good such default, neglect or failure.

The City also reserves the right to perform any portion of the Work due to an emergency threatening the safety of the Work, public, City, and any property or equipment.

In either case, a Change Order shall be issued unilaterally deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies and/or for performing such work, including compensation for the Design Consultant's, the Construction Manager's, and the City's additional services made necessary by such default, neglect, failure, or emergency.

### **3.06 CITY'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS**

The City reserves the right to perform work related to the Project with the City's own forces, and to award separate Contracts in connection with the Project or other work on the Site. If the Contractor claims that delay, damage, or additional cost is involved because of such action by the City, the Contractor shall make such claim as provided elsewhere in the Contract Documents.

When separate Contracts are awarded for different portions of the Project or other work on the Site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Agreement.

The City will provide for the coordination of the work of the City's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate therewith

as provided in Section 00700-4.10, **COOPERATION WITH OTHER CONTRACTORS.**

### **3.07 RESPONSIBILITY OF THE CITY**

The City shall not be held responsible for the care or protection of any material or parts of the Work prior to the final Acceptance, except as expressly provided in these Specifications.

## **4 ARTICLE 4 - CONTRACTOR**

### **4.01 STATUS OF CONTRACTOR AND SUBCONTRACTORS**

- A. It is stipulated and agreed that the Contractor shall be an independent contractor in the performance of this Contract and shall have complete charge of all persons engaged in performance of the Work. The Contractor shall perform the Work in accordance with its own methods, subject to compliance with the requirements of the Contract.
- B. Subcontractors will not be recognized as having a direct relationship with the City. The persons engaged in the Work, including employees of subcontractors and suppliers, will be considered employees of the Contractor and their work shall be subject to the provisions of the Contract. References in these Contract Documents to actions required of subcontractors, manufacturers, suppliers, or any person other than the Contractor, the City or the Construction Manager shall be interpreted as requiring that the Contractor shall require such subcontractor, manufacturer, supplier or person to perform the specified action.

The Contractor shall not employ any subcontractors that are not properly licensed in accordance with State law. Prior to commencement of any work by a subcontractor, the Contractor shall submit verification to the Construction Manager that the subcontractor is properly licensed for the work it will perform.

Contractor shall be fully responsible to City for the performance, acts and omissions of its subcontractors, and of persons directly or indirectly employed by them. Each subcontract shall expressly incorporate by reference the terms of this Contract, including the following provisions:

- Each subcontractor shall carry insurance as required by this Contract, and provide evidence of such insurance, as provided in Section 00800-2.01, **INSURANCE.**
- Each subcontractor shall be obligated to defend, indemnify, and hold the City harmless from all claims arising from the subcontractor's portion of the Work in the same manner as Contractor.
- Each subcontractor shall grant the City a license to use its drawings and design materials as provided in the Agreement.

- Each subcontract shall acknowledge the City's right to suspend or terminate the Contract, and waive any right to anticipated profits in the event of such termination.

The removal and/or substitution of any subcontractor listed in Section 00430, **DESIGNATION OF SUBCONTRACTORS**, shall be made by the Contractor and the City only as provided for in Public Contract Code Section 4100 *et seq.*

#### **4.02 CONTRACTOR'S REPRESENTATIVE**

The Contractor shall designate in writing, before starting work, an authorized representative who shall have complete authority to represent and to act for the Contractor. Said authorized representative, or designated alternate, that has the authority to act in matters relating to the Contract, shall be personally present at the work site at all times while work is actually in progress on the Contract. During periods when work is suspended, arrangements acceptable to the Construction Manager shall be made for any emergency work that may be required. The Contractor's authorized representative, or designated alternate(s) shall be fluent and proficient in the English language in order to understand, receive, and carry out oral and written communications or instructions relating to all job functions and responsibilities.

When the Contractor consists of two or more persons, firms, partnerships, or corporations functioning on a joint venture basis, said Contractor shall designate in writing to the Construction Manager, the name of their authorized representative who shall have supreme authority to direct the Work and to whom orders will be given by the Construction Manager, to be received and obeyed by the Contractor.

Information shall include the representative's name, street address, town, and telephone number, and the mailing address if different from the street address.

The Contractor shall give its personal attention to and shall supervise the Work to the end that it shall at all reasonable times be prosecuted faithfully; and when the authorized representative or designated alternate is not personally present on the Work, the representative shall at all reasonable times be represented by a competent superintendent or foreman who shall receive and obey all instructions or orders given under this Contract, and who shall have full authority to supply materials, tools, and labor without delay, and who shall be the legally appointed representative of the Contractor. The Contractor shall be liable for the faithful observation of any instructions delivered to the Contractor or to its authorized representative.

#### **4.03 LANDS AND RIGHTS OF WAY**

With the approval of the Construction Manager, the Contractor may use portions of the City's site for storage of construction equipment, materials and field offices. The City will not accept any responsibility for damage or loss of the Contractor's equipment or materials stored on any project related site caused by vandalism, nature, or otherwise, suffered by the Contractor. Protection of all construction equipment, stores, and supplies shall be the sole responsibility of the Contractor. Where additional work space is desired

by the Contractor, it shall be the Contractor's sole responsibility and expense to obtain such a space for its use.

#### **4.04 FEES AND PERMITS**

The requirements for fees and permits are specified in Section 01060-1.02, **FEES AND PERMITS**.

#### **4.05 COMPLIANCE WITH LAWS**

The Contractor shall keep itself and its subcontractors fully informed of all existing and future legislated State and Federal Laws and City and County ordinances and regulations which in any manner affect those engaged or employed in the Work, or the materials and equipment used in the Work, or which in any way affect the conduct of the Work, and all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. If any discrepancy or inconsistency is discovered in the Drawings, Specifications, or in any other part of this Contract, in relation to any such law, ordinance, regulation, order or decree, the Contractor shall forthwith report of the same to the Construction Manager in writing. The Contractor shall at all times observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees; and shall protect and indemnify the City, the Construction Manager, the Design Consultant, and all of their officers, agents, employees and servants against any claim or liability arising from or based upon the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor itself or by its employees.

A. Particular attention is called to the following:

1. The Contractor shall abide by and shall include in its contracts and agreements with subcontractor(s) for the performance of Work on the City's Project a copy of the provisions the California Labor Code Sections 1771, 1775, 1776, 1777.5, 1813, and 1815.
2. Eight Hour Day Limitation – In accordance with the provisions of Division 2, Part 7, Chapter 1, Article 3 of the Labor Code, State of California, and in particular Sections 1810 to 1815 inclusive, thereof, eight (8) hours labor shall constitute a day's work and no laborer, worker, or mechanic in the employ of said Contractor, or any subcontractor doing or contracting to do any part of the Work contemplated by this Contract, shall be required or permitted to work more than eight (8) hours in any one calendar day, and forty (40) hours in any one calendar week unless compensated at not less than time and a half as set forth in California Labor Code Section 1815. However, if the prevailing wage determination requires a higher rate of pay for overtime than is required under said Section 1815, then the overtime rate must be paid, as specified in California Code of Regulations Title 8, Group 3, Section 16200(a)(3)(F). The Contractor and each subcontractor shall also keep an accurate record showing the names and actual hours worked of all workers employed by them in connection with the work contemplated by this Contract, which record shall be open at all reasonable hours for the inspection of the City or its officers or agents and by the Division of Labor Standards

Enforcement of the Department of Industrial Relations, their deputies or agents; and it is hereby further agreed that said Contractor shall forfeit as a penalty to the Authority, the sum of twenty-five and No/100 Dollars (\$25.00) for each laborer, worker or mechanic employed in the execution of this Contract by the Contractor or by any subcontractor for each calendar day during which such laborer, worker or mechanic is required or permitted to labor more than eight (8) hours in any one calendar day and forty (40) hours in one calendar week in violation of this stipulation.

- B. Prior to commencing the Work, Contractor shall comply with the provisions of Labor Code 1777.5, including but not limited to the submission of contract award information to an applicable apprenticeship program that can supply apprentices to the site of the Work. Such information shall include an estimate of journeyman hours to be performed under this Contract, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall be submitted to the City if requested by the City.

A determination by the Chief of the Division of Apprenticeship Standard's that Contractor or its subcontractors have knowingly violated Labor Code 1777.5 shall forfeit as a civil penalty an amount not exceeding one hundred dollars (\$100) for each full calendar day of noncompliance. Contractor or its subcontractor, who knowingly commits a second or subsequent violation of Labor Code 1777.5 within a three-year period, where the noncompliance results in apprenticeship training not being provided as required, shall forfeit as a civil penalty the sum of not more than three hundred dollars (\$300) for each full calendar day of noncompliance. Upon the receipt of a determination that a civil penalty has been imposed by the Chief of the Division of Apprenticeship Standards, the City shall withhold the amount of the civil penalty from the next progress payment then due or to become due Contractor.

- C. Receipt of Workers' Wages, Fee for Registering or Placing Persons In Public Works - Attention is directed to the provisions of Sections 1778 and 1779 of the California Labor Code, which read as follows:

Section 1778. "Every person, who individually or as a representative of an awarding or public body or officer, or as a contractor or subcontractor doing public work, or agent or officer thereof, who takes, receives or conspires with another to take or receive, for its own use or the use of any other person any portion of the wages of any workman or working subcontractor, in connection with services rendered upon any public work is guilty of a felony."

Section 1779. "Any person or agent or officer thereof who charges, collects, or attempts to charge or collect, directly or indirectly, a fee or valuable consideration for registering any person for public work, or for giving information as to where such employment may be procured, or for placing, assisting in placing, or attempting to place, any person in public work, whether the person is to work directly for the state, or any political subdivision or for a contractor or subcontractor doing public work is guilty of a misdemeanor."



- D. Labor Discrimination. Attention is directed to Section 1735 of the Labor Code, which reads as follows:
- "No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, or sex of such persons, except as provided in Section 12940 of the Government Code, and every contractor for public works violating this section is subject to all the penalties imposed for violation of this chapter."
- E. Worker's Compensation Insurance - The provisions of Section 00800-2.01B, Worker's Compensation Insurance, shall be considered as repeated herein.
- F. Lateral and Subjacent Supports - Attention is directed to Section 832 of the Civil Code of the State of California relating to lateral and subjacent supports, and wherever structures or improvements adjacent to the excavation may be damaged by such excavation, the Contractor shall comply with this law. As provided in Labor Code Section 6707, a separate bid item is provided for costs of shoring and bracing of excavations five feet or more in depth.
- G. Safety Standards - The Contractor shall comply with all applicable provisions of the Safety and Health Regulations of Construction, promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act (40 USC 327 et. seq.) as set forth in Title 29, C.F.R., CAL/OSHA, and the regulations issued thereunder. Compliance shall be the Contractor's sole responsibility, and neither the City, the Construction Manager nor the Design Consultant shall have any liability for non-compliance. See Section 00700-4.07, **SAFETY**, for additional safety requirements.

#### **4.06 COMPLIANCE WITH ENVIRONMENTAL LAWS**

During construction, including any suspension of the Work, the Contractor shall comply with all pertinent requirements of Federal, State, and local environmental laws and regulations, including, but not limited to, the Federal Clean Air Act, State and local air pollution and noise ordinances, construction site erosion control regulations. Specific requirements are further specified in Section 01060, **REGULATORY REQUIREMENTS AND PERMITS**, and Section 01560, **TEMPORARY CONTROLS**.

#### **4.07 SAFETY**

- A. Contractor's Safety Responsibility - The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to U.S. Department of Labor (OSHA), the California Occupational Safety and Health Act, and all other applicable Federal, State, County, and local laws, ordinances, codes, the requirements set forth below, and any regulations that may be detailed in other parts of these Contract Documents. In the event of conflicting

requirements, the most stringent requirement as it pertains to the Contractor's safety responsibility, shall apply and shall be followed by the Contractor.

No provision of the Contract Documents shall act to make the City, the Construction Manager, Design Consultant or any other party than the Contractor responsible for safety. The Contractor agrees that for purposes of California Labor Code Section 6400 and related provisions of law the Contractor, the Contractor's privities and any other entities acting pursuant to this Contract will be "employers" responsible for furnishing employment and a place of employment that is safe and healthful for the employees, if any, of such entities acting pursuant to this Contract and that neither the City nor the Construction Manager, Design Consultant or their respective officers, officials, employees, agents or volunteers or other authorized representatives will be responsible for having hazards corrected and /or removed at the location(s) where the Work is to be performed. The Contractor agrees that neither the City nor the Construction Manager, Design Consultant or their respective officers, officials, employees, agents or volunteers or other authorized representatives will be responsible for taking steps to protect the Contractor's employees from such hazards, or for instructing the Contractor's employees to recognize such hazards or to avoid the associated dangers. The Contractor agrees that with respect to the Work to be performed under this Contract and the location(s) where such Work is to be performed, the Contractor will be responsible for not creating hazards, and for having hazards corrected and/or removed. The Contractor agrees that through the safety obligations contained in this Contract and the Contractor's own inspection of the site(s) where the Contract Work is to be performed, the Contractor is aware and has been notified of the hazards to which the Contractor's employees may be exposed in the performance of Contract Work. The Contractor has taken and/or will take appropriate, feasible steps to protect the Contractor's employees from such hazards, and has instructed and/or will instruct its employees to recognize such hazards and how to avoid the associated dangers. The Contractor agrees that neither the City nor the Construction Manager, Design Consultant or their respective officers, officials, employees, agents or volunteers or other authorized representatives will be "employers" pursuant to California Labor Code Section 6400 and related provisions of law with respect to the Contractor, the Contractor's privities or other entities acting pursuant to this Contract.

The Contractor shall indemnify, defend and hold Owner and Construction Manager, Design Consultant and their respective officers, officials, employees, agents and volunteers or other authorized representatives harmless to the full extent permitted by law concerning liability related to the Contractor's safety obligations in accordance with Section 00800-2.01E, **Indemnification**.

If death or serious injuries or serious damages occur, the accident shall be reported immediately by telephone or messenger to both the Construction Manager and the City. In addition, the Contractor shall furnish the Construction Manager with a copy of the Employer's Report of Injury immediately following any incident requiring the filing of said report during the prosecution of the Work under this Contract. The Contractor shall also furnish the Construction Manager with a copy of the Employer's Report of Injury involving any subcontractors on

this project. The Contractor shall make all reports as are, or may be, required by any authority having jurisdiction, and permit all safety inspections of the Work being performed under this Contract.

If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Construction Manager, giving full details of the claim.

- B. Safety Program - The Contractor shall establish, implement, and maintain a written injury prevention program as required by Labor Code Section 6401.7. Before beginning the Work the Contractor shall prepare and submit to the Construction Manager a Contractor Safety Program that provides for the implementation of all of the Contractor's safety responsibilities in connection with the Work at the site and the coordination of that program and its associated procedures and precautions with safety programs, precautions and procedures of each of its subcontractors and other prime Contractors performing work at the site. The Contractor shall be solely responsible for initiating, maintaining, monitoring, coordinating, and supervising all safety programs, precautions, and procedures in connection with the Work and for coordinating its programs, precautions, and procedures of the other prime contractors and subcontractors performing the Work at the site. The Safety Program should contain all the necessary elements for the Contractor to administer its program on site. At a minimum, this written Safety Program shall address the elements required by Labor Code Section 6401.7.

The Contractor's compliance with requirements for safety and/or the Construction Manager's review of the Contractor's Safety Program shall not relieve or decrease the liability of the Contractor for safety. The Construction Manager's review of the Contractor's Safety Program is only to determine if the above listed elements are included in the program.

- C. Safety Supervisor - The Contractor shall appoint an employee as safety supervisor who is qualified and authorized to supervise and enforce compliance with the Safety Program. The Contractor shall notify the Construction Manager in writing prior to the commencement of work of the name of the person who will act as the Contractor's safety supervisor and furnish the safety supervisor's resume to the Construction Manager.

The Contractor will, through and with its Safety Supervisor, ensure that all of its employees and its subcontractors of any tier fully comply with the Project Safety Policies. The Safety Supervisor shall be a full-time employee of the Contractor whose responsibility shall be for supervising compliance with applicable safety requirements on the work site and for developing and implementing safety training classes for all job personnel. The City shall have the authority to require removal of the Contractor's Safety Supervisor if the representative is judged to be improperly or inadequately performing the duties; however, this authority shall not in any way affect the Contractor's sole responsibility for performing this work safely, nor shall it impose any obligation upon the City to ensure the Contractor performs its work safely.

D. Safety and Protection - The Contractor shall take all necessary protection to prevent damage, injury, and loss to:

- All employees on the Project, employees of all subcontractors, and other persons and organizations who may be affected thereby;
- All the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
- Other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and underground facilities not designated for removal, relocation, or replacement in the course of construction.

The Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and of underground facilities and utility agencies when prosecution of the Work may affect them and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor, supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the Contractor.

E. Excavation Safety - In accordance with the provisions of Section 6705 of the Labor Code, the Contractor shall submit, in advance of excavation of any trench or trenches five feet or more in depth, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plans vary from the shoring system standards set forth in the Construction Safety Orders of the Division of Industrial Safety in Title 8, Subchapter 4, Article 6, California Code of Regulations, the plans shall be prepared and signed by a registered civil or structural engineer employed by the Contractor, and all costs therefore shall be included in the price named in the Contract for completion of the Work as set forth in the Contract Documents. Nothing in this section shall be deemed to allow the use of a shoring, bracing, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this section shall be construed to impose a tort liability on the City, the Design Consultant, the Construction Manager, nor any of their agents, consultants, or employees. The City's review of the Contractor's excavation plan is only for general conformance to the Construction Safety Orders.

Prior to commencing any excavation, the Contractor shall designate in writing to the Construction Manager the "competent person(s)" with the authority and responsibilities designated in the Construction Safety Orders.

- F. Safety Emergencies - In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, the Contractor, without special instruction or authorization from the Construction Manager, is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the Construction Manager prompt written notice if the Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby.
- G. Safety Violations - Should the Contractor fail to correct a condition, the City shall have the right to notify the Contractor through the Construction Manager that an unsafe condition may exist and must be corrected or the work in question can be stopped in accordance with Section 00700-6.06, **SUSPENSION OF WORK**, until the condition is corrected to the satisfaction of the City. No extension of time or additional compensation will be granted as a result of any stop order so issued. The notification and suspension of such work or the failure to provide such notification and suspension by the City shall not relieve the Contractor of its sole responsibility and liability for safety.

The City shall have the authority to require the removal from the project of the foreman and/or superintendent in responsible charge of the work where safety violations occur.

- H. Equipment Safety Provisions - The completed Work shall include all necessary permanent safety devices, such as machinery guards and similar ordinary safety items, required by the State and Federal (OSHA) industrial authorities and applicable local and national codes. Further, any features of the Work, including City-selected equipment, subject to such safety regulations shall be fabricated, furnished, and installed in compliance with these requirements. All equipment furnished shall be electrically grounded and provided guards and protection as required by safety codes. Where vapor-tight or explosion-proof electrical installation is required by safety codes, this shall be provided. Contractors and manufacturers of equipment shall be held responsible for compliance with the requirements included herein. The Contractor shall notify all equipment suppliers and subcontractors of the provisions of this paragraph.
- I. Confined Spaces – The Work requires work in confined spaces and requires compliance with CAL/OSHA and Federal OSHA requirements. Confined spaces for the purposes of this section shall be as defined by the Division of Industrial Safety. Notwithstanding any classifications relative to the Tunnel Safety Orders, work within confined spaces of this project is subject to the definitions and applicable provisions of Section 5156 et. seq., Title 8, Division 1, Chapter 4, Subchapter 7, Group 16, Article 108 of California Code of Regulations. Including exposure to hydrogen sulfide, methane, carbon dioxide and other gases and vapors commonly found in municipal sewers which could have, or has the potential of having Immediate Danger to Life or Health Conditions (IDLH).
- J. Public Safety and Convenience - The Contractor shall conduct his work so as to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work and to ensure the protection of persons and property. No road or street shall be closed to the public except with the

permission of the Construction Manager and the proper governmental authority. Fire hydrants on or adjacent to the work shall be accessible to firefighting equipment. Temporary provisions shall be made by the Contractor to ensure the use of sidewalks, private and public driveways and proper functioning of gutters, sewer inlets, drainage ditches and culverts, irrigation ditches and natural water courses.

#### **4.08 PROVISIONS FOR HANDLING EMERGENCIES**

It is possible that emergencies may arise during the progress of the Work that may require special treatment or make advisable extra shifts of labor forces to continue the Work for twenty-four (24) hours per day. These emergencies may be caused by damage or possible damage to nearby existing structures or property by reason of the Work under construction, or by storm, accidents, or leakage. The Contractor shall be prepared in case of such emergencies to make all necessary repairs and shall promptly execute such work when required by the Construction Manager. The determinations made by the Construction Manager for handling emergencies shall be final and conclusive upon the parties.

Upon start of the Work, Contractor shall provide means for immediate emergency notification of Contractor's designated representative and designated emergency alternates.

#### **4.09 NONSTANDARD WORKING HOURS**

The Contractor may be required to prosecute the Work at night or outside of the normal working hours defined in Section 01560-1.07, **WORKING HOURS**. Such work may be required due to project and/or operational constraints as defined in Section 01010, **SUMMARY OF WORK**, or if emergencies arise as provided for in Section 00700-4.08, **PROVISIONS FOR HANDLING EMERGENCIES**. When required, ordered, or permitted to work at night, the Contractor shall provide sufficient and satisfactory lighting and other facilities therefore. For work outside of the normal working hours, the Contractor shall receive no extra payment, but compensation shall be considered as having been included in the price stipulated for the Work, except for authorized work performed outside of the Contract requirements.

#### **4.10 COOPERATION WITH OTHER CONTRACTORS**

This Paragraph shall serve as notice to the Contractor that the City may let other contracts for other work at or near the site of this Work. The Contractor shall afford other contractors reasonable opportunity for the delivery and storage of their materials and the execution of their work, and shall properly connect and coordinate its work with theirs.

Should construction be under way by other forces or by other contractors within or adjacent to the limits of the work or in the vicinity of the Work to be done under this Contract, the Contractor shall so conduct its operations as to interfere to the least possible extent with the Work of such other forces or contractors.

Any difference or conflicts which may arise between the Contractor and any other forces or contractors, creating delays or hindrance to each other, shall be adjusted as determined by the Construction Manager.

Section 01010, **SUMMARY OF WORK**, indicates anticipated other potential construction activities within or adjacent to Work to performed in this Contract.

## **5 ARTICLE 5 - CONTROL OF WORK AND MATERIAL**

### **5.01 MEANS, METHODS AND APPLIANCES**

The means, methods and appliances adopted by the Contractor shall be planned and executed to, in the opinion of the Construction Manager, produce the highest grade quality of work and will enable the Contractor to complete the Work in the time agreed upon. The City and Construction Manager shall not supervise, direct, or have control over, or be responsible for, Contractor's means, methods and appliances of construction or for the safety precautions and programs incident thereto, or for any failure of Contractor to comply with laws and regulations applicable to the furnishing or performance of Work. However, if at any time the means, methods and appliances appear inadequate or of inferior quality, the Construction Manager may order the Contractor to improve their character or efficiency, and the Contractor shall conform to such order; failure of the Construction Manager to order such improvement of methods of efficiency will not relieve the Contractor from its obligation to perform satisfactory work and to finish it in the time agreed upon.

### **5.02 CHARACTER OF WORKERS**

None but competent forepersons and workers shall be employed on work requiring special qualifications; and, when required by the Construction Manager, the Contractor shall remove from the work any person who commits trespass, or is, in the opinion of the Construction Manager, disorderly, dangerous, insubordinate, incompetent, or otherwise objectionable. Such discharge shall not be the basis of any claim for compensation or damages against the Construction Manager, the City, or any of its officers or representatives.

### **5.03 MATERIALS AND WORKMANSHIP**

Unless otherwise indicated in these Specifications, materials and equipment for the construction work shall be the best grade in quality of a manufacturer regularly engaged in the production of such materials and equipment or materials and equipment of comparable character. All materials must be of the specified quality and equal to approved samples, if samples have been submitted. All work shall be done and completed in the best workmanlike manner, obtainable in the local market. All permanent materials and equipment shall be new unless otherwise specified.

Notwithstanding any omission from these Specification or the Drawings it shall be the duty of the Contractor to call the Construction Manager's attention to apparent errors or omissions and request instructions before proceeding with the Work. The Construction Manager may, by appropriate instructions correct errors and supply omitted information.

Such instructions shall be as binding upon the Contractor as though contained in the original Specifications or Drawings.

All defective work or materials shall be promptly removed from the premises by the Contractor, whether in place or not, and shall be replaced or renewed in such manner as the Construction Manager may direct. All materials and workmanship of whatever description shall be subjected to the inspection of, and rejection by, the Construction Manager if not in conformance with the Contract Documents.

Any defective material or workmanship, or any unsatisfactory or imperfect work which may be discovered before the final Acceptance of the Work or within one (1) year thereafter, shall be corrected immediately on the requirement of the Construction Manager, without extra charge, notwithstanding that it may have been overlooked in previous inspections and estimates. Failure to inspect work shall not relieve the Contractor from any obligation to perform sound and reliable work as herein described.

#### **5.04 EXISTING UTILITIES**

A. General - The location of known existing utilities and pipelines are shown on the Plans in their approximate locations. However, nothing herein shall be deemed to require the City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the site of the Project can be inferred from the presence of other visible facilities, such as buildings, cleanouts, meter and junction boxes, on or adjacent to the site of the construction.

The City will assume the responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the construction site if such utilities are not identified by the City in the Contract Documents or which can reasonably be inferred from the presence of other visible facilities.

B. Utility Location - It shall be the Contractor's responsibility to determine the exact location and depth of all utilities, including service connections, which have been marked by the respective utility owners and which the Contractor believes may affect or be affected by the Contractor's operations. The Contractor shall not be entitled to additional compensation nor time extensions for work necessary to avoid interferences nor for repair to damaged utilities if the Contractor does not expose all such existing utilities as required by this section.

Pursuant to Government Code Section 4216.2 the Contractor shall contact the appropriate regional notification center at least two (2) working days before, but not more than 14 calendar days prior to commencing any excavation. The Contractor shall request that the utility owners conduct a utility survey and mark or otherwise indicate the location of their service.

After the utility survey is completed, the Contractor shall commence "potholing" or hand digging to determine the actual location of the pipe, duct, or conduit. The Construction Manager shall be given notice prior to commencing potholing operations. The Contractor shall uncover all piping and conduits, to a point one (1) foot below the pipe, where crossings, interferences, or connections are shown



in the Contract Documents, prior to trenching or excavating for any pipe or structures, to determine actual elevations. New pipelines shall be laid to such grade as to clear all existing facilities which are to remain in service for any period subsequent to the construction of the run of pipe involved.

- C. Utility Relocation and Repair - If interferences occur at locations other than those indicated in the Contract Documents with reasonable accuracy, the Contractor shall notify the Construction Manager in writing. The Construction Manager will supply a method for correcting said interferences in accordance with the responsibilities of this section and Government Code Section 4215.

The City shall compensate the Contractor for the costs of locating and repairing damage not due to the failure of the Contractor to exercise reasonable care, and for removing or relocating such main or trunk-line utility facilities not indicated in the Contract Documents with reasonable accuracy, and for the cost of equipment on the Project necessarily idled during such work. The payment for such costs will be made as provided in Section 00700-7.01, **CHANGE ORDERS**. The Contractor shall not be assessed liquidated damages for delay in completion of the Project, when such delay is caused by the failure of the City or utility company to provide for removal or relocation of such utility facilities. Requests for extensions of time arising out of utility relocation or repair delays shall be filed in accordance with Section 01310-1.06, **TIME IMPACT ANALYSES**.

The public utility, where they are the owner of the affected utility, shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price. The right is reserved to the City and the owners of utilities or their authorized agents to enter upon the Work area for the purpose of making such changes as are necessary for the rearrangement of their facilities or for making necessary connections or repairs to their properties. The Contractor shall cooperate with forces engaged in such work and shall conduct its operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by such forces and shall allow the respective utilities time to relocate their facility.

When the Contract indicates that a utility is to be relocated, altered or constructed by others, the City will conduct all negotiations with the utility company and the work will be done at no cost to the Contractor, unless otherwise stipulated in the Contract.

Temporary or permanent relocation or alteration of utilities desired by the Contractor for its own convenience shall be the Contractor's responsibility and it shall make arrangements and bear all costs for such work.

## **6 ARTICLE 6 - PROGRESS OF THE WORK**

### **6.01 COMMENCEMENT OF WORK**

Within thirty (30) calendar days after receipt of the required bonds and evidences of insurance and the executed Agreement from the Contractor, written Notice to Proceed will be given by the City to Contractor. Notwithstanding other provisions of the Contract,

the Contractor shall not be obligated to perform work, and the City shall not be obligated to accept or pay for work performed by the Contractor, prior to Notice to Proceed. The Contractor shall provide the required Contract bonds and evidences of insurance prior to Notice to Proceed and commencing work at the Site.

The Contractor shall commence the Work covered by this Contract within ten (10) days after the date established in the Notice to Proceed for the commencement of Contract Time.

The Contractor shall give the Construction Manager written notice not less than two (2) working days in advance of the actual date on which the work will be started. The Contractor shall be entirely responsible for any delay in the Work which may be caused by its failure to give such notice.

## **6.02 CONTRACT TIME**

Time shall be of the essence of the Contract. The Contractor shall prosecute the Work so that the various portions of the project shall be Substantially Complete and ready for use within the time specified in Section 00800-1.01, **TIME ALLOWED FOR COMPLETION**. It is expressly understood and agreed by and between the Contractor and the City that the Contract time for completion of the Work described herein is a reasonable time taking into consideration the average climatic and economic conditions and other factors prevailing in the locality and the nature of the Work. The Contractor is hereby advised that the Contractor's Bid is to be based on the entire Contract Time and the Contractor shall include its field and home office overhead costs in the Bid for the entire Contract Time.

## **6.03 DELAYS**

- A. Notice of Delays - When the Contractor foresees a delay in the prosecution of the Work and, in any event, immediately upon the occurrence of a delay, and in any event no later than five days from the event giving rise to the delay, the Contractor shall notify the Construction Manager in writing of the probability of the occurrence and the estimated extent of the delay, and its cause. The Contractor shall take immediate steps to prevent, if possible the occurrence or continuance of the delay. The Contractor agrees that no claim shall be made for delays, which are not called, to the attention of the Construction Manager at the time of their occurrence.
- B. Non-Excusable Delays - Non-excusable delays in the prosecution of the Work shall include delays which could have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its subcontractors at any tier level, or suppliers. The Contractor shall receive no compensation for such delay.
- C. Excusable Delays - Excusable delays in the prosecution or completion of the Work shall include delays which result from causes beyond the control of the Contractor and City and which could not have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its subcontractors, at any tier level, or suppliers. The Contractor shall receive no compensation for such delay, but the Contract Time may be extended as provided in Section 6.04. Excusable delays are as further defined below.

1. Abnormal Delays - Delays caused by acts of god, fire, unusual storms, floods, tidal waves, earthquakes, strikes, labor disputes, freight embargoes, and shortages of materials shall be considered as excusable delays insofar as they prevent the Contractor from proceeding with at least seventy-five (75) percent of the normal labor and equipment force for at least five (5) hours per day toward completion of the current critical activity item(s) on the latest Favorably Reviewed Progress Schedule.
  2. Weather Delays - Should unusual inclement weather conditions or the conditions resulting from weather prevent the Contractor from proceeding with seventy-five (75) percent of the normal labor and equipment force engaged in the current critical activity item on the latest Favorably Reviewed Progress Schedule for a period of at least five (5) hours per day toward completion of such operation or operations, and the crew is dismissed as a result thereof, it shall be a weather delay day.
  3. Material Shortages - Upon the submission of satisfactory proof to the Construction Manager by the Contractor, shortages of material may be acceptable as grounds for granting a time extension. In order that such proof may be satisfactory and acceptable to the Construction Manager, it must be demonstrated by the Contractor that the Contractor has made every effort to obtain such materials from all known sources within reasonable reach of the proposed Work. Only the physical shortage of material, caused by unusual circumstances, will be considered under these provisions as a cause for extension of time, and no consideration will be given to any claim that material could not be obtained at a reasonable, practical, or economical cost or price, unless it is shown to the satisfaction of the Construction Manager that such material could have been obtained only at exorbitant prices entirely out of line with current rates, taking into account the quantities involved and usual practices in obtaining such quantities. A time extension for shortage of material will not be considered for material ordered or delivered late or whose availability is affected by virtue of the mishandling of procurement. The above provisions apply equally to equipment to be installed in the Work.
- D. Compensable Delays - Compensable delays in the prosecution or completion of the Work shall include delays that occur through no fault of the Contractor and prevent the Contractor from proceeding with at least seventy-five (75) percent of the normal labor and equipment force for at least five (5) hours per day toward completion of the current critical activity item(s) on the latest Favorably Reviewed Progress Schedule due to the following cause(s):
1. Delays due solely to the actions and/or inactions of the City.
  2. Delays due to differing site conditions as defined in Section 00700-7.02, **DIFERING SITE CONDITIONS**.
  3. Delays due to other contractors employed by the City who interfere with the Contractor's prosecution of the Work as defined above.
- E. Concurrent Delays - Concurrent delays are those delay periods when the prosecution of the Work is delayed during the same period of time due to causes from a combination of the delays defined in Sections 00700-6.03B, **Non-**

**Excusable Delays**, 00700-6.03C, **Excusable Delays**, or 00700-6.03D, **Compensable Delays**. During such concurrent delay periods, time extensions will be granted in accordance with Section 00700-6.04, **TIME EXTENSIONS**; however, the Contractor shall not be compensated for its overhead costs as defined in Section 00700-6.04C, **Indirect Overhead**, and the City shall not assess its actual costs as defined in Section 00700-6.04A, **Non- Excusable Delays**.

#### 6.04 TIME EXTENSIONS

- A. Non-Excusable Delays - The City, at its sole option, may grant an extension to milestone or completion dates for non-excusable delays. If the City grants an extension of time for non-excusable delays, the Contractor agrees to pay the City's actual costs, including charges for engineering, inspection and administration incurred during the extension.
- B. Excusable or Compensable Delays - If the Contractor is delayed in the performance of its Work as defined in Sections 00700-6.03C, **Excusable Delays**, or 00700-6.03D, **Compensable Delays**, then milestone and Contract completion dates may be extended by the City for such time that, in the City's and Construction Manager's determination, the Contractor's completion dates will be delayed, provided that the Contractor strictly fulfills the following:
1. The Contractor shall provide notification, in accordance with Section 00700-6.03A, **Notice of Delays**, and submit in writing a request for an extension of time to the Construction Manager stating at a minimum the probable cause of the delay and the number of days being requested. The time extension request shall be submitted in accordance with the requirements of Section 01310-1.06, **TIME IMPACT ANALYSES**.
  2. If requested by the Construction Manager, the Contractor shall promptly provide sufficient information to the Construction Manager to assess the cause or effect of the alleged delay, or to determine if other concurrent delays affected the Work.
  3. Weather Delays - The Contractor will be granted a non-compensable time extension for weather caused delays, pursuant to Section 00700-6.03 C2, **Weather Delays**, over and above an allowance as provided for in Section 00800-1.03, **WEATHER DAYS**. No compensable time extensions for weather delays will be granted until the total number of weather days exceeds this allowance.

Should the Contractor fail to fulfill any of the foregoing, which are conditions precedent to the right to receive a time extension, the Contractor waives the right to receive a time extension.

During such extension of time, neither extra compensation for engineering, inspection, and administration nor damages for delay will be charged to the Contractor. It is understood and agreed by the Contractor and City that time extensions due to excusable or compensable delays will be granted only if such delays involve the current critical activity item(s) on the latest Favorably Reviewed Progress Schedule.

Should the Contractor fail to complete the Work within the time specified in the Contract, as extended in accordance with this clause if appropriate, the Contractor shall pay to the City liquidated damages in accordance with Section 00700-6.05, **LIQUIDATED DAMAGES**.

- C. Indirect Overhead - The Contractor may be entitled to reimbursement of indirect overhead expenses for periods of time when the Work is delayed as defined in Section 00700-6.03D, **Compensable Delays**. Reimbursement for indirect overhead shall not be made for concurrent delays as defined in Section 00700-6.03E, **Concurrent Delays**.

The compensation described in Section 01035-1.05, **MARK-UP ALLOWANCES**, includes provisions for reimbursement of indirect overhead expenses for Change Order work. Compensation as described in this section shall reasonably consider the indirect overhead included in the Mark-Up Allowance, as follows:

1. If City and Contractor agree that the Mark-Up Allowance does not provide sufficient compensation for a compensable delay associated with changed work, this section shall apply.
2. Upon application of this section, an amount equal to the entire Mark-Up Allowance for all Change Order work shall be deducted from the indirect overhead compensation as calculated based on Sections 00700 6.04 C3 (Indirect Field Overhead) and 6.04 C4 (Indirect Home Office Overhead) below.

As a condition precedent to any reimbursement of indirect overhead expense, the Contractor must fulfill all conditions as provided in Section 00700-6.04B, **Excusable or Compensable Delays**. No additional markup for overhead or profit shall be provided for such reimbursable indirect overhead expenses.

Payment to the Contractor for indirect overhead expenses will be made only for the extended Contract Time granted for Compensable Delay(s) that run following the expiration of the original Contract Time plus any time extensions granted for delays other than Compensable Time extensions.

3. Indirect Field Overhead - For those allowable delay periods as defined in Section 00700-6.04C, **Indirect Overhead**, the Contractor shall be reimbursed for its indirect field overhead based on:
  - a. Actual invoice costs for on-site field offices and temporary utilities as described in Section 01560, **TEMPORARY CONTROLS**, and Section 01510, **TEMPORARY UTILITIES**.
  - b. Actual indirect labor costs, as determined consistent with Section 01035-1.03, **FORCE ACCOUNT PAYMENT**, for field office staff.
  - c. Fair rental values acceptable to the Construction Manager as described in Section 01035-1.03, **FORCE ACCOUNT PAYMENT**, for construction equipment idled due to the delay.

4. Indirect Home Office Overhead - For those allowable delay periods as defined in Section 00700-6.04C, **Indirect Overhead**, the Contractor shall be reimbursed for its unabsorbed home office overhead based on the following formula:

$$\frac{\text{ContractAwardAmount}(\$)}{\text{OriginalContractTime}(\text{Days})} * 0.03 = \text{DailyHomeOfficeOverhead}(\$ / \text{day})$$

The Contract Award Amount is the total amount in the executed Agreement (Section 00500). The Contract Time is as provided in Section 00800-1.01, **TIME ALLOWED FOR COMPLETION**.

As it is impractical to determine the actual home office overhead, such reimbursement shall constitute full payment for any and all home office overhead expenses for such periods of time for the Contractor and all subcontractors, whether greater or less than actual. Distribution of the markup amount among the Contractor and all subcontractors and suppliers is the responsibility of the Contractor.

## 6.05 LIQUIDATED DAMAGES

- A. Owner and the Contractor recognize that time is of the essence of this Agreement and that the Owner will suffer financial loss if the Work is not completed within the time specified in Section 00800-1.01, **TIME ALLOWED FOR COMPLETION**, and required milestone work in Section 00800-1.02 herein, plus any extensions thereof allowed in accordance with Section 00700-6.04 of the General Conditions. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage which the Owner will sustain in the event of and by reason of the Contractor's failure to fully perform the Work or to fully perform all of its Contract obligations that have accrued by the time for completion as specified in Section 00800-1.01 herein and/or as specified for completion of any scheduled operations or works described in Section 00800-1.02. It is, therefore, agreed in accordance with California Government Code Section 53069.85 that the Contractor will forfeit and pay to the Owner liquidated damages in the amount set forth in Section 00800-1.02, **DAMAGES FOR DELAYS**, per day for each and every calendar day that expires after the time for completion specified in Section 00800-1.01 herein and/or as specified for completion of any scheduled operations or works described in Section 00800-1.02 except as otherwise provided by extension of time pursuant to Section 00700-6.04 of the General Conditions. It is further understood and agreed in accordance with California Government Code Section 53069.85 that the liquidated damages sum specified in this provision is not manifestly unreasonable under the circumstances existing at the time this Contract was made, and that the Owner may deduct liquidated damages sums in accordance with this provision from any payments due or that may become due the Contractor.
- B. Liquidated damages will continue to accrue at the stated rate until Substantial Completion of the Work. Accrued liquidated damages may be deducted by the

Owner from amounts due or that become due to the Contractor for performance of the Work. Liquidated damages may not be waived or reduced by the Owner unless expressly waived or reduced in writing by the Construction Manager.

## **6.06 SUSPENSION OF WORK**

- A. If the Contractor fails to correct defective work as required by Section 00700-5.03, **MATERIALS AND WORKMANSHIP**, or fails to carry out the Work in accordance with the Contract Documents or any other applicable rules and regulations, the City, by a written order of the City's representative or signed personally by an agent specifically so empowered by the City, in writing, may order the Contractor to stop the Work, or any portion thereof. The suspension of Work shall remain in effect until the cause for such order has been eliminated. This right of the City to stop the Work shall not give rise to any duty on the part of the City to exercise this right for the benefit of the Contractor or any other person or entity. All delays in the Work occasioned by such stoppage shall not relieve the Contractor of any duty to perform the Work or serve to extend the time for its completion. Any and all necessary corrective work done in order to comply with the Contract Documents shall be performed at no cost to the City. The City's concurrence that the condition or cause has been eliminated will be provided in writing to the Contractor.
- B. In the event that a suspension of Work is ordered, as provided in this paragraph, the Contractor, at its expense, shall perform all work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public, pedestrian, and vehicular traffic, during the period of such use by suspension. Should the Contractor fail to perform the Work as specified, the City may perform such work and the cost thereof may be deducted from monies due the Contractor under the Contract.
- C. The City shall also have authority to suspend the Work wholly or in part, for such period as the City may deem necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the Work, or for the City's own convenience. Such temporary suspension of the Work will be considered justification for time extensions to the Contract in an amount equal to the period of such suspension if such suspended work includes the current critical activity on the latest Favorably Reviewed Progress Schedule. The Contractor as directed by the City shall provide the provisions as stipulated in Section 00700-6.06, **SUSPENSION OF WORK**, above. Such additional work shall be compensated as provided for in Section 00700-Article 7, **CHANGES IN THE WORK**.

## **6.07 RIGHT TO TERMINATE CONTRACT**

- A. Termination for Default
  - 1. In the event of default by the Contractor, the City may give 10 Days written notice to the Contractor of City's intent to terminate the Agreement and provide the Contractor an opportunity to remedy the conditions

constituting the default. It will be considered a default by the Contractor whenever Contractor shall:

- a. Declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors;
  - b. Fail to provide materials or workmanship meeting the requirements of the Contract Documents;
  - c. Disregard or violate provisions of the Contract Documents or Construction Manager's instructions;
  - d. Fail to prosecute the Work according to the accepted progress schedule; or
  - e. Fail to provide a qualified superintendent, competent workmen, or materials or equipment meeting the requirements of the Contract Documents; or
  - f. Fail to provide a consistently safe work place and follow the Contractor's approved safety plan.
2. If the Contractor fails to remedy the conditions constituting default within the time allowed, the CITY may then issue the Notice of Termination.
  3. In the event the Agreement is terminated in accordance with the above provisions of Paragraph 6.07, the City may take possession of the Work and may complete the Work by whatever method or means the City may select. The cost of completing the Work will be deducted from the balance which would have been due the Contractor had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the Contractor shall pay the excess amount to the City. If such cost is less than the balance which would have been due, the Contractor shall have no claim to the difference.

**B. Termination of Agreement by City (For Convenience)**

1. The City may, without cause and without prejudice to any other right or remedy of the City, terminate the Agreement at any time by providing Contractor a written Notice of Termination. In such a case, the Contractor shall have no Request for Change Orders or claims against the City except for (i) the value of Work performed up to the date the Agreement is terminated and (ii) the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Agreement is terminated, which would be needed in the Work and which meet the requirements of the Contract Documents.
2. The value of Work performed and the cost of materials and equipment delivered to the site, as mentioned above, will be determined by the City in accordance with the procedure prescribed for the making of the final Application for Payment under Article 8 below.



3. If a Notice of Termination issued by City for default under the provision of Paragraph 15.2 is found by a court (or other tribunal having jurisdiction) to be in violation of said provisions, the termination shall be deemed to be a termination for the City's convenience under the provisions of this Paragraph 15.3, and all of the provisions of this Article relating to a Notice of Termination issued under Paragraph 15.3 shall apply.
4. After receipt of Notice of Termination, and except as directed by the City, the Contractor shall, regardless of any delay in determining or adjusting any amounts due under this termination for convenience clause, immediately proceed with the following obligations:
  - a. Stop Work as specified in the Notice of Termination.
  - b. Complete any Work specified in the Notice of Termination in a least cost/shortest time manner while still maintaining the quality and safety called for under the Contract Documents.
  - c. Leave the property upon which the Contractor was working and upon which the facility (or facilities) forming the basis of the Contract Documents is situated in a safe and sanitary manner such that it does not pose any threat to the public health or safety of the public (including the occupants of any adjoining properties).
  - d. Terminate all subcontracts to the extent that they relate the portions of the Work terminated.
  - e. Place no further subcontracts or orders, except as necessary to complete any Work specified in the Notice of Termination.

#### **6.08 SUSPENSION, TERMINATION, OR CHANGES IN WORK DUE TO LITIGATION**

1. If all Work is suspended, delayed, or interrupted by an order of a court of competent jurisdiction, such suspension, delay or interruption will be considered to be for the convenience and benefit of the City under the provisions of Paragraph 15.1, except where the order is determined by the City to have resulted from a failure or refusal of the Contractor to comply with this Agreement or any statute, rule, regulation, or decision directly applicable to performance of the Work in effect at the time of contract award, in which case the suspension, delay or interruption will be considered to be a suspension for failure of the Contractor to carry orders under the provisions of Paragraph 15.1.
2. If pursuant to court order, the City is temporarily or permanently prohibited from requiring the Contractor to perform any portion of the

Work, the City Representative or Construction Manager may eliminate the enjoined Work pursuant to Paragraph 10.1.

## 7 ARTICLE 7 - CHANGES IN THE WORK

### 7.01 CHANGE ORDERS

- A. Without invalidating the Contract and without notice to sureties or insurers, the City through the Construction Manager, may at any time or from time to time, order additions, deletions, or revisions in the Work; these will be authorized by Field Directive, Field Order, or Change Order. A Change Order will not be issued for a Field Directive unless the Construction Manager concurs with an appeal by the Contractor that such Field Directive is a change in the scope of the Contract. The Contractor shall comply promptly with the requirements for all Change Orders, Field Orders, or Field Directives. The work involved in Change Orders shall be executed under the applicable conditions and requirements of the Contract Documents. If any Field Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made by issuing a Change Order. By the acceptance of a Change Order, the Contractor waives any claim for additional time, not included in the Change Order, for the work covered by that Change Order. Additional or extra work performed by the Contractor without written authorization of a Field Order or Change Order will not entitle the Contractor to an increase in the Contract Price or an extension of the Contract Time.
- B. Compensable extra work shall be that work required for the completed project, but not shown or detailed on the Contract Drawings, and not called for in the Contract Documents, and not constituting “incidental work” as defined in Section 00700-1.04, **PLANS AND SPECIFICATIONS**. Such work shall be governed by all applicable provisions of the Contract Documents. In giving instructions, the Construction Manager shall have authority to make minor changes in the Work, not involving extra cost, and not inconsistent with the purposes of the Work; but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the City through the Construction Manager, and no claim for an addition to the total amount of the Contract shall be valid unless so ordered.
- C. In case any change increases or decreases the work shown, the Contractor shall be paid for the work actually done at a mutually agreed upon adjustment to the Contract price, based upon the provisions of Section 01035, **MODIFICATION PROCEDURES**.
- D. If the Contractor refuses to accept a Change Order, the City may issue it unilaterally. The Contractor shall comply with the requirements of the Change Order. The City shall provide for an equitable adjustment to the Contract, and compensate the Contractor accordingly. If the Contractor does not agree that the adjustment is equitable, it may submit a claim in accordance with Section 00700-7.03, **RESOLUTION OF DISPUTES**.

## 7.02 DIFFERING SITE CONDITIONS

Pursuant to Public Contract Code Section 7104, the Contractor shall promptly, and before such conditions are disturbed, notify the Construction Manager in writing, of any:

- A. 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 disposal site in accordance with provisions of existing law.
- B. Subsurface or latent physical conditions at the site differing from those indicated in the Contract documents.
- C. Unknown physical conditions at the site of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract.

The City shall promptly investigate the conditions, and if it finds that the conditions do materially 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 the City shall cause to be issued a Change Order under the procedures provided in Section 00700-7.01, **CHANGE ORDERS**.

In the event that a dispute arises between the City 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 Contract, but shall proceed with all work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties, Section 00700-7.03, **RESOLUTION OF DISPUTES**.

No claim of the Contractor under this clause shall be allowed unless the Contractor has promptly given the notice required.

## 7.03 RESOLUTION OF DISPUTES

It is the intent of this Contract that disputes regarding the Contract be resolved promptly and fairly between the Construction Manager and Contractor. However, it is recognized that some disputes will require detailed investigation and review by one or both parties before a determination and resolution can be reached. For the protection of the rights of both the Contractor and the City the following provisions are provided for the resolution of disputes which cannot be resolved by the Contractor and Construction Manager within two days after either party should bring verbal notice of dispute or potential dispute to the other's attention and prior to the commencement of such work.

- A. Notice - If the Contractor disagrees with the Construction Manager's decision in Section 00700-1.06, **CONTRACT INTERPRETATION BY THE CONSTRUCTION MANAGER**, or in any case where the Contractor deems additional compensation or a time extension to the Contract Time is due the Contractor for work or materials not covered in the Contract or which the Construction Manager has not recognized as extra work, the Contractor shall notify

the Construction Manager, in writing, of its intention to make claim. Notice pertaining to decisions provided in Section 00700-1.06, **CONTRACT INTERPRETATION BY THE CONSTRUCTION MANAGER**, or such other determinations by the Construction Manager shall be delivered in writing to the Construction Manager within no more than ten (10) days of receipt of such decision and prior to the commencement of such work. All other notices for extra work shall be filed in writing to the Construction Manager prior to the commencement of such work. Written notice shall include the words "Notice of Potential Claim" in the subject line. Such Notice of Potential Claim shall state the circumstances and the reasons for the claim, but need not state the amount.

Additionally, no claim for additional compensation or extension of time for a delay will be considered unless the provisions of Sections 00700-6.03, **DELAYS**, and 6.04, **TIME EXTENSIONS**, are complied with. No claim filed after the date of final payment will be considered.

Unless notice is properly given, the Contractor shall not recover costs incurred by it as a result of the alleged extra work, changed work or other situation which had proper notice been given would have given rise to a right for additional compensation. The Contractor should understand that timely notice of potential claim is of great importance to the Construction Manager and the City, and is not merely a formality. Such notice allows the City to consider preventative action, to monitor the Contractor's increased costs resulting from the situation, to marshal facts, and to plan its affairs. Such notice by the Contractor, and the fact that the Construction Manager has kept account of the work in question, shall not in any way be construed as proving the validity of the claim.

- B. Response by Construction Manager - The Construction Manager shall review the "Notice of Potential Claim" and within ten (10) days of receipt of the notice shall respond to the Contractor in writing with its determination, or if it is necessary to extend this period, the Construction Manager shall notify the Contractor in writing as to when a decision will be provided.
- C. Appeals to the City's Representative - In the event the Contractor disagrees with any determination of the Construction Manager provided in accordance with Section 00700-7.03B, **Response by Construction Manager**, the Contractor may, within ten (10) days of receipt of such determination, appeal the determination to the City's Representative for review. The City's Representative shall review the appeal and transmit the decision in writing to the Contractor within thirty (30) days from the date of receipt of the appeal. Failure of the Contractor to appeal the determination of the Construction Manager within said ten (10) day period shall constitute a waiver of the Contractor's right to thereafter assert claim resulting from such determination or decision.

In the event the Contractor disagrees with the determination of the City's Representative, the Contractor shall notify the Construction Manager, in writing within ten (10) days of receipt of such determination, of its intention to make claim in accordance with Section 00700-7.03G, **Resolution of Claims**.

- D. Records of Disputed Work - In proceeding with a disputed portion of the Work, the Contractor shall keep accurate records of its costs, separate from costs incurred

performing contract work, and shall make available to the Construction Manager, a daily summary of the hours and classification of equipment and labor utilized on the disputed work, as well as a summary of any materials or any specialized services which are used. Such information shall be submitted to the Construction Manager on a monthly basis, receipt of which shall not be construed as an authorization for or acceptance of the disputed work.

- E. Submission of Claim Costs - Within thirty (30) days after the last cost of work for which the Contractor contends it is due additional compensation is incurred, but if costs are incurred over a span of more than thirty (30) days, then within fifteen (15) days after the thirtieth (30<sup>th</sup>) day and every month thereafter, the Contractor shall submit to the Construction Manager its costs incurred for the claimed matter. Claims shall be made in itemized detail and should the Construction Manager be dissatisfied with the format or detail of presentation, upon request for more or different information, the Contractor will promptly comply, to the satisfaction of the Construction Manager. If the additional costs are in any respect not knowable with certainty, they shall be estimated as best can be done. The Construction Manager shall have the right as provided in Section 01035-1.07, **COST PRICING DATA AND ACCESS TO RECORDS**, to review the Contractor's records pertaining to a submitted claim. In case the claim is found to be just, it shall be allowed and paid for as provided in Section 01035, **MODIFICATION PROCEDURES**.
- F. Claim Meetings - From time to time the Contractor may request or the Construction Manager may call a special meeting to discuss outstanding claims should it deem this a means of possible help in the resolution of the claim. The Contractor shall cooperate and attend prepared to discuss its claims, making available the personnel, subcontractors and suppliers necessary for resolution, and all documents which may reasonably be requested by the Construction Manager.
- G. Resolution of Claims - Claims pertaining to this Agreement for three hundred and seventy-five thousand dollars (\$375,000) or less which cannot be resolved between the parties shall be resolved pursuant to the provisions of Public Contract Code commencing at Section 20104.
1. Claims Not Exceeding \$375,000 - Said Code sections provide in part that: Under the law (starting at Public Contract Code Section 20104.2) construction claims of \$375,000.00 or less on local public agency construction contracts must be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment.  
  
The City must respond in writing to any written claim of three hundred seventy-five thousand dollars (\$375,000) or less within sixty (60) days [or, in the case of claims of less than fifty thousand dollars (\$50,000), within forty-five (45) days] of receipt of claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the City may have against the claimant.

If additional information is thereafter required, it shall be requested and provided, pursuant to Public Contract Code Section 20104.2, upon mutual agreement of the City and the claimant.

The City's written response to the claim, as further documented, shall be submitted to the claimant within thirty (30) days [or, for claims of less than \$50,000, within fifteen (15) days] after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

If the claimant disputes the City's written response (or if the City fails to respond within the time periods prescribed above) the claimant may notify the City, in writing, within fifteen (15) days of receipt of the City's response or within fifteen (15) days of the City's failure to respond within the times prescribed, respectively, and demand an informal settlement conference. The City must then schedule a settlement conference within thirty (30) days.

Following the settlement conference, if the claim or any portion remains in dispute, the claimant may file a claim as required by the claims statute commencing at California Government Code Section 910. The time within which a Government Code claim must be filed is tolled from the time the claimant submits the Public Contract Code claim until the time when the claim is denied.

2. Claims Exceeding \$375,000 - Unless this Contract provides otherwise, all claims between the City and the Contractor that are not resolved between the parties and are not governed by Public Contract Code Section 20104 shall be resolved according to the procedures established in Public Contract Code Section 20104 with the following exceptions:
  - a. The City must respond in writing to any written claim greater than three hundred seventy-five thousand dollars (\$375,000) within sixty (60) days of receipt of the claim, or may request in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the City may have against the claimant, or may advise the Contractor in writing within thirty (30) days of receipt of the claim when the review and response to the claim will be furnished.
  - b. The arbitration proceedings established in Public Contract Code Section 20104.4(b) and specified in Section 00700-7.03 G3, **Civil Action Proceedings**, shall only apply if both the City and Contractor mutually agree to arbitration.
3. Civil Action Proceedings - If a civil action is filed to resolve the claim, then between thirty (30) and sixty (60) days after the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by the parties. The parties are given fifteen (15) days to

select a disinterested third person as mediator. Mediation must commence within thirty (30) days of submittal and conclude within fifteen (15) days of commencement unless the time is extended for good cause by the court.

4. Mediation of Disputes - All disputes among the parties arising under this Agreement shall be mediated before resorting to arbitration or Court action. Mediation is a process in which parties attempt to resolve a dispute by submitting it to an impartial neutral mediator who is authorized to facilitate the resolution of the dispute but who is not empowered to impose a settlement on the parties. The mediation fee, if any, shall be divided equally among the parties. Before the mediation begins, the parties agree to sign a document limiting the admissibility and arbitration or any civil action of anything said, any admission made, and any documents prepared in the course of the mediation, consistent with Evidence Code Section 1152.5 or any successor statute. The filing of a judicial action to enable the imposition of a receivership, injunction or other provisional remedy shall not constitute a waiver of the right to mediate under this provision. The mediation shall take place in Marin County, California. The mediator shall be experienced in construction law. At least 30 days before mediation, the parties will exchange those documents that are reasonably necessary to evaluate the issues and arrive at an informed resolution of the issues.
5. If the matter remains in dispute, the case must be submitted to judicial arbitration pursuant to procedures set forth in the Code of Civil Procedure commencing at Section 1141.10. Discovery is permitted consistent with the rules pertaining to judicial arbitration.
6. Should either party to this Contract bring legal action against the other, the case shall be handled by a court of competent jurisdiction in Marin County, California.

## **8 ARTICLE 8 - PAYMENT**

### **8.01 BASIS OF PAYMENT**

- A. General - The Contractor shall accept the compensation, as herein provided, as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed Work and for performing all work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work, also for all expenses incurred in consequence of the suspension or discontinuance of the Work as herein specified; and for completing the Work according to the Contract Documents. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.

No compensation will be made in any case of loss of anticipated profits. This includes the event of the termination of the Contract, and therefore no compensation will be made to the Contractor for the loss of anticipated profits

associated with the terminated work. Increased or decreased work involving supplemental agreements will be paid for as provided in such agreements.

Full compensation for conforming to all of the provisions of the Contract Documents shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefore.

- B. Payment for Patents and Patent Infringement - All fees or claims for any patented invention, article, or arrangement that may be used upon, or in, any manner connected with the performance of the Work or any part thereof shall be included in the price bid for doing the work, and the Contractor and its sureties shall defend, protect, and hold the City, the Construction Manager, and Design Consultants, together with all their officers, agents, and employees harmless against liability of any nature or kind for any and all costs, legal expenses, and damages made for such fees or claims and against any and all suits and claims brought or made by the holder of any invention or patent, or on account of any patented or unpatented invention, process, article, or appliance manufactured for or used in the performance of the Contract, including its use by the City, unless otherwise specifically stipulated in the Contract. Before final payment is made on the Contract, the Contractor shall furnish an affidavit to the City regarding patent rights for the project. The affidavit shall state that all fees and payments due as a result of the work incorporated into the project or methods utilized during construction have been paid in full. The Contractor shall certify in the affidavit that no other fees or claims exist for work in this project.
- C. Payment of Taxes - The Contractor shall pay and shall assume exclusive liability for all taxes levied or assessed on or in connection with its performance of this Contract, whether before or after acceptance of the Work, including, but not limited to, State and local sales and use taxes, Federal and State payroll taxes or assessments, and excise taxes, including any taxes or assessments levied or increased during the performance period of the Work. No separate allowance will be made therefore, and all costs in connection therewith shall be included in the total amount of the Contract price.

## 8.02 PARTIAL PAYMENTS

- A. General - In consideration of the faithful performance of the Work prosecuted in accordance with the provisions of these Specifications and the Contract, the City will pay the Contractor for all such work installed on the basis of unit prices and/or percentage completion of lump sum Bid Items. Amounts earned for lump sum work will be based on accepted Cost Breakdown (Section 01025, **MEASUREMENT AND PAYMENT**).

Payments will be made by the City to the Contractor on estimates duly certified and approved by the Construction Manager, based on the Lump Sum or unit price value of equipment installed and tested, labor and materials incorporated into said permanent work by the Contractor during the preceding month. Payments will not be made for temporary construction unless specifically provided for in the Contract Documents.



Partial payments will be made monthly based on work accomplished as of a day mutually agreed to by the City and the Contractor. Additionally, the Contractor shall submit a detailed statement of the Contractor's request for payment of acceptable materials and equipment on hand in compliance with Section 00700-8.02B, **Partial Payments: Inclusion of Materials on Hand**. Each payment request shall list each Change Order executed prior to date of submission, including the Change Order Number.

Upon receipt of Contractor's requests for payment, the City shall act in accordance with the following:

1. The Construction Manager shall review the submitted estimates, as soon as practicable after receipt for the purpose of determining that the estimates are a proper request for payment, and shall prepare a certified estimate of the total amount of work done.
2. Any request for payment determined not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven (7) days after receipt. A request for payment returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the request for payment is not proper.
3. The number of days available to the City to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the City exceeds the seven (7) day return requirement set forth in Section 00700-8.02 A2 above.

If requested, the Contractor shall provide such additional data as may be reasonably required to support the partial payment request. The Construction Manager will be available to meet to discuss the partial payment request prior to its resubmittal(s). When the Contractor's estimate of amount earned conforms to the Construction Manager's evaluation, the Contractor shall submit to the Construction Manager a properly completed and signed progress payment request. The Construction Manager will submit the recommended progress payment request for the City's approval and processing. Payment will be made by the City to the Contractor in accordance with the City's normal accounts payable procedures; the City shall retain amounts in accordance with Section 00700-8.03, **RIGHT TO WITHHOLD AMOUNTS**.

No such estimate or payment shall be required to be made, when in the judgment of the Construction Manager, the Work is not proceeding in accordance with the provisions of the Contract, or when in the Construction Manager's judgment the total value of the Work done since the last estimate amounts to less than one thousand dollars (\$1,000).

Subject to the provisions of this section, the City shall pay the Contractor within thirty (30) days after receipt of undisputed and properly submitted requests for payment from the Contractor. In accordance with Public Contract Code Section 20104.50, if the City fails to pay an undisputed request for payment within the allotted thirty (30) days, the City shall pay interest to the Contractor equivalent to

the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

- B. Partial Payments: Inclusion of Materials on Hand - Materials, as used herein, shall be considered to be those items which are fabricated and manufactured material and equipment. Only those materials for which the Contractor can transfer clear title to the Owner will be qualified for partial payment. The Contractor may request payment of seventy-five (75) percent of the actual net cost of these materials. The request for partial payment will be subject to retention as provided elsewhere in the Contract Documents.

To receive partial payment for materials and equipment not incorporated in the Work, it shall be necessary for the Contractor to submit to the Construction Manager a list of such materials, at least seven (7) days prior to submitting the monthly estimate of amount earned for work completed. At the Construction Manager's sole discretion, it will approve items for which partial payment is to be made subject to the following:

1. Equipment and materials will only be eligible if given conditional or final acceptance by the Design Consultant and are in apparent compliance with Favorably Reviewed Shop Drawings.
2. Only materials which have received Favorable Review of shop drawings will qualify.
3. Eligible equipment or materials must be delivered and properly stored, protected, and maintained in a manner Favorably Reviewed by the Construction Manager, at the job site or an offsite location acceptable to the Construction Manager.
4. The Contractor's actual net cost for the materials must be supported by paid invoices of suppliers, or other documentation requested by the Construction Manager.
5. At the City's request, Contractor shall obtain an executed security agreement and all necessary UCC-1's as a condition of payment by City.
6. Materials or equipment delivered to the Site less than thirty (30) days prior to their scheduled incorporation in the Work shall not qualify.
7. Final payment shall be made only for materials actually incorporated in the Work and, upon acceptance of the Work, all materials remaining for which advance payments had been made shall revert to the Contractor, unless otherwise agreed, and partial payments made for these items shall be deducted from the final payment for the Work.
8. Partial payments for materials and equipment on hand shall not be deemed to be final payment for the material nor relieve the Contractor of its obligations under the Contract.

- C. Effect of Payment – Payment will be made by Owner based on the Construction Manager’s observations at the Site and the data comprising the progress payment request. Payment will not be a representation that the City has:
1. Made exhaustive or continuous on-site inspections to check the quality or quantity of Work;
  2. Reviewed construction means, methods, techniques, sequences or procedures;
  3. Reviewed copies of requisitions received from subcontractors and material suppliers and other data requested by Owner to substantiate Contractor’s right to payment;
  4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum; or
  5. Accepted all or part of the Work.

### **8.03 RIGHT TO WITHHOLD AMOUNTS**

- A. Retention - The City will withhold from each of the partial payments and retain as part security, ten (10) percent of the amount earned until the final payment.
- B. Other Withholds - In addition to the amount which the City may otherwise retain under the Contract, the City may withhold a sufficient amount or amounts of any payment or payments otherwise due the Contractor, as in its judgment may be necessary to cover:
1. For defective work not remedied.
  2. A reasonable doubt that the Contract can be completed for the balance then unpaid.
  3. Damage to another contractor or third party, or to property.
  4. Failure of the Contractor to maintain Record Documents current as required in Section 01720, **PROJECT RECORD DOCUMENTS**.
  5. Cost of insurance arranged by the City due to cancellation or reduction of the Contractor's insurance.
  6. Failure to submit, revise, resubmit or otherwise conform to the requirements herein for preparing and maintaining a construction schedule as required in Section 01310, **PROGRESS SCHEDULES**.
  7. Failure to make proper submissions, as specified herein.
  8. Amounts due the City from the Contractor.
  9. The Contractor's neglect or unsatisfactory prosecution of the Work including additional engineering and administrative costs related to construction and/or shop drawing errors and the failure to clean up.
  10. Provisions of law that enable or require the City to withhold such payments in whole or in part.

11. Stop Notice claims filed by Contractor's subcontractors, of any tier, or its material suppliers.

When the above reasons for withhold amounts are removed, payment will be made to the Contractor for amount withheld because of them.

#### **8.04 SECURITY SUBSTITUTION FOR WITHHOLDS**

For any retention of amount earned by the Contractor under Sections 00700-8.02, **PARTIAL PAYMENTS**, or 00700-8.07, **FINAL INSPECTION AND PAYMENT**, the Contractor may substitute securities as provided in Section 22300 of the Public Contract Code, as amended, which state in part as follows:

"Provisions shall be included in any invitation for bid and in any Contract Documents to permit the substitution of securities for any moneys withheld by a public agency to ensure performance under a Contract; however, substitution of securities provisions shall not be required where federal regulations or policies, or both, do not allow the substitution of securities. At the request and expense of the contractor, securities equivalent to the amount withheld shall be deposited with the public agency, or with a state or federally chartered bank in the State of California as the escrow agent, who shall then pay those monies to the contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the contractor."

"Alternatively, the contractor may request and the City shall make payment of retentions earned directly to the escrow agent at the expense of the contractor. At the expense of the contractor, the contractor may direct the investment of the payments into securities and the contractor shall receive the interest earned on the investments upon the same terms provided for in this section for securities deposited by the contractor. Upon satisfactory completion of the Contract, the contractor shall receive from the escrow agent all securities, interest and payments received by the escrow agent from the City, pursuant to the terms of this section."

"The contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon."

The escrow agreement used hereunder shall be substantially similar to the form in Section 00630, **ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION**.

#### **8.05 WARRANTY OF TITLE**

No material, supplies, or equipment for the Work under this Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants good title to all material, supplies, and equipment installed or incorporated in the Work and agrees upon completion of all Work to deliver the premises, together with all improvements and appurtenances constructed or placed thereon by the Contractor, to the City free from any claim, liens, security interest, or charges. The Contractor further agrees that neither the Contractor nor any person, firm, or corporation furnishing any materials or labor for any work covered by this Contract shall

have any right to a lien upon the premises or any improvement or appurtenances thereon, provided that this shall not preclude the Contractor from installing metering devices and other equipment of utility companies or of municipalities, the title of which is commonly retained by the utility company or the municipality. In the event of the installation of any such metering device or equipment, the Contractor shall advise the Owner as to the legal City thereof.

Nothing contained in this paragraph, however, shall defeat or impair the right of such persons furnishing materials or labor under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the City. The provisions of this Paragraph shall be inserted in all subcontracts and material contracts, and notice of its provisions shall be given to all persons furnishing materials for the Work when no formal Contract is entered into for such materials.

#### **8.06 SUBSTANTIAL COMPLETION**

When the Contractor considers that the Work is Substantially Complete, the Contractor shall notify the Construction Manager in writing. Upon receipt of the notification, the Construction Manager, the City and/or their authorized representatives will make inspection, to determine if the Work and administrative requirements are sufficiently complete in accordance with the Contract Documents so the City can occupy or utilize the Work for its intended use. If items are found which prevent such use or occupancy, the Construction Manager shall notify the Contractor in writing of such items by issuing a Corrective Work Item List.

Upon the completion of such corrective work, the Contractor shall so notify the Construction Manager in writing. The Construction Manager shall inspect the Work to determine its acceptability for Substantial Completion and for determination of the status of any other items which are required to meet the terms of Substantial Completion as listed in the Contract Documents. Upon verification that the project is Substantially Complete, the Construction Manager shall prepare a Certificate of Substantial Completion and the Punch List. The Certificate shall establish the date of Substantial Completion and the responsibilities of the City and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, commencement of warranties required by the Contract Documents, and shall fix the time, not to exceed sixty (60) days, within which the Contractor shall finish all items on the Punch List or remaining work or administrative requirements accompanying the Certificate. When the preceding provisions have been approved by both the City and the Contractor, they shall sign the Certificate to acknowledge their written acceptance of the responsibilities assigned to them in such Certificate. By such acknowledgment, the Contractor agrees to pay the City's actual costs including, but not limited to, charges for engineering, inspection and administration incurred due to the failure to complete the Punch List within the time period provided in the Certificate of Substantial Completion.

#### **8.07 FINAL INSPECTION AND PAYMENT**

Upon completion of the Work, including all items on the Punch List, and upon completion of final cleaning, the Contractor shall so notify the Construction Manager in

writing. Upon receipt of the notification, the Construction Manager, the City and/or their authorized representatives will make the final inspection, to determine the actual status of the Work in accordance with the terms of the Contract. If materials, equipment, workmanship or administrative requirements are found which do not meet the terms of the Contract, the Construction Manager shall prepare a Final Inspection List of such items and submit it to the Contractor. Following completion of the work to correct all items in the Final Inspection List the Contractor shall notify the Construction Manager. The Construction Manager shall, in turn, notify the City that the Work has been completed in accordance with the Contract. Final determination of the acceptability of the Work shall be made by the City. After completion of the Work, but prior to its Acceptance by the City, the last partial payment will be made to the Contractor in accordance with Section 00700-8.02, **PARTIAL PAYMENTS**.

After receipt of the last partial payment, but prior to Acceptance of the Work by the City, the Contractor shall send a letter to the Construction Manager. The letter, pursuant to California Public Contract Code Section 7100, shall state that acceptance of the final payment described below shall operate as and shall be, a release to the City, the Construction Manager, the Design Consultant, and their duly authorized agents, from all claim of and/or liability to the Contractor arising by virtue of the Contract related to those amounts. Disputed Contract claims in stated amounts previously filed as provided in Section 00700-7.03, **RESOLUTION OF DISPUTES**, may be specifically excluded by the Contractor from the operation of the release.

Following receipt of all required submittals and the Construction Manager's written statement that construction is complete and recommendation that the City accept the project, the City will take formal action on Acceptance.

Within ten (10) days of the Acceptance by the City of the completed Work embraced in the Contract, the City will cause to be recorded in the office of the County Recorder a Notice of Completion.

Thirty-five (35) days after recording the Notice of Completion of the work involved in the Contract, the City will pay the Contractor in lawful money such sums of money as may be due the Contractor including all sums retained but excluding such sums as have previously been paid the Contractor or as may be needed to cover outstanding stop notice claims or disputes. This payment will constitute the final payment to the Contractor under this Contract except for outstanding stop notice claims and disputed amounts.

In the event of a dispute between the City and the Contractor, the City may in accordance with Public Contract Code Section 7107 withhold from the final payment an amount of one hundred fifty (150) percent of the disputed amount.

## **END OF SECTION**

**SECTION 00800**

**SUPPLEMENTARY GENERAL CONDITIONS**

**ARTICLE I - MODIFICATIONS TO THE GENERAL CONDITIONS**

1.01 TIME ALLOWED FOR COMPLETION

In accordance with the provisions of Section 00700-6.02, **CONTRACT TIME**, Substantial Completion of this Project shall be completed within twenty (20) consecutive calendar days from the date established in the Notice to Proceed for the commencement of Contract Time.

1.02 DAMAGES FOR DELAYS

A. General

In accordance with the provisions of Section 00700-6.05, **LIQUIDATED DAMAGES**, for the period of time that any portion of the Work remains unfinished after the time fixed for Substantial Completion in Section 00800-1.01, **TIME ALLOWED FOR COMPLETION**, as modified by extensions of time granted by the City, it is understood and agreed by the Contractor and the City that the Contractor shall pay the City the damages listed below for direct costs the City incurs.

<u>Item</u>	<u>Dollars Per Day Liquidated Damages</u>
Substantial Completion	\$2,500

1.03 WEATHER DAYS

In accordance with the provisions of Section 00700-6.04 B3, **Weather Delays**, an allowance of five (5) working days of weather caused delay have been included in the time allowed for completion. This allowance represents a reasonable assessment of anticipated lost working days based on historical weather patterns. These weather days shall be included in the Contractor's schedule as specified in Section 01310-1.04, **WEATHER CONDITIONS**.

1.04 CCTV AND POTHOLING OF EXISTING SEWER MAINS

Prior to any excavation, Contractor shall clean and televise all existing sewer mains and mark all sewer lateral connections to the sewer main on the street. Contractor shall locate and mark each sewer lateral immediately behind the curb area, including the entire alignment of each sewer lateral from the main to back of curb area. Contractor shall pothole all sewer laterals behind the curb area to confirm each is a live sewer by cutting a hole in the top of pipe. Contractor shall then temporarily repair sewer laterals and either temporarily backfill the sewer lateral potholes or cover them in a manner approved by the City. Contractor shall remove and replace existing laterals to far side of curb and reconnect lateral service as outlined in construction drawings.

## 1.05 CONTRACT ADMINISTRATION

The following project representatives are hereby designated by the City:

- A. Name of City Representative:  
Andrew Davidson, Senior Civil Engineer  
Phone: 415-289-4111  
Email: [adavidson@ci.sausalito.ca.us](mailto:adavidson@ci.sausalito.ca.us)
- B. Name of Construction Manager:  
**To Be Determined**
- C. Name of Design Consultant Representative:  
Jill Shankel  
Phone: 925-932-1710  
Email: [jshankel@carollo.com](mailto:jshankel@carollo.com)

## 1.06 CHANGES

The Contractor is notified that the Engineer's authority for approving Change Orders is limited to 10 percent of the project cost. Amounts in excess of this limit will require approval by the Sausalito City Council with requisite time to schedule change order reviews and to process approvals.

## ARTICLE 2 - INDEMNITY AND INSURANCE

### 2.01 INSURANCE

Within ten (10) days after award of the Contract, the Contractor shall promptly obtain, at its own expense, all the insurance required by Section 00800-Article 2, INDEMNITY AND INSURANCE, and submit coverage verification for review and approval by the City prior to the City's execution of the Contract.

The Contractor shall not commence work until such insurance has been approved by the City. Such insurance shall remain in full force and effect at all times during the prosecution of the Work and until the final completion and Acceptance thereof. In addition, the Commercial General Liability Insurance shall be maintained for a minimum of five (5) years after final completion and acceptance of the Work (the "Guarantee Period"). The Notice to Proceed does not relieve the Contractor of the duty to obtain such insurance as required herein.

The Contractor shall require insurance coverage and limits of Subcontractors appropriate to the risks associated with their work and shall not allow any subcontractor to commence work on its subcontract until evidence of required insurance has been obtained and verified by the Contractor and submitted to the Construction Manager for the City's review and records. Subcontractors shall furnish original certificates and endorsements as verification of insurance coverage. Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII.



None of the policies of insurance required herein shall be suspended, voided, canceled, except after thirty (30) days' prior notice has been given to the City. All costs for all insurance shall be included in the Bid.

Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from its operations under this Contract. The Contractor's Commercial General Liability, Protection and Indemnity and Pollution Liability insurance policies shall be endorsed to state that each policy is primary and shall not contribute with any insurance or self-insurance of the City, the Design Consultant, the Construction Manager, and all of their officers, officials, employees, agents and volunteers (the "Additional Insureds"). Any failure of the Contractor to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the Additional Insureds.

The Contractor shall take out, pay for, and maintain throughout the duration of this Contract and for such additional periods as more specifically required herein the following insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work hereunder by the Contractor, the Contractor's agents, representatives, employees or subcontractors.

- A. Commercial General Liability, Pollution Liability, Protection and Indemnity for owned and non-owned vessels (if marine equipment and vessels are used) and Automobile Liability Insurance for owned, hired and non-owned automobiles.
  1. Additional Insureds - The Commercial General Liability, Protection and Indemnity and Pollution Liability policies of insurance shall be endorsed to name as additional insureds the City of Sausalito, the Design Consultant, the Construction Manager and each of their partners, officers, employees, and agents and coverage provided to such additional insureds. The Commercial General Liability policy shall provide coverage to each of the insureds with respect to products/completed operations. All policies shall be written on an occurrence basis.
  2. Amount of Coverage - The Commercial General Liability insurance shall provide coverage in the following limits of liability: \$1,000,000 on account of any one occurrence. The limits of coverage for Protection and Indemnity (for marine equipment and vessels) shall be not less than \$1,000,000 on account of any one accident. The Automobile Liability insurance policy shall provide minimum limits of \$1,000,000 per accident. These limits shall apply separately to the Project; if the limits are not project specific, Contractor shall provide insurance with limits double the amounts set forth above.
  3. Subcontractors - The bodily injury and property damage liability insurance shall not be deemed to require the Contractor to have its subcontractors named as insureds in the Contractor's policy, but the policy shall protect the Contractor from contingent liability which may arise from operations of its subcontractors.
  4. Included Coverage - The above Commercial General Liability insurance shall also include the following coverage:
    - a. Premises - Operations.
    - b. Owner's / Independent Contractor's and Contractor's Protective.
    - c. Products - Completed Operations.

- d. Personal Injury - (False Arrest, Libel, Wrongful Eviction, etc.).
  - e. Broad Form Property Damage – including to the Maximum Extent Possible, coverage for the Assumption of Liability Pursuant to Completed Operations.
  - f. Separation of Insureds / Cross-Liability Provisions.
  - g. Duty to Defend all Insureds.
  - h. Deletion of any Limitation on Coverage for Bodily Injury or Property Damage Arising out of Subsidence or Soil or Earth Movement.
  - i. A provision that the annual general aggregate and the products and completed operations annual aggregate shall apply separately to each Project for which Contractor provides services away from premises owned by or rented to Contractor.
  - j. Pollution Legal Liability Endorsement.
  - k. XCU - (Explosion, Collapse, Underground Damage) XCU may be deleted when not applicable to operations performed by the Contractor or its sub-contractors.
  - l. Blanket Contractual Liability including the Indemnification Agreement as herein stated.
5. Umbrella Policy - At the option of the Contractor, primary limits may be less than required, with an Umbrella Policy providing the additional limits needed. This form of insurance will be acceptable provided that the Primary and Umbrella Policies both provide the insurance coverages herein required, including all additional insured requirements. The umbrella policy shall provide coverage at least as broad as provided on the underlying commercial General Liability insurance.
- B. Workers' Compensation Insurance - In accordance with the provisions of Article 5, Chapter 1, Part 7, Division 2 (commencing with Section 1860) and Chapter 4, Part 1, Division 4 (commencing with Section 3700) of the Labor Code of the State of California, the Contractor is required to secure the payment of compensation to its employees and for that purpose obtain and keep in effect adequate Workers' Compensation Insurance.

The Contractor is advised of the provisions of Section 3700 of the Labor Code, which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that code, and shall comply with such provisions and have Employers' Liability limits of \$1,000,000 per accident before commencing the performance of the Work of this Contract.

Contractor and its subcontractors shall comply with the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for Worker's Compensation, including Longshoremen's and Harbor Workers' Compensation and Jones Act coverages, if applicable, before commencing the performance of the Work.

Before begins performance of the Work, the Contractor shall submit written evidence that the Contractor has obtained Workers' Compensation Insurance coverage for all persons whom it employs or may employ in carrying out the Work under this Contract. This insurance shall be in accordance with the requirements of the most current and applicable State Workers' Compensation Insurance Laws.

- C. Builder's Risk Insurance - "All Risk or Special Form" Builder's Risk Insurance on the replacement cost basis, in an amount equal to the full replacement cost on a completed value basis. Such insurance shall be obtained, paid for, and maintained by the Contractor and shall cover, but shall not be limited to, fire, lightning, windstorm, hail, explosion, riot, riot attending a strike, civil commotion, smoke damage, damage by aircraft, watercraft or vehicles, vandalism and malicious mischief, theft, collapse, flood and earthquake. This insurance shall name the City, the Design Consultant, the Construction Manager and the Contractor as insureds, as their interests may appear and shall include coverage including, but not by way of limitation, for all damages of loss to the Work and to appurtenances, to materials and equipment to be incorporated into the Project while the same are in transit, stored on or off the Project site, to construction plant and temporary structures.

Pursuant to Section 7105 of the Public Contract Code, the City requires Contractor to obtain insurance providing full replacement value coverage for any damage to the Work caused by an Act of God, as defined by Section 7105(b)(2) of that Code. Builder's Risk Insurance policies shall contain the following provisions:

- (1) The City shall be named as loss payee.
- (2) The Insurer shall waive all rights of subrogation against the City.

Builder's Risk Insurance may have a deductible clause not to exceed the following limits:

- (1) The deductible for coverage for any damage to the Work caused by an Act of God, as defined by Section 7105(b) of the Public Contract Code shall not exceed five percent of the value at risk at the time of the loss. The City shall be named as an insured.
- (2) All Other Perils: \$5,000.

The Contractor shall be responsible for paying any and all deductible costs. The policy shall provide the City the right to occupy the premises without termination of the policy until acceptance of the Project.

- D. Proof of Coverage - Contractor shall furnish the City with certificate(s) evidencing issuance of all insurance mentioned herein, copies of the policy declaration or information page(s) and endorsements. The certificate(s) and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The endorsements are to be on Forms A-1 and B-1 as included in Section 00650, **GENERAL LIABILITY ENDORSEMENT**, Section 00651, **AUTO LIABILITY ENDORSEMENT**, or equivalent endorsement forms acceptable to the City. The certificate(s), policy declaration or information page(s), and endorsements are to be received and approved by the City before work commences. Endorsements are not required for Workers' Compensation or Builder's Risk Insurances. Such policies of insurance shall be endorsed to provide that the insurance policy shall not be cancelable, be subject to non-renewal, or otherwise be subject to material modification, except with thirty (30) days prior written notice to the City and Contractor shall also provide certificate(s) evidencing renewals of all insurance required herein, at least ten (10) days prior to the expiration date of any such insurance.

Any deductibles or self-insured retentions must be declared to and approved by the City. At the option of the City, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City, the Design Consultant, the Construction Manager, and all of their officers, officials, employees and agents; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

In the event of the breach of any provision of this paragraph, or in the event of any notices received which indicate any required insurance coverage will be diminished or canceled, the City, at its option, may, notwithstanding any other provisions of this Agreement to the contrary, immediately declare a material breach of this Agreement and suspend all further work pursuant to this Agreement.

- E. Hold Harmless - The City of Sausalito and all officers and employees thereof connected with the Work, including but not limited to the City Council, shall not be answerable or accountable in any manner: for any loss or damage that may happen to the Work or any part thereof; for any loss or damage to any of the materials or other things used or employed in performing the Work; for injury to or death of any person; or for damage to property from any cause except losses due to sole or active negligence of the City of Sausalito's officers or employees.
- F. Indemnification - To the fullest extent allowed by law, Contractor shall defend, indemnify and hold harmless the City of Sausalito, its elected and appointed officials, the Design Consultant, Construction Manager, their employees and agents (collectively, the "Indemnified Parties"), from all liability, penalties, costs, losses, damages, expenses, causes of action, claims or judgments, including attorney's fees and other defense costs, resulting from injury to or death sustained by any person (including Contractor's employees), or damage to property of any kind, or any other injury or damage whatsoever, which injury, death or damage arises out of or is in any way connected with the performance of the Work, regardless of the Contractor's fault or negligence, including any of the same resulting from the alleged or actual negligent act or omission, of an Indemnified Party; except that said indemnity shall not be applicable to injury, death or damage to property arising from the sole or active negligence or willful misconduct of City, its officers, agents, or servants who are directly responsible to City. This indemnification shall extend to claims asserted after termination of this Contract for whatever reason. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist.
- G. In addition to any remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall be considered necessary by the City, may be retained by the City until disposition has been made of such suits or claims for damage.

## 2.02 INSURANCE DURING GUARANTEE PERIOD

Contractor shall maintain the above-described worker's compensation, commercial general liability, and property damage insurance in force during the entire period of the Guarantee Period as defined above.

## 2.03 INJURY OR ILLNESS REPORTS

The Contractor shall furnish the Construction Manager with a copy of the Employer's Report of Injury as required by CAL/OSHA immediately following any incident requiring the filing of said report during the prosecution of the Work under this Contract. The Contractor shall also furnish the Construction Manager with a copy of the Employer's Report of injury involving any subcontractor on this Project.

## 2.04 NOTIFICATION OF INSURANCE COMPANIES

The Contractor shall advise all insurance companies to familiarize themselves with all of the conditions and provisions of this Contract, and they shall waive the right of special notification of any change or modification of this Contract or of extension of time, or of decreased or increased work, or of the cancellation of the Contract, or of any other act or acts by the City or its authorized employees and agents, under the terms of this Contract, and failure to so notify the aforesaid insurance companies of changes shall in no way relieve the insurance companies of their obligation under this Contract.

## ARTICLE 3 - TERMINATION

### 3.01 TERMINATION FOR DEFAULT

- A. Add this language to the end of Section 00700-6.07A.
1. Payments Withheld. If the District terminates the Contract for one of the reasons stated in paragraph 6.07A.1, the Contractor shall not be entitled to receive further payment until the Work is complete.
  2. Payments Upon Completion. If the unpaid balance of the Contract Sum, including contract retentions, exceeds costs of completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the District within thirty days of the City's written demand. This payment obligation shall survive termination or completion of the Contract.

### 3.02 TERMINATION FOR CONVENIENCE

NOTE: THIS PROVISION REPLACES 00700-6.07.b IN ITS ENTIRETY.

- A. The City may, without cause, order the Contractor in writing to suspend, interrupt or terminate performance of the Work in whole or in part for such period of time as the City may determine. An adjustment may be made for an increase in the cost of performance of the Contract including profit on the increased cost of performance, if any, caused by any such suspension or interruption or termination. An equitable adjustment may be made of the price or prices specified in the Contract relating to the portion of the Work not suspended, interrupted, or terminated by notice of suspension, interruption, or termination. No adjustment shall be made to the extent:
1. That performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

2. An equitable adjustment is made or denied under another provision of this Contract.
- B. Any such suspension, interruption, or termination shall be effected by delivery to the Contractor of a written notice of suspension, interruption or termination specifying the extent to which performance of work under the Contract is suspended, interrupted, or terminated and the date upon which such suspension, interruption, or termination becomes effective. The effective date shall be not less than three (3) days after delivery of the written notice. After receipt of the notice of suspension, interruption, or termination, and except as otherwise directed by the City, the Contractor shall:
1. Stop work under the Contract on the date and to the extent specified in the notice of suspension, interruption, or termination;
  2. Place no further orders or subcontracts for materials, services or facilities except as necessary to complete the portion of the Work under the Contract which is not suspended, interrupted or terminated;
  3. Terminate all orders or subcontracts to the extent they relate to the performance of work suspended, interrupted or terminated by notice of suspension, interruption or termination;
  4. Assign to the City in the manner, at the times, and to the extent directed by the City, all the right, title and interest of the Contractor under the orders and subcontracts so suspended, interrupted or terminated. The City shall have the right, in its discretion, to settle or pay any or all claims arising out of the suspension, interruption, or termination of such orders and subcontracts;
  5. Settle all outstanding liabilities and all claims arising out of such suspension, interruption, or termination of orders and subcontractors, with the approval or ratification of the City to the extent the City may so require. The City's approval or ratification shall be final for all purposes of his clause;
  6. Transfer title to the City, and deliver in the manner, at the times, and to the extent, if directed by the City, the fabricated or unfabricated parts, work in process, completed work, supplies, and other materials produced as a part of, or acquired in connection with the performance of the work terminated by the notice of suspension, interruption, or termination, and the completed or partially completed plans, drawings, information, and other property, which, if the contract had been completed, would have been required to be furnished to the City;
  7. Use its best efforts to sell, in the manner, at the times, and to the extent, and at the price or prices that the City directs or authorizes, any property of the types previously referred to herein, but the Contractor shall not be required to extend credit to any purchaser and may acquire any such property under the conditions prescribed and at a price or prices approved by the City. The proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the City to the Contractor under this Contract or shall otherwise be credited to the price or cost of the work covered by this Contract or paid in such other manner as the City may direct;
  8. Complete performance of such part of the Work as shall not have been suspended, interrupted, or terminated by the notice of suspension, interruption, or termination; and

9. Take such action as may be necessary, or as the City may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the City has or may acquire an interest.
- C. After receipt of the notice of suspension, interruption, or termination, the Contractor shall submit to the City a certified suspension, interruption, or termination claim. Such claim shall be submitted promptly but in no event later than sixty (60) days from the effective date of the notice of suspension, interruption, or termination. If the Contractor fails to submit a suspension, interruption, or termination claim within such sixty (60) day period, the City may determine, on the basis of information available to it, the amount, if any, due to the Contractor. The City shall then pay to the Contractor the amount so determined, and that payment shall constitute full compensation for all work performed and costs incurred in connection with the Project.
  - D. After receipt of a certified claim, the City and the Contractor may agree upon the whole or any part of the amount or amounts to be paid to the Contractor because of the total or partial suspension, interruption, or termination of the Contract. The amount may include a reasonable allowance for profit on work performed. However, such agreed amount or amounts, exclusive of costs solely attributable to the suspension, interruption or termination, shall not exceed the total Contract Sum as reduced by the amount of payments otherwise made and as further reduced by the Contract Sum of work not suspended, interrupted, or terminated and any claims the City may have against the Contractor. Nothing in paragraph E of this section, shall be deemed to limit, restrict, or otherwise determine or effect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this paragraph.
  - E. After receipt of a certified claim, if the Contractor and City fail to agree on the amounts to be paid to the Contractor, the City shall determine, on the basis of the information available to it the amount, if any due, the Contractor by reason of the suspension, interruption, or termination and shall pay the Contractor the amounts determined as follows:
    1. For all work specified in the Contract which is performed before the effective date of the notice of suspension, interruption, or termination, the total of:
      - a. The reasonable cost to the Contractor, without profit, for all contract Work performed prior to the notice of suspension, interruption, or termination, including the work done to secure the project. In determining the reasonable cost, the City may utilize the schedule of values, contract unit prices, or lump sums, the percentage of Work completed and any other method available to it. For purposes of determining reasonable cost, deductions will be made for the cost of materials to be retained by the Contractor, amounts realized by the sale of materials, and for other appropriate credits against the cost of the Work. When in the opinion of the City the cost of an item of Work is unreasonably high, the reasonable cost to be allowed will be the estimated reasonable cost of performing such work in compliance with the requirements of the plans and specifications and excessive actual cost shall be disallowed.

- b. Reasonable cost will include a reasonable allowance for project overhead and general administrative overhead not to exceed a total of ten percent (10%) of direct costs of such work.
- c. A reasonable allowance for profit on the cost of the work performed as determined under subsection (1) provided the Contractor established to the satisfaction of the City that it would have made a profit had the Contract been completed and provided further, that the profit allowed shall in no event exceed five percent (5%) of the cost of the Work completed.
- d. The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the City or otherwise disposed of as directed by the City.

**ARTICLE 4 - TEAMING**

The successful Bidder will have the opportunity to enter into a teaming agreement with the City. Teaming consists of a voluntary effort by all parties having a major role in the Project to develop joint goals and establish a cooperative rather than an adversarial atmosphere while executing the construction project. The objective of teaming is the effective completion of the work on schedule, within budget and in accordance with the Contract Documents.

Although teaming is strongly encouraged, it is not a requirement of the Contract. The establishment of a teaming agreement will not change the legal relationship of the parties to the Contract nor relieve either party of any of the terms of the Contract.

To initiate the teaming process, the City and Contractor will meet after the Notice of Award to confirm if both parties agree that teaming will be utilized on the Project.

If agreement is reached that teaming will be utilized, the parties will conduct a Teaming workshop prior to the preconstruction conference. Follow-up workshop(s) may also be held throughout the Project. All workshops may be conducted by an outside facilitator. It is expected that, at the conclusion of the initial workshop, the parties will express a consensus regarding, among other things, the respective goals in completing the Contract.

A successful partnership will require the participation of the following project personnel:

- Contractor: Company Executive, Project Manager, Superintendent, Foreman, Key suppliers  
Subcontractor's supervisory personnel
- City: Director of Public Works, Project Manager, Inspector, Key staff
- Design Consultant: Principal-in-Charge, Project Manager, Project Engineer
- Construction Manager: Principal-in-Charge, Project Manager, Inspectors(s)

The City will make all the necessary arrangements for the workshop(s). The Contractor's costs associated with effectuating this teaming agreement will include attendance of appropriate personnel at the workshops. The City will pay for the actual site and facilitator costs for the teaming workshop.



## ARTICLE 5 - RECORD DRAWINGS AND ADDITIONAL INFORMATION

Any record or other information available at the City's offices regarding existing conditions at the Job Site may be reviewed by the Contractor upon request. The City makes no warranty as to the accuracy of the information available.

## ARTICLE 6 - SUBSTANTIAL COMPLETION

Substantial completion of the Project as required by Section 00700-8.06, **SUBSTANTIAL COMPLETION**, requires that the following portions of the Work must be completed in accordance with the requirements of the Contract Documents:

- Completion of the Work as required by the Contract Documents so the City, the public, and Sausalito Marin City Sanitary District can occupy and utilize the Project and any areas to which access has been restricted on account of the Work for their intended purpose.
- Completion of the Corrective Work Item List as described in Section 00700-8.06, **SUBSTANTIAL COMPLETION**
- All testing required by the Contract and the City's General Provisions and Specifications has been successfully completed.
- All items related to health and safety of Owner operations and maintenance staff, including warning signs, guardrails, and safety equipment shall be complete.
- All record drawings have been submitted, updated, reviewed and approved.

Portions of the Work not essential to sewer operation, that can be completed without interruption of public access or system operations, may be completed after the Work is substantially complete, and may include the following items:

- Final Site Clean-Up
- Restriping of roadways
- Completion of the Punch List prepared by the Construction Manager in accordance with Section 00700-8.06, **SUBSTANTIAL COMPLETION**.

**END OF SECTION**

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## SECTION 01010

### SUMMARY OF WORK

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. General work included in this section:
  - 1. Furnish all labor, materials, and equipment required by the Contract Documents or required to complete the Work.
  - 2. Coordinate work of all trades.
  - 3. Furnish and install miscellaneous items incidental to or necessary for completion of the Work, whether these items are specifically indicated in the Contract Documents or not.

##### 1.02 WORK COVERED BY CONTRACT

- A. The Work covered under this Contract will be performed along public right of ways located within the City of Sausalito. The project location is indicated on the Drawings.
- B. The Work includes, but is not limited to:
  - 1. Replacement of existing 6-inch sanitary sewer with new 6-inch sanitary sewers.
  - 2. Replacement of existing manholes.
  - 3. Replacement of existing lower sewer laterals and installation of cleanouts.
  - 4. Construction of shored excavations related to the work.
  - 5. Traffic control.
  - 6. Dewatering.
  - 7. Bypass pumping.
  - 8. Pavement replacement and repair, grading, and other miscellaneous work needed to restore areas disturbed by the construction back to original condition.

##### 1.03 OTHER CONTRACTS

- A. Construction of portions of the sewer pipeline may coincide with construction activities by other contractors and agencies. Coordination with the contractors undertaking related work or un-related work within the project work areas is the responsibility of the Contractor.

#### 1.04 SPECIFICATION LANGUAGE

- A. Specifications may be written in the imperative mood and streamlined form in accordance with practices and principals of the Construction Specifications Institute.
- B. Imperative language is directed to the Contractor unless specifically noted otherwise.
- C. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.
- D. Contractor to alert Construction Manager if the Contractor believes the permit requirements exceed the contract requirements.

#### 1.05 REGULATORY REQUIREMENTS

- A. Comply with all Federal, State, and local laws, regulations, codes, and ordinance applicable to the work.
- B. References in the Contract Documents to local codes shall mean those of Marin County.
- C. Other standards and codes that apply to the work are designated in the Specifications.
  - 1. Contractor shall alert the Construction Manager if the Contractor believes the permit requirements exceed the contract requirements.

#### 1.06 ACCESS BY GOVERNMENT OFFICIALS

- A. Authorized representatives of governmental agencies shall at all times have access to the work area. Provide proper facilities for access and inspection.

#### 1.07 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

- A. Pipeline construction will encounter numerous existing features of various types, such as fences, drain culverts, irrigation facilities, roadside drainage facilities, mailboxes, signs, private and public driveways, curbs, asphalt pavement, buildings, utility poles, guy wires, and other surface structures. Contractor shall protect existing features of this nature and all features affected by construction operations shall be restored to their original condition.
- B. To the greatest extent possible, remove existing features without damaging the materials and re-use the material to place back in the original condition. When existing features are damaged during removal, install new materials of similar type, appearance, and function, at no additional cost to the Owner.

- C. Contractor shall be responsible for all damage to streets, roads, driveways, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, that may be caused by transporting equipment, materials, or workers to or from the work or any part or site thereof, whether by Contractor or Contractor's subcontractors or suppliers.
- D. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
- E. In areas where the Contractor's operations are adjacent to or near a utility and such operations may cause damage resulting in expense, loss, and inconvenience, construction operations shall be suspended until all arrangements necessary for the protection thereof have been made by the Contractor.

#### 1.08 CONSTRAINTS

- A. Restrict work activities to public right-of-way in work areas indicated on the Drawings. Equipment and materials shall not be stored overnight on public streets or unapproved storage areas.
- B. Street shall remain passable for cars, and emergency vehicles to the extent feasible. Only one leg of Glen Court shall be closed at a time. Road closures will require prior approval by City and advanced notification to local residents.
- C. No excavation shall be left open overnight. Provide traffic-rated trench plating.
- D. Contractor shall provide door hangers alerting the residents of the upcoming work on their street 48 hours in advance of the work. Notification shall include contact name and phone number for questions related to work, work hours, parking restrictions, and dates of construction.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

***END OF SECTION***

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## SECTION 01025

### MEASUREMENT AND PAYMENT

#### PART 1 - GENERAL

##### 1.01 GENERAL

- A. Measurements of the completed work shall be in accordance with, and by instruments and devices calibrated to United States Standard Measures and the units of measurement for payment, and the limits thereof, shall be made as shown on the Plans, Specifications, General Conditions and Requirements, and Supplementary Conditions.
- B. Units of Measurement:
  - 1. Measurements shall be in accordance with U.S. Standard Measures.
  - 2. A pound is an avoirdupois pound.
  - 3. A ton is 2,000 pounds avoirdupois.
  - 4. The unit of liquid measure is the U.S. gallon.
- C. Certified Weights:
  - 1. When payment is to be made on the basis of weight, the weighing shall be done on certified platform scales, or when approved by the Construction Manager, on a completely automated weighing and recording system.
  - 2. The Contractor shall furnish the Construction Manager with duplicate licensed weighmaster's certificates showing the actual net weights.
  - 3. The City will accept the certificates as evidence of the weights delivered.
- D. Methods of Measurement:
  - 1. 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.
  - 2. In determining quantities, all measurements shall be made in a horizontal plane unless otherwise specified.
  - 3. Material not used from a transporting vehicle shall be determined by the Construction Manager and deducted from the certified tag.
  - 4. 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 Construction Manager in writing, the material will be weighed and converted to volume measurement for payment purposes.

5. Factors for conversion from weight measurement to volume measurement will be determined by the Construction Manager and shall be agreed to by the Contractor before such method of measurement of pay quantities will be adopted.
6. 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.
7. 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 Construction Manager; or material remaining on hand after completion of the Contract, will not be paid for and such quantities will be deducted from the final total quantities.
8. No compensation will be allowed for hauling rejected material.

#### 1.02 BID ITEMS:

- A. The Bid amounts for each Bid Item will be used for comparative bid analysis. The Bid amounts will also form the basis of monthly progress payments. Each Lump Sum bid amount will undergo further breakdown as described later in this Section. Unit prices for any unit price bid items, will be the basis for monthly progress payment determinations and for any changes related to that Work item. Bid Item will also demonstrate the Contractor's compliance with the California Labor Code relating to the price for sheeting, shoring, and bracing of excavations. Bid items are not intended to be exclusive descriptions of work categories and the Contractor shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item (work phase) as shown and specified. Measurement and payment for each Bid Item is defined in each section of the Special Provisions.
- B. Bid Item 1 – Mobilization and Demobilization:
  1. This bid item shall be lump sum. Payment shall be made at seventy five (75%) percent of the bid item amount on the first progress payment following completion of mobilization and the remaining amount on the final progress payment, with retention withheld as allowed by the Contract Documents. The Contractor may apply for the remaining twenty-five (25%) percent of the bid item amount upon completion of the project final punch list items provided by the Construction Manager.
  2. This bid item shall include payment for obtaining all bonds, all Contractor acquired permits, licenses, agreements, certifications, notices of intent, and temporary easements; moving onto the site of all equipment, materials, and staff including obtaining and set up of Contractor's staging



area/yard; preparing Storm Water Pollution Prevention Plan; furnishing and erecting all needed construction facilities; fencing; preparing traffic control plans; project signage; project security; demobilization; preconstruction photographs; video recording of surface features; progress schedules and reports; contract meetings; and record drawings.

3. Final payment for mobilization and demobilization, or any part thereof, will be approved for payment under the Contract when all applicable mobilization and demobilization items listed above have been completed.
4. This amount shall not exceed five percent (5%) of the total bid price for the Work.

C. Bid Item 2 - Bypass Pumping and Control of Sewage Flow:

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.
2. This bid item includes all work and materials necessary to maintain uninterrupted sewer service during the project and includes design and preparation of a flow control plan; submittals; personnel; plugging; bypass pumping; piping; temporary pipe trenching and surface restoration; protecting piping from traffic; sound attenuation equipment; temporary flow diversions; odor control equipment, handling flow from laterals that are temporarily disconnected; restoration of sewer flow; and all incidentals as required by these Plans and Specifications.

D. Bid Item 3 – Dewatering:

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.
2. This bid item includes all work and materials necessary for design and installation of dewatering system necessary to keep sewer trench and other excavations dry at all times. Payment will be "Lump Sum" and will be full compensation for furnishing and operating pumps, power supply; noise control, sediment removal devices; piping; protecting piping from traffic; wells, appurtenances; submittals; and all incidentals including obtaining all permits; and restoration of pavement; sidewalk; or landscaping damaged.

E. Bid Item 4 –Shoring:

1. This bid item shall be measured in lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.
2. This bid item includes excavation support measures required including but not limited to: design; submittals; installation and removal of shoring and bracing required to stabilize and prevent movement of existing ground and to protect and provide for the safety of the Contractor's workers due to collapse or movement of the existing ground during excavation and

trenching operations, including furnishing all equipment, materials, and personnel associated therewith, and in accordance with these Specifications and California Labor Code 6700-6708.

F. Bid Item 5 – 4 inch C900 PVC Sanitary Sewer - Open Cut.

Bid Item 6 – 6-inch HDPE DR 17 Sanitary Sewer - Pipe Burst.

Bid Item 7 – 6-inch C900 DR 18 PVC Sanitary Sewer - Open Cut with Concrete Cap.

Bid Item 8 - 6-inch C900 DR 18 PVC Sanitary Sewer - Open Cut.

1. These bid items shall be measured in linear feet. Measurement for unit price work will be based on the actual number of linear feet complete and in place as determined by the Construction Manager.
2. These bid items include submittals; traffic control; SWPPP pollution prevention measures; locating/potholing and protecting existing utilities; surveying; saw cutting, grinding, surface demolition; concrete plugs, excavation of trench; spoil removal and proper disposal; pipe bedding; trench backfill, drain rock; filter fabric; compaction; testing; CCTV inspection; pipe; dust control; cleaning; testing, record drawings; furnishing all equipment, materials, and personnel associated therewith, and all incidentals in accordance with these Plans and Specifications.

G. Bid Item 9 –Lateral Replacement per Detail A-C03:

1. This bid item shall be for the lateral replacement and connection installed as directed in the field by the Construction Manager. Measurement in linear feet will be based on the actual number of feet of lateral complete and in place as determined by the Construction Manager.
2. This bid item includes furnishing all equipment, materials, (except for one-way cleanouts covered in Bid Item 10), and personnel associated therewith, and in accordance with these Specifications; submittals; traffic control; SWPPP pollution prevention measures; dust control; collection and legal disposal of all coupons; locating/potholing and protecting existing utilities; surveying; locating/potholing the lateral; surface demolition; saw cutting; grinding; trenching; excavation; removal and proper disposal of concrete; spoil handling and proper disposal; cutting and sealing sewer service laterals; removal and disposal of existing laterals; preparing and compacting pipe sub base; placing and compacting pipe bedding; furnishing, installing, and compacting trench backfill; installation of lateral wye connection and lateral piping and connection couplings, connection to existing lateral; backfill; compaction; testing; CCTV inspection; additional surface restoration including fences, curb and gutter, sidewalks, asphalt paving per Detail B-C03, irrigation system components and landscaping; cleaning; record drawings, and all incidentals as required by these Specifications and Drawings.

H. Bid Item 10 – One-Way Clean Out.

1. This bid item shall be measured for each one-way cleanout installation and connection installed as directed in the field by the Construction Manager. The measurement will be based on the actual number of one-way cleanouts complete and in place as determined by the Construction Manager.
2. This bid item includes all labor, materials, and equipment to install and connect the one-way cleanout to the lateral pipe per Detail D-C03. This shall include surface demolition, excavation spoils handling and disposal, pipe bedding and initial backfill, trench backfill and compaction, surface restorations that are in addition to those indicated for Bid Item 9.

I. Bid Item 11 - 48" Manholes:

1. This bid item will be for each Manhole including frame and cover, installed regardless of depth. Payment will be based on the actual number of manholes along with manhole frames and covers completed and in place as determined by the Construction Manager, regardless of depth.
2. This bid item includes all labor, equipment, and materials necessary to furnish precast concrete manholes including bases, barrel sections, frames and covers; submittals; traffic control; SWPPP pollution prevention measures; saw cutting; excavation; dust control; soil stockpiling and spoils handling and disposal; structure bedding;; non-shrink grout; backfilling; compaction; routing of new flow channels within manholes; testing; surface restoration including sidewalks, concrete paving, asphalt paving, curbs, gutters, fences, and other surface features disturbed by the Work; cleaning; record drawings and all incidentals required for a complete installation.

J. Bid Item 12-AC Pavement Restoration per Detail B-C03:

1. This bid item will be pavement restoration for asphalt pavements as indicated in Detail B-C03 and the Specifications and measured in the field by the Construction Manager. Payment shall be based on the actual number of square feet installed for pavement restoration on Glen Court and Glen Drive. Pavement and surface restorations for laterals are addressed elsewhere.
2. This bid item includes all labor, equipment, and materials necessary to repair the trench-disturbed asphalt including sawcutting and widening the tee section of the base course and pavement; hauling and disposal of debris, furnish, place and compact aggregate base material; dress sides of the existing asphalt with asphalt emulsion; furnish, place and compact hot mix asphalt concrete; provide submittal and quality assurance documentation; testing; and miscellaneous work for a complete system.

K. Bid Item 13- Traffic Control:

1. This bid item will be for traffic control required to safely complete the work. Payment will be based on the linear footage of sewer main work completed as determined by the Construction Manager.
2. This bid item includes all labor, equipment, and materials necessary to provide traffic control in compliance with encroachment permits and these bid documents during construction of the project.

L. Bid Item 14- CCTV of Sewer Mains and Laterals:

1. This bid item shall be lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.
2. This bid item includes all work and materials necessary to CCTV sewer mains and laterals to determine exact lateral locations service during the project and includes design and preparation of a flow control plan; submittals; personnel; plugging; bypass pumping; piping; temporary pipe trenching and surface restoration; protecting piping from traffic; sound attenuation equipment; temporary flow diversions; odor control equipment, handling flow from laterals that are temporarily disconnected; restoration of sewer flow; and all incidentals as required by these Plans and Specifications.

M. Bid Item 15 –Builder's Risk Insurance:

1. This bid item shall be measured in lump sum. Payment for this item will be prorated over the course of the Project based on percentage complete of all items.
2. This bid item includes the cost of "All Risk or Special Form" Builder's Risk Insurance required to cover full replacement of any damage to the work caused by an Act of God, as defined by Section 7105(b) of the Public Contract Code.

### 1.03 LUMP SUM PAYMENT ITEMS

- A. Payment items for the Project for which Contract lump sum payments will be made are as listed in the Bid Schedule.
- B. Payment for each lump sum item provides full compensation for furnishing the labor, materials, tools, and equipment and doing all the work involved to complete the work covered by each item and included in the Contract Documents. Costs for items of Work, not specifically mentioned to be included in a particular lump sum or unit price payment item, but deemed incidental to the Work to be considered complete, shall be included in the listed lump sum item most closely associated with the Work involved.
- C. The lump sum price and payment made for each item listed shall be for performing all work required to complete the item and for which separate payment is not otherwise provided.
- D. Contractor shall submit a Schedule of Values for lump sum items. Provide itemized costs of lump sum items to facilitate progress payments of lump sum items that will take longer than one month to complete and are not tied to overall project completion.

### 1.04 UNIT PRICE PAYMENT ITEMS

- A. Payment items for the Project on which the Contract unit price payments will be made are as listed in the approved Bid Schedule.
- B. Each unit price item provides full compensation for furnishing the labor, materials, tools, and equipment and doing all the work involved to complete the work covered by each item and included in the Contract Documents. Measurement and payment stipulations are as detailed in the Specifications.

### 1.05 BID SCHEDULE QUANTITIES

- A. Contract quantities are those quantities that have been calculated from the neat lines shown on the Plans and Specifications with no allowance for so-called shrinkage, swelling or settlement.
- B. When the Plans and Specifications have been altered or when disagreement exists between the Contractor and the Construction Manager as to the accuracy of the Plan and Specification quantities, either party shall, before any work is started that would affect the measurement, have the right to request in writing a change to the noted quantity.

### 1.06 SCHEDULE OF VALUES

- A. In addition to the requirements stated in Contract Documents, the Schedule of Values shall be in the form of an Excel hardcopy spreadsheet along with the electronic file on a disk. A Schedule of Values shall be submitted for each bid

item as directed by the Construction Manager. Each component of work shall be consistent with the Contractor's Construction Schedule as defined in Section 01310 PROGRESS SCHEDULES. Construction Manager will use the approved Schedule of Values to assist in determining monthly progress payments for associated bid items, but will pay for work in terms of percentages actually completed.

- B. Lump Sum bid items as listed in the Bid Schedule submitted by the Contractor with the accepted bid shall be included in a separate detailed Schedule of Values addendum. Each lump sum item shall be as included on the Bid Schedule and shall indicate the portion of the lump sum expected to be requested for each month for the period of the Project. Construction Manager will use this information for reviewing and approving partial payments for these items.
- C. Construction Manager will review the Schedule of Values to assure that item breakdowns are reasonable and balanced. Before any work associated with Schedule of Value items can commence, Construction Manager must approve the Schedule of Values. When approved, they will be used in reviewing and approving the associated bid items to be included in the monthly partial payment requests.
- D. Updates and proposed changes to cash flow and Schedule of Values shall be submitted with the monthly partial payment request. Construction Manager will review the updates and proposed changes and advise the Contractor as to their acceptance, modification, or rejection.

#### 1.07 CHANGES AND EXTRA WORK

- A. Measurement and payment of changes and extra work shall be as detailed in the Contract Documents.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01035

### MODIFICATION PROCEDURES

#### PART 1 - GENERAL

##### 1.01 CHANGES IN CONTRACT PRICE

This section provides supplementary procedures for the administration of changes to the Contract as specified in Section 00700-Article 7, **CHANGES IN THE WORK**. Whenever corrections, alterations, or modifications of the Work under this Contract are ordered by the Construction Manager and approved by the City and increase the amount of work to be done, such added work shall be known as extra work; and when such corrections, alterations, or modifications decrease the amount of work to be done, such subtracted work shall be known as omitted work.

The difference in cost of the work affected by such change will be added to or deducted from the amount of said Contract price, as the case may be, by a fair and reasonable valuation, which shall be determined in one or more of the following ways as directed by the Construction Manager:

- A. Where applicable, by unit prices accepted by the City and stated in the Contract Documents;
- B. By unit prices subsequently fixed by agreement between the parties;
- C. By an acceptable lump sum proposal from the Contractor; or
- D. By Force Account (as described in Section 01035-1.03, **FORCE ACCOUNT PAYMENT**), when directed in writing and administered by the City through its agents or representatives.

The prices agreed upon and any agreed upon adjustment in Contract Time shall be incorporated in the written order issued by the City, which shall be written so as to indicate an acceptance on the part of the Contractor as evidenced by its signature. By signature of the Change Order, the Contractor acknowledges that the adjustments to cost and time contained in the Change Order are in full satisfaction and accord, payment in full, and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by the Change Order.

##### 1.02 NEGOTIATED CHANGE ORDERS

Under the methods described in Sections 01035-1.01B and 01035-1.01C, the Contractor shall submit substantiating documentation with an itemized breakdown of Contractor and subcontractor direct costs, including labor, material, equipment rentals, and approved services, pertaining to such ordered work in the form and detail acceptable to the

Construction Manager. The direct costs shall include only costs as described in Section 01035-1.04, **DIRECT COST CATEGORIES**.

The Construction Manager will review the Contractor's proposal for the change and negotiate an equitable adjustment with the Contractor. After there is an agreement the Construction Manager will prepare and process the Change Order and make a recommendation for action by the City. All Change Orders must be approved by the City in writing before the work can be authorized and the Change Order executed.

### 1.03 FORCE ACCOUNT PAYMENT

If either the amount of work or payment for a Change Order cannot be determined or agreed upon beforehand, the City may direct by written Change Order or Field Order that the work be done on a force account basis. The term "force account" shall be understood to mean that payment for the work will be done on a time and expense basis, that is, on an accounting of the Contractor's forces, materials, equipment, and other items of cost as required and used to do the work. For the work performed, payment will be made for the documented actual cost of the work as described in Section 01035-1.04, **DIRECT COST CATEGORIES**.

Prior to the commencement of force account work, the Contractor shall notify the Construction Manager of its intent to begin work. Labor, equipment and materials furnished on force account work shall be recorded daily by the Contractor upon report sheets acceptable to the Construction Manager. The reports, if found to be correct, shall be signed by both the Contractor and Construction Manager, or inspector, and a copy of which shall be furnished to the Construction Manager no later than the working day following the performance of said work. The daily report sheet shall thereafter be considered the true record of force account work provided. If the Construction Manager, or inspector, do not agree with the labor, equipment and/or materials listed on the Contractor's daily force account report, the Contractor and Construction Manager, or inspector, shall sign-off on the items on which they are in agreement. The Construction Manager shall then review the items of disagreement and will advise the Contractor, in writing, of its determination. If the Contractor disagrees with this determination, it shall have the right to file a claim notice as provided in Section 00700-7.03A, **Notice**.

The Contractor shall maintain its records in such a manner as to provide a clear distinction between the direct costs of work paid for on a force account basis and the costs of other operations.

To receive partial payments and final payment for force account work, the Contractor shall submit, in a manner approved by the Construction Manager, detailed and complete documented verification of the Contractor's and any of its subcontractor's actual costs involved in the force account pursuant to the pertinent Change Order or Field Order. Such costs shall be submitted within thirty (30) days after said work has been performed. No payments will be made for work billed and submitted to the Construction Manager after the thirty (30) day period has expired.



The force account invoice shall itemize the materials used and shall cover the direct costs of labor and the charges for equipment rental, whether furnished by the Contractor, subcontractor, or other forces. The invoice shall be in a form acceptable to the Construction Manager and shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type, and identification number of equipment and hours operated. Material charges shall be substantiated by valid copies of vendor's invoices.

#### 1.04 DIRECT COST CATEGORIES

The categories described below are defined to be direct costs. No other type of costs will be allowable as direct costs. Direct costs shall not include any labor costs pertaining to the Contractor's and subcontractors' managers or superintendents, their office and engineering staffs, the cost of their offices, facilities, vehicles, or anyone not directly employed on such work, nor small tools, and supplies. All such items are considered indirect costs which form a part of the Contractor's and subcontractors' overhead expenses.

The City reserves the right to furnish such labor, materials, and equipment as it deems expedient, and the Contractor shall have no claim for profit or added fees on the cost of such items.

##### A. Direct Labor

The Contractor will be paid the cost of direct craft labor for the workers and foremen (when authorized by the Construction Manager) used or proposed to be utilized in the actual and direct performance of the work.

The direct labor cost will be the actual payroll cost, including wages, subsistence and travel payments, and fringe benefits as established by negotiated labor agreements or state prevailing wages. To these actual wages, a labor surcharge in the amount of 11% of the direct labor cost will be added for all workers including Pile Drivers and Longshoremen and Harbor Workers. The labor surcharge compensates Contractor for the following statutory payroll-related costs: Workers Compensation, Social Security, Medicare, Federal Unemployment, State Unemployment, and State Training taxes. No other fixed labor burdens will be considered, unless approved in writing by the Construction Manager. Except as otherwise provided, the Contractor shall receive no additional compensation for wage premiums resulting from overtime work performed under change conditions without the prior written authorization of the Construction Manager.

##### B. Materials

The Contractor will be paid the cost of the materials to the purchaser, including tax and delivery if paid. If the Contractor does not furnish satisfactory evidence of the cost of such materials, it shall be deemed to be the lowest current price for the materials delivered to the job site for the applicable quantities of the materials.

No payment for small tools and supplies will be made for modifications. The Contractor's base compensation shall be deemed as full compensation for all tools and materials which are incidental to performing work including safety equipment provided by the Contractor to its employees.

C. Construction Equipment

The cost of construction machinery and equipment for changes shall be based on fair rental cost or equivalent rental cost of owned equipment. Such costs will be allowed for only those days or hours during which the equipment is in actual use. Payment shall be based on actual rental and transportation invoices but shall not exceed the rental rates listed for such equipment in the State of California Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates" which is in effect on the date upon which the work is performed. Owner-operated equipment rates shall not exceed the rates in the aforesaid Rental Rate publication plus the labor costs as provided in Section 01035-1.04A, **Direct Labor**. The rental cost allowed for equipment will, in all cases, be understood to cover all fuel, supplies, repairs, ownership, and incidental costs and no further allowances will be made for those items, unless specific written agreement to that effect is made. Compensation for idle time of equipment through delays caused by the City will be made consistent with Section 8-1.09, **Right-of-Way Delays**, of the Caltrans Standard Specifications.

Individual items of construction equipment or small tools which have a replacement value of five hundred dollars (\$500) or less shall not be charged to the Change Order work unless it can be demonstrated that the particular item is needed solely for the completion of the Change Order work.

1.05 MARK-UP ALLOWANCES

To the total of the direct costs of labor, materials, and equipment computed as described above, Contractor may add the following markups to the direct cost of the Change Order work, as further described below. The maximum markups allowed are:

- A. For work by its own organization, the Contractor may add up to the following percentages:
  - 1. Direct Labor
    - a. Negotiated Change Orders (Section 01035-1.02): 25 percent
    - b. Force Account Payment (Section 01035-1.03): 15 percent
  - 2. Materials 10 percent
  - 3. Equipment (owned or rented) 15 percent
- B. For all such work performed by subcontractors, such subcontractor may add the same percentages as the Contractor as listed in Section 01035-1.05A above to its actual net increase in costs for combined overhead and profit. The Contractor may add up to five (5) percent of the subcontractor's total for its combined overhead

and profit. No further compensation will be allowed for the Contractor's administration of the work performed by the subcontractor.

- C. For all such work done by sub-tier subcontractors, such sub-subcontractors may add the same percentages as the Contractor as listed in Section 01035-1.05A above to its actual net increase in costs for combined overhead and profit. The subcontractor may add up to five (5) percent of the sub-subcontractor's total for its combined overhead and profit. The Contractor may add up to five (5) percent of the subcontractor's total for its combined overhead and profit. No further compensation will be allowed for the Contractor's administration of the work performed by the subcontractor.
- D. For all such work performed by consultants, engineers, surveyors, etc. the combined total allowable markup for the Contractor and all subcontractors shall be five (5) percent of the fee total.
- E. To the total of the direct costs and markups allowed herein under, not more than two (2) percent shall be added for any and all additional Contractor bond and insurance, other than workers compensation insurance. (Cost for workers compensation insurance is included in the labor surcharge.) The compensable percentage for additional bonds and insurance shall be based on actual costs for the Contractor's bonds and insurance, as substantiated through documentation submitted to the Construction Manager.

When both additional and deleted work are involved in any one change, the markup allowances of this Section shall be applied to the net extra cost of the work, if any, after subtraction of the costs for the deleted work. For Change Order work which results in a net decrease in cost a minimum of five (5) percent markup shall be added to the sum of the direct labor, materials and equipment as a deduction for profit, indirect and overhead costs, and reduction in bond and insurance. The Contractor shall not be entitled to nor claim for anticipated profits on work that may be omitted.

The added mark ups shall be considered to be full compensation covering the cost of general supervision, field and home office overhead, profit, delay costs, small tools, safety equipment, incidentals, and any other items of expense not specifically designated as cost for labor, materials, and equipment, above. The above mark ups represent the maximum limits which will be allowed, and they include the Contractor's and all subcontractors' indirect field and home office expenses and all other costs for cost proposal preparation, schedule analysis and preparation, operation and maintenance manual documentation, and record documents and change order administration.

#### 1.06 INCREASED OR DECREASED QUANTITIES

Increases or decreases in the quantity of a Contract unit price bid item of work will be determined by comparing the total pay quantity of such item of work with the Bid Schedule quantity.

If the total pay quantity of any item of work required under the Contract varies from the Bid Schedule quantity by twenty five (25) percent or less, payment will be made for the quantity of work of said item performed at the Contract unit prices therefore, unless eligible for adjustment pursuant to Section 01035-1.06D, **Changes in Character of Work**.

If the total pay quantity of any item of work required under the Contract varies from the Bid Schedule quantity by more than twenty five (25) percent in the absence of an executed Contract Change Order specifying the compensation to be paid, the compensation payable to the Contractor will be determined in accordance with Sections 01035-1.06A, 1.06B or 1.06C, as the case may be.

A. Increases of more than twenty five (25) percent

Should the total pay quantity of any item of work required under the Contract exceed the Bid Schedule quantity by more than twenty five (25) percent, the work in excess of one hundred twenty five (125) percent of the Bid Schedule quantity will be paid for by adjusting the Contract unit price, as hereinafter provided. At the option of the Construction Manager, payment for the work involved in such excess will be made on the basis of force account as provided by Section 01035-1.03, **FORCE ACCOUNT PAYMENT**.

Such adjustment of the Contract unit price will be the difference between the Contract unit prices and the actual unit costs, which will be determined as hereinafter provided, of the total pay quantity of the item. If the costs applicable to such item of work include fixed costs, such fixed costs will be deemed to have been recovered by the Contractor by the payments made for one hundred twenty five (125) percent of the Bid Schedule quantity for such item, and in computing the actual unit cost, such fixed costs will be excluded. Subject to the above provisions, such actual unit cost will be determined by the Construction Manager in the same manner as if the work were to be paid for on a force account basis as provided in Section 01035-1.03, **FORCE ACCOUNT PAYMENT** or such adjustment will be as agreed to by the Contractor and the Construction Manager.

When the compensation payable for the number of units of an item of work performed in excess of one hundred twenty five (125) percent of the Bid Schedule quantity is less than \$5,000 at the applicable Contract unit price, the Construction Manager reserves the right to make no adjustment in said price if it so elects, except that an adjustment will be further considered if requested in writing by the Contractor.

B. Decreases of more than twenty five (25) percent

Should the total pay quantity of any item of work required under the Contract be less than seventy five (75) percent of the Bid Schedule quantity, an adjustment in compensation pursuant to this Section will not be made unless the Contractor so requests in writing. If the Contractor so requests, the revised quantity will be paid for by adjusting the Contract unit price as hereinafter provided. At the option of the Construction Manager, payment for the quantity of the work of such item performed

will be made on the basis of force account as provided in Section 01035-1.03, **FORCE ACCOUNT PAYMENT**. However, in no case shall the payment for such work be less than that which would be made at the Contract unit price.

Such adjustment of the Contract unit price will be the difference between the Contract unit price and the actual unit cost of the total pay quantity of the item, including fixed costs. Such actual unit cost will be determined by the Construction Manager in the same manner as if the work were to be paid for on a force account basis as provided in Section 01035-1.03, **FORCE ACCOUNT PAYMENT**; or such adjustment will be as agreed to by the Contractor and the Construction Manager.

The payment for the total pay quantity of such item of work will in no case exceed the payment which would have been made for the performance of seventy five (75) percent of the Bid Schedule of the quantity for such item at the original Contract unit price.

C. Eliminated Items

In the event that a part of the Work is to be eliminated in its entirety and such Work is covered by unit price(s) contained in the Bid and/or Contract Documents, the price of the eliminated Work item shall be based on the applicable unit price(s). The Contractor shall be paid five (5) percent of the total extended amount (bid price times the Bid Schedule quantity) for the eliminated Work item in consideration of the applicable Contractor's overhead costs.

Should any Contract item of the Work be eliminated in its entirety, in the absence of an executed Contract Change Order covering such elimination, payment will be made to the Contractor for actual costs incurred in connection with such eliminated Contract item if incurred prior to the date of notification in writing by the Construction Manager of such elimination.

If acceptable material is ordered by the Contractor for the eliminated item prior to the date of notification of such elimination by the Construction Manager, and if orders for such material cannot be canceled, it will be paid for at the actual cost, including a five (5) percent mark-up, to the Contractor. In such case, the material paid for shall become the property of the City and the actual cost of any further handling will be paid for. If the material is returnable to the vendor, and if the Construction Manager so directs, the material shall be returned and the Contractor will be paid for the actual costs of charges made by the vendor for returning the material. The actual cost of handling returned material will be paid for by the City.

D. Changes in Character of Work

If an ordered change in the Plans and Specifications materially changes the character of work of a Contract unit price bid item from that on which the Contractor based its Bid price, and if the change increases or decreases the actual unit cost of such changed item as compared to the actual or estimated actual unit

cost of performing the work of said item in accordance with the Plans and Specifications originally applicable thereto, in the absence of an executed Contract Change Order specifying the compensation payable, an adjustment in compensation therefore will be made in accordance with the following:

The basis of such adjustment in compensation will be the difference between the actual unit cost to perform the work of said item or portion thereof involved in the change as originally planned and the actual unit cost of performing the work of said item or portion thereof involved in the change, as changed. Actual unit costs will be determined by the Construction Manager in the same manner as if the work were to be paid for on a force account basis as provided in Section 01035-1.03, **FORCE ACCOUNT PAYMENT**; or such adjustment will be agreed to by the Contractor and the Construction Manager. Any such adjustment will apply only to the portion of the work of said item actually changed in character. At the option of the Construction Manager, the work of said item or portion of item which is changed in character will be paid for by force account as provided in Section 01035-1.03, **FORCE ACCOUNT PAYMENT**.

If the compensation for an item of work is adjusted under this Section, the costs recognized in determining such adjustment shall be excluded from consideration in making an adjustment for such item of work under the provisions in Sections 01035-1.06A, **Increases of More Than Twenty five (25) percent** and 1.06B, **Decreases of More Than Twenty five (25) percent**.

#### 1.07 COST PRICING DATA AND ACCESS TO RECORDS

All cost and pricing data submitted by the Contractor with respect to any change, prospective or executed, or any claim for extra compensation shall be a true, complete, accurate, and current representation of actual cost and pricing of the work. The Construction Manager may require a formal certification as to cost and pricing data submitted by the Contractor.

The City, its Construction Manager or other designated representative shall have access, upon reasonable notice during normal business hours, to any books, documents, accounting records, papers, project correspondence, project files, scheduling information, and other relevant records of the Contractor and all subcontractors directly or indirectly pertinent to the work, original as well as changes and claimed extra work, and the Contract for the purpose of making audit, examination, excerpts, and transcriptions and in order to verify or evaluate any change, prospective or executed, or any claim for which compensation has been requested or notice of potential claim has been tendered.

Such books, documents, and other records mentioned above shall include, but are not limited to all those reasonably necessary to determine the accurate amount of direct and indirect costs, job site, and delay and impact costs, however characterized, and shall include the original Bid and all documents related to the Bid and its preparation, as well as, the as-planned construction schedule and all related documents.

Such access shall include the right to examine and audit such records and make excerpts, transcriptions, and photocopies at the City's cost.

1.08 TIME EXTENSIONS FOR CHANGE ORDERS

If the Contractor requests a time extension for the extra work necessitated by a proposed Change Order, the request must comply with the applicable requirements of Section 01310-1.06, **TIME IMPACT ANALYSES**.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## SECTION 01050

### FIELD ENGINEERING

#### PART 1 - GENERAL

##### 1.01 DATUM

Vertical and horizontal datum is based on the coordinates and elevations shown on the Drawings. The Contractor shall establish other control and reference points from these City-furnished reference points as required to properly layout the Work and to document as-built location. The control will be tied to not less than two retraceable permanent monuments that are further tied to NAD 83 HARN, GRS Spheroid for horizontal location and NAVD 88 for vertical location. HT1072 (FEMA-2009 FIRM), HT1074 (FEMA-2009 FIRM), M223 (Sausalito), M 224(Sausalito), RM13 (Sausalito) are suggested. Other benchmarks and monuments may be used subject to approval by the Owner. The Contractor shall confirm all relative elevations identified on the Plans prior to start of construction. All connections shall be installed based on actual elevations of existing structures to which connections are made.

Contractor shall protect control points and preserve permanent reference points during construction. Any control points or monuments lost, disturbed or destroyed by the Work shall be replaced by the Contractor's surveyor.

##### 1.02 QUALITY ASSURANCE

The Contractor's surveyor or engineer responsible for surveying specified herein shall be a registered land surveyor in the State of California.

Accuracy of stakes, alignments, and grades may be checked randomly by Engineer:

1. Notice of when checking will be conducted will be given.
2. When notice of checking is given, postpone parts of the Work affected by stakes, alignments, or grades to be checked until checked.
3. Do not assume that Engineer's check substitutes or complements required field quality control procedures.

##### 1.03 LINES AND GRADES

The Contractor shall lay out all work, including but not limited to structures, pipelines, and utilities, and shall be responsible for any errors resulting therefrom. In all questions arising as to proper location of lines and grades, the Construction Manager's decision will be final.

As part of the bid price for the construction of the improvements, the Contractor shall provide and be responsible for the layout of all work. The Contractor shall provide all necessary surveys, field staking, and positioning for the construction of all components at

the proper alignment, elevations, grades, and positions, as indicated on the Drawings and as required for the proper operation and function. The Contractor shall stake its work limits.

The Contractor's layout shall be based on existing structures, survey control and bench marks established by the City.

The Contractor shall supply such labor as required, at no extra charge, to aid and assist the Construction Manager in checking location and grades of the Work as set by the Contractor if the Construction Manager desires to perform this checking. This shall include moving materials and equipment located between monuments and the construction work.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01060

### REGULATORY REQUIREMENTS AND PERMITS

#### PART 1 - GENERAL

##### 1.01 APPLICABLE CODES

Contractor shall comply with all codes applicable to the Project; see Technical Specifications for applicable codes as well Division 0 and Division 1 Specifications and Drawings. The omission of a code shall not excuse nor relieve the Contractor's obligation to comply with any such code applicable to the Work.

##### 1.02 FEES AND PERMITS

The Contractor shall obtain the necessary encroachment permit from the City of Sausalito. If facilities owned by the Marin Municipal Water District (MMWD), PG&E, or other agency having jurisdiction over the construction area will be disturbed by construction, the contractor shall obtain the necessary encroachment permit and shall be responsible for satisfying all requirements, calling for inspections, and obtaining final approvals. The Contractor shall notify the Construction Manager of the need and the readiness of all required inspections. All inspections are to be coordinated with the Construction Manager. The Contractor shall comply with all construction conditions stipulated in the permits. The Contractor shall initially pay for all permits, fees and inspections required for local agency and code requirements. The Contractor shall submit invoice to the Construction Manager for the City's reimbursement of such costs.

The Contractor shall be responsible for and the City shall not provide reimbursement for any costs required for the reinspection of defective work or additional costs due to the Contractor's failure to properly schedule the inspections.

##### 1.03 STORM WATER QUALITY CONTROLS

- A. On Sept. 2, 2009, the State Water Resources Control Board (State Water Board) adopted a revised General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ) for all categories of construction storm water discharges. This permit is a statewide general construction storm water permit for construction activity that results in a land disturbance of one (1) acre or more. Contractor shall be responsible for compliance with the State of California Construction General Permit Order 2009-0009-DWQ adopted on September 2, 2009, as well as compliance for construction of this Project with the City's Permit Coverage as a Small MS4s under Phase II NPDES General Permit, and existing City storm water regulations.

- B. Since the City is responsible to the State for the preparation of and compliance with the various management plans called for in the permit, the City requires the Contractor to provide the detail planning and compliance activities required insofar as they would potentially affect Contractor's methods and means of performing the Work. The conditions of the permit applicable to the Contractor are as follows:
1. Discharge prohibitions.
  2. Receiving water limitations.
  3. Special Provisions for Construction Activity.
    - a. Standard Provisions 2, 3, 5, and 6.
  4. Section A: Storm Water Pollution Prevention Plan.
    - a. Contractor shall prepare a storm water pollution prevention submittal and obtain approval from City prior to the start of any construction activity with the potential for adverse impacts to storm water quality. It is recommended that Contractor's storm water pollution prevention submittal be developed by a Qualified Storm Water Pollution Prevention Plan ("SWPPP") Developer ("QSD") and implemented by a Qualified SWPPP Practitioner ("QSP") unless a SWPPP is not required under the Construction General Permit. In the event that a SWPPP is not required, Contractor shall remain obligated to acquire City approval of a storm water pollution prevention submittal.
  5. Section B: Monitoring and Reporting Requirements.
    - a. The Contractor shall comply with all applicable paragraphs of this section of the SWPPP. The Contractor shall conduct inspections of the construction site prior to anticipated storm events and after storm events to assess effectiveness of the SWPPP.
    - b. A record of the inspections must include the date of the inspection, the individual(s) who performed the inspection and the observations.
    - c. The inspection reports shall be submitted within twenty-four (24) hours of the event.
  6. Storm Water Pollution Prevention Best Management Practices.
    - a. In preparing and complying with its storm water pollution prevention submittal, Contractor shall consider best management practices ("BMPs") for erosion control, sediment control, run-on and runoff control and make all necessary provisions for inspection, maintenance and repair of all BMPs employed during the course of construction and until the Project is accepted and the Contractor has fully demobilized from the site. All BMPs must be periodically inspected, maintained, and repaired to ensure that receiving water quality is protected.

- b. Contractor shall properly handle, store and dispose of any potential pollutants, and actively prevent the contamination of waterways or subsoil.
- c. Contractor shall eliminate sediment discharge into storm drains, the Bay or any other receiving waters due to rainwater run-off, and shall eliminate all construction debris, soil or contaminants prior to discharge of storm water.
- d. Contractor shall ensure that construction materials are properly handled and managed to minimize threats to water quality. These procedures shall include good housekeeping measures for: construction materials, waste management, vehicle storage and maintenance, landscape materials, and other potential pollutant sources.
- e. Contractor shall control all non-storm water discharges directly connected to receiving waters or the storm drain system must during construction, including any dewatering activities associated with construction.

#### 1.04 EXISTING UTILITIES AND IMPROVEMENTS

##### A. General.

- 1. Access shall be provided at all times to all fire hydrants.
- 2. Contractor shall contact Underground Services Alert (USA) at (800) 227-2600 or (800) 642-2444 one week in advance of starting excavation to provide for marking of utilities. Shutdown of utilities shall be performed only by the utility owner.
- 3. The Contractor shall protect all existing utilities, pavement, sidewalks, curbs, fences, landscaping, and other improvements that are not designated for removal, from damage by his operations. Any such features that are damaged or temporarily relocated by the Contractor during construction shall be repaired or restored by the Contractor 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 and at no expense to the City.
- 4. The location of known existing utilities and pipelines are shown on the drawings in their approximate locations. Some of the locations include multiple conduits. The Contractor shall exercise care in avoiding damage to those facilities which are to remain in service subsequent to the Work, and shall be held responsible for their repair if damaged. The Contractor shall also exercise care in maintaining those facilities which will be removed or abandoned by the Work until such time as they can be removed or abandoned.

5. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in his construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. There is no guaranty that all utilities or obstructions are shown or that the locations indicated are accurate. 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 cost of repair of any damages to existing utilities shown on the Plans, marked in the field, or attributable to negligence on the part of the Contractor shall be at the Contractor's expense.
6. Nothing herein shall be deemed to require the public agency to indicate the presence of existing overhead power, telephone and TV cable or underground service laterals and appurtenances when the presence of such utilities on the site of the construction can be inferred from the presence of visible facilities, such as poles, buildings, or meter and junction boxes, on or adjacent to the site of construction; provided, however, nothing herein shall relieve the public agency from identifying buried main or trunk lines in the Plans and Specifications.

B. Owner's Right of Access.

1. The right is reserved to the City 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.

C. Exploratory Excavation.

1. The Contractor shall verify the exact locations and depths of all utilities shown on the Plans or by Underground Services Alert (USA). Prior to trenching or excavating for any pipe or structure, the Contractor shall make exploratory excavations to completely expose all utilities shown on the drawings, or located by USA that may interfere with the Work. Excavations around underground electrical ducts and conduits shall be performed using extreme caution to prevent injury to workers or damage to the electrical ducts or conduits.
2. The Contractor shall contact the owner of each utility to determine if they permit potholing of their utility or if they pothole with their own personnel. All such exploratory excavations shall be performed as soon as practicable after award of the Contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor's work. Contractor shall submit pothole log with utility information to Construction Manager for record in advance of construction.

3. New pipeline shall be laid to such grade as to clear all existing facilities which are to remain in service for any period subsequent to the construction of the run of pipe involved. A sufficient number of exploratory excavations shall be made for each utility to determine the alignment and grade of the utility.
4. The cost for performing said excavations shall be included in the Contractor's Bid Price. If the Contractor does not expose all required utilities, it shall not be entitled to additional compensation for work necessary to avoid interferences or for repair to damaged utilities.
5. When such exploratory excavations show the utility location as shown to be in conflict with the Work, the Contractor shall so notify the Construction Manager and a method for correcting the conflict will be supplied by the Construction Manager. The Contractor will be reimbursed for the cost of correcting the conflict in accordance with Section 00700-Article 7, **CHANGES IN THE WORK**.

D. Utilities to be Moved.

1. Where the proper completion of the Work requires the temporary removal and/or relocation of an existing utility or other improvement the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Construction Manager 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.
2. In case it shall be necessary to permanently move any existing utility or improvement, the Contractor shall notify the Construction Manager a sufficient time in advance for the necessary measures to be taken to prevent interruption of service or delay of the Work.

E. Underground Utilities Shown or Indicated.

1. Existing utility mains and improvements that are shown on the Plans or the locations of which are indicated to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during the Work shall be protected from damage during excavation and backfilling, and if damaged, shall be immediately repaired by the Contractor at no expense to the City. This provision shall also apply to existing utility services whose locations can be inferred from meters, vaults, valves, and other markings or those indicated by the owner of the utility.

2. All buried utilities shall be considered to be correctly shown or indicated if their true locations are within five (5) horizontal feet of the locations shown either on the Plans or marked on the ground by the utility's owner regardless of depth.
3. The Contractor shall receive no additional compensation for extra work or delay for locating such correctly shown or indicated utilities.
4. If an existing utility service or appurtenance interferes with the installation of a sewer lateral, the Contractor shall notify the Construction Manager a sufficient time in advance for the necessary measures to be taken to prevent interruption of service or delay of the Work.

F. Underground Utilities Not Shown or Indicated.

1. If the Contractor encounters any existing utility mains that are not shown or correctly shown on the Plans, and the locations of which are not correctly indicated to the Contractor prior to excavation, he shall immediately make a written report to the Construction Manager. If directed by the Construction Manager, repairs shall be made by the Contractor under the provisions for changes and extra work. This provision shall also apply to existing utility services whose locations cannot be inferred from meters, vaults, valves, or other markings, and are not indicated to the Contractor prior to excavation by the owner of the utility.
2. The Contractor shall be reimbursed for repair, removal, and/or relocation of these utilities, provided that he exercised reasonable care to avoid causing the damage. Reimbursement will be limited to extra materials, extra labor, and idled equipment that was actually working on the portion of the Work that was stopped due to the damage and could not reasonably be reassigned to another task of the Work.
3. The Contractor shall not be assessed liquidated damages for delay in completion of the Project when such delay was due to utilities that were not shown or located, or could not be inferred from visual evidence.

G. Approval of Repairs.

1. The utility or improvement owner shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.
2. All repairs to a damaged improvement are subject to inspection and approval by an authorized representative of the improvement owner before being concealed by backfill or other work.



H. Maintaining in Service.

1. All oil and gasoline pipelines; railroad facilities; power, telephone or communication cable ducts; gas and water mains; irrigation, sewer, and storm drain lines; and overhead power and communication poles, 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 Construction Manager are made with the owner of said facilities.
2. Planned facility shutdowns shall be accomplished as required by the owner of the facility. In some cases, this may require night or weekend work which shall be at no additional cost to the City. The Contractor shall program its work so that service will be restored in the minimum possible time and shall cooperate with the City in reducing shutdowns of utility systems to a minimum. No utility interruption will be permitted without the prior approval of the Construction Manager and the specific utility.
3. 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.

I. Interruption of Public Utilities or Residential Services.

1. Construction will occur adjacent to existing potable water lines crossing above, below, and parallel to the Work. The Contractor shall exercise extreme caution in working adjacent to existing sewerage facilities.
2. It is essential that all existing facilities be maintained in service for full-time operation, except where approved temporary facilities are installed or temporary closures are made as part of the Work. Where wastewater flow in existing facilities is interrupted or must be diverted for construction, the Contractor shall conduct this work in accordance with this paragraph and Section 02145, **SEWER BYPASSING AND CONTROL**.
3. Construction of connections between existing facilities and new facilities shall be scheduled to minimize disruption to sewer service. The Contractor shall coordinate the schedule for all work on existing facilities during periods acceptable to the City. Contractor shall notify the City at least 48 hours prior to such work.
4. When working on existing sewers, the Contractor shall investigate and ensure that temporary sewage flow stoppage does not cause the backing up and flooding of residences and businesses connected upstream of the location in question. Any lateral flow stoppage work requiring greater than 1/2 hour shall be approved in advance by the City staff in writing.
5. The Contractor shall advise the Construction Manager in writing at least five (5) calendar days prior to interrupting flow in any sanitary sewer main.

6. The Contractor shall immediately contact PG&E by calling (800) 743-5000 should any damage occur to gas pipelines, cables, appurtenances, or overhead power lines.
7. The Contractor shall immediately contact MMWD by calling at (415) 945-1500 should any damage occur to water pipelines or valves.
8. The Contractor shall immediately contact AT&T by calling 800-288-2020 should any damage occur to telephone conduit, cables or poles.
9. The Contractor shall immediately contact Comcast by calling 925-424-0329 should any damage occur to fiber optic lines, cables or poles.
10. The Contractor shall immediately contact Sausalito Marin City Sanitary District by calling 415-332-0244 should any damage occur to District owned sewers or force mains.

#### 1.05 RIGHTS-OF-WAY

- A. The Contractor shall not do any work that would affect any existing oil, gas, sewer, or water pipeline; any existing telephone, telegraph, or electric transmission line; any fence; any railroad facility; or any other structure, nor shall the Contractor enter upon the rights-of-way involved until notified by the Construction Manager that the Owner has secured authority therefore from the proper party. After authority has been obtained, the Contractor shall give said party due notice of its intention to begin work, comply with any preconstruction easement conditions, and shall give said party convenient access for removing, shoring, supporting, or otherwise protecting such pipeline, transmission line, ditch, fence, or structure, and for replacing same.
- B. When two or more contracts are being executed at one time on the same or adjacent land in such manner that work on one contract may interfere with that on another, the Owner shall determine the sequence and order of the Work. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the Owner to the Contractor so desiring, to the extent, amount, in the manner, and at the times permitted. No such decision as to the method or time of conducting the Work or the use of territory shall be made the basis of any claim for delay or damage, except as provided in the General Conditions for temporary suspension of the Work, Section 00700-6.06, **SUSPENSION OF WORK.**

#### 1.06 CULTURAL RESOURCES

- A. The Contractor's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and PRM 75-27 which provides for the preservation of potential historical architectural, archeological, or cultural resources (hereinafter called "cultural resources").

- B. The Contractor shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources. Fair compensation to the Contractor for delays resulting from such cultural resources investigations shall be made.
- C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:
- D. The Construction Manager will issue a Stop Work Order directing the Contractor to cease all construction operations at the location of such potential cultural resources find.
- E. Such Stop Work Order shall be effective until such time as a qualified archaeologist can be called to assess the value of these potential cultural resources and make recommendations to the City. Any Stop Work Order shall contain the following:
  - 1. A clear description of the work to be suspended.
  - 2. Any instruction regarding issuance of further orders by the Contractor for material services.
  - 3. Guidance as to action to be taken on subcontracts.
  - 4. Any suggestions to the Contractor as to minimization of his costs.
  - 5. Estimated duration of the temporary suspension.
- F. If the archaeologist determines that the potential find is a bona fide cultural resource, at the direction of the City, the Engineer shall extend the duration of the Stop Work Order in writing, and the Contractor shall suspend work at the location of the find.
- G. Equitable adjustment of the construction contract time shall be made in the following manner: If the work temporarily suspended is on the "critical path," the total number of days for which the suspension is in effect shall be added to the number of allowable contract days.

#### 1.07 SPECIAL WORK HOURS FOR SPECIFIC ITEMS OF WORK

- A. The following items of work are required to be completed during the specified time period:
  - 1. General working hours shall be defined in Section 01560-1.07
  - 2. At least one lane of traffic shall be maintained between 8:00 a.m. and 6:00 p.m. Closure of Miller Avenue and 3rd Street in the work zone will be permissible.

3. All traffic lanes shall be opened between 6:00 p.m. and 8:00 a.m. except during the “night work” as specified below.
4. Contractor shall prepare a traffic control plan, including pedestrian traffic, for all areas of work for the review and approval of the City. Traffic control plan shall be part of the City Encroachment permit application.

1.08 NIGHT WORK (NOT USED)

1.09 PROTECTION OF STREET OR ROADWAY MARKERS

- A. It is the responsibility of the Contractor to protect all survey monuments, survey markers, and street markers in the area of his work.
- B. Prior to breaking pavement or starting excavation, the Contractor shall reference all survey monuments and markers that will be affected by his work, and reset such monuments and markers after construction, in accordance with the requirements of Marin County and the City of Sausalito.
- C. Referencing and resetting of survey monuments and markers shall be done by a land surveyor registered in the State of California who is hired by the Contractor.

1.10 WORK WITHIN PRIVATE PROPERTY

- A. The Contractor shall restrict operations to cause the least amount of damage to the surrounding property and to save as many trees and plants as possible. If damage to the surrounding property has occurred, the Contractor shall restore the property to a condition equal to or better than that which existed prior to the Contractor’s entry, or as required as part of these Contract Documents.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01090

### REFERENCES

#### PART 1 - GENERAL

##### 1.01 CODES AND STANDARDS

Whenever reference is made to a code or standard, it means the latest edition in effect the date that the Contract Documents are dated. Where codes, standards, and reference documents are referred to in the Contract Documents, the Contractor may submit a written request to the Construction Manager for assistance in locating such documents. Within three days of receipt of such request, the Construction Manager will notify the Contractor as to where the document(s) can be reviewed.

No provision of any such standard, specifications, manual, code or instruction shall be effective to change the duties and responsibilities of the City, City's representative, or any of their consultants, agents, or employees from those set forth in the Contract Documents. Nor shall any of the aforementioned be effective to assign to the City or the City's representative, or any of their consultants, agents, or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

##### 1.02 DEFINITIONS OF WORDS AND TERMS

Where used in the Contract Documents, the following words and terms shall have the meanings indicated. The meanings shall be applicable to the singular, plural, masculine, and feminine of the words and terms.

- A. Acceptance - Formal action of the City in determining that the Contractor's work has been completed in accordance with the Contract and in notifying the Contractor in writing of the acceptability of the Work.
- B. Acts of God - "Acts of God" shall include only the following occurrences or conditions and effects: earthquakes in excess of a magnitude of 3.5 on the Richter Scale and tidal waves.
- C. Addenda - Supplemental written specifications or drawings issued prior to bid submittal which modify or interpret these Contract Documents by addition, deletion, clarification, or corrections.
- D. Agreement - The written document covering the performance of the Work as more fully described in Section 00500, **AGREEMENT FOR CONSTRUCTION**.

- E. Bid - Offer of a bidder submitted on the prescribed form setting forth prices of the Work to be performed.
- F. Bidder - Individual, partnership, corporation, or a combination thereof, including joint venturers offering a bid to perform the Work.
- G. Clarification Letter - A Clarification Letter is issued by the Construction Manager to address the clarification of Contract issues raised by the Construction Manager, Design Consultant or City.
- H. City - City of Sausalito, California, as Owner, acting through the City Council or other duly authorized agents.
- I. Completion - The word completion shall indicate Substantial Completion.
- J. Construction Manager - The person designated, in writing, by the City to act as its representative at the construction site and to perform construction inspection services and administrative functions relating to this Contract. Initial contact by the Contractor with the City shall be through the Construction Manager.
- K. Contract - The word "Contract" means this Contract, as set forth in the Agreement and the Contract Documents.
- L. Contract Change Order - A written order to the Contractor, covering changes in the Plans or quantities, or both, and establishing the basis of payment and time adjustments for the Work affected by the changes. Also referred to as a Change Order.
- M. Contract Documents - The words "Contract Documents" shall mean any or all of the following items, as applicable:
  - 1. Notice Inviting Bids.
  - 2. Instructions to Bidders.
  - 3. Bid Form and Bid Schedule.
  - 4. Designation of Subcontractors.
  - 5. Bid Guaranty Bond.
  - 6. Agreement.
  - 7. Performance Bond.
  - 8. Payment Bond.
  - 9. Insurance Endorsements.
  - 10. Site Visit Affidavit.
  - 11. Non-Collusion Affidavit.
  - 12. General Conditions.

13. Supplementary General Conditions.
14. General Requirements.
15. Specifications.
16. Drawings.
17. Addenda, if any.
18. Executed Change Orders, if any.
19. Field Orders.
20. Notice to Proceed.
21. Permits.

Each of these items is to be considered by reference as part of the Contract Documents, also referred to as Contract.

- N. Contract Price (also referred to as Contract Amount) - The amount payable to the Contractor under the terms and conditions of the Contract based on the price given on the bidding schedule, with adjustments made in accordance with the Contract. The Total Base Amount given in the Bid Proposal shall be either a lump sum bid or the summation of the unit price bids multiplied by the estimated quantities set forth in the bid form.
- O. Contract Time - Number of calendar days stated in the Contract for the completion of the Work.
- P. Contractor - The individual partnership, corporation, or combination thereof including joint venturers who enter into the Contract with the City for the performance of the Work. The term appropriately extends to subcontractors, subtier subcontractors, consultants, equipment and material suppliers and their employees which are utilized by the Contractor.
- Q. Contractor's Plant and Equipment - Equipment, material, supplies, and all other items, except labor, brought onto the site by the Contractor to carry out the Work, but not to be incorporated in the Work.
- R. Corrective Work Item List - List of incomplete items of work, incomplete administrative requirements and items of work which are not in conformance with the Contract, prepared by the Construction Manager and issued to the Contractor as an attachment to the response to the Contractor's notification of Substantial Completion.
- S. Days - The word "Days" shall mean calendar days, including legal holidays, Saturdays and Sundays, unless specifically noted otherwise.

- T. Design Consultant - The engineer or architect designated by the City to have design control over the Work or a specified portion of the Work, acting either directly or through duly authorized representatives. Such representatives shall act within the scope of the particular duties delegated to them. The Design Consultant may also furnish inspection services as provided by the Contract.
- U. Direct - Action of the City or Construction Manager by which the Contractor is ordered to perform or refrain from performing work under the Contract.
- V. City - The word “City” refers to the City of Sausalito, the governing body of which is termed the Council.
- W. City Representative - The person designated in writing by the City to act as its agent on specified matters relating to this Contract. The City's Representative is not the Construction Manager, but an employee of the City who has been designated to represent the City.
- X. Drawings - Also referred to as “Plans.” That part of the Contract Documents consisting of the graphical and technical requirements of the Contract as included on the Plan sheets.
- Y. Engineer - Engineer shall refer to either the Construction Manager or Design Consultant based on their roles as defined in Section 00700, **GENERAL CONDITIONS**, and their separate contracts with the City.
- Z. Favorable Review - “Favorable Review” means that the person or entity acting on behalf of the City has reviewed a proposal or submittal and found it acceptable as to the aspects for which review was sought. “Favorable Review” does not imply any approval of deviations from the Contract Documents which can only be made by formal Field Directive, Field Order or Contract Change Order.
- AA. Field Directive - Written documentation of the actions of the City or Construction Manager in directing the Contractor. Also referred to as a Directive.
- BB. Field Order - A written instruction given to the Contractor authorizing work that is a change to the scope of work carried out on a time and material basis.
- CC. Final Acceptance - The point at which work has been completed in accordance with the Contract Plans and Specifications to the satisfaction of the Engineer and there are no items of work remaining to be completed.
- DD. Final Inspection List - List of materials, equipment, workmanship, or administrative requirements, which are not in conformance with the Contract. The list shall be prepared by the Construction Manager and submitted to the Contractor following the Contractor's notice of completion of the Work, including all items on the Punch List.



- EE. Float - Float or "total float" shall be defined as provided in the Associated General Contractors of America "CPM in Construction, A Manual for General Contractors."
- FF. Furnish - To deliver to the job site or other specified location any item, equipment or material.
- GG. General Conditions - Sections 00700, **GENERAL CONDITIONS**, and 00800, **SUPPLEMENTARY GENERAL CONDITIONS**, which form the part of the Contract Documents representing the general clauses that establish how the Project is to be administered.
- HH. General Requirements - Division 1, **GENERAL REQUIREMENTS**, which forms the part of the Contract Documents establishing special conditions or requirements peculiar to the Work and supplementary to the General Conditions.
- II. Herein - Refers to information presented in these Contract Documents.
- JJ. Holidays - Legal holidays shall include the holidays designated by the City and listed in Section 01560.
- KK. Install - Placing, erecting, or constructing complete in place any item, equipment, or material.
- LL. Notice to Proceed - Notice to Proceed shall mean the written notice issued by the City to Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Contract Time. Notice to Proceed may or may not include separate dates establishing the date of commencement of the submittal process.
- MM. Owner - The word "Owner" shall have the same meaning as the term "City."
- NN. Paragraph - For reference or citation purposes, a paragraph shall refer to the paragraph, or paragraphs, called out by paragraph number and alphanumeric designator.
- OO. Person - The term, person, includes firms, companies, corporations, partnerships, and joint ventures.
- PP. Plans - See "Drawings."
- QQ. Project - The undertaking to be performed under the provisions of the Contract.
- RR. Provide - Furnish and install, complete in place.

- SS. Punch List - List of incomplete items of work, incomplete administrative requirements, and items of work which are not in conformance with the Contract, prepared by the Construction Manager and issued to the Contractor as an attachment to the Certificate of Substantial Completion.
- TT. Request for Information - Also referred to as “Request for Clarification.” A Request for Information (RFI) is issued by the Contractor to the Construction Manager to request resolution of a question on a Contract issue. A RFI is not to be used for request for material/equipment substitutions or value engineering/cost reduction incentive proposals.
- UU. Request for Quotation - A request for a proposed cost made of the Contractor by the Owner to add, delete or change the Work. A Contract Change Order is issued upon Agreement of Price and nature of the change of the Work.
- VV. Shall - The use of “shall” or “will” means that the Contractor or City, as appropriate, is contractually or legally obligated to take the required action, unless another meaning is clearly indicated.
- WW. Shown - Refers to information presented on the Drawings, with or without reference to the Drawings.
- XX. Specifications - That part of the Contract Documents consisting of written descriptions of the technical features of materials, equipment, constructions systems, standards, and workmanship.
- YY. Specify - Refers to information described, shown, noted or presented in any manner in any part of the Contract.
- ZZ. State of California Specifications - The State of California Department of Transportation Standard Specifications in effect at the time of advertising the Work. Also referred to as State Standard Specifications and Caltrans Standard Specifications.
- AAA. Subcontractor - A subcontractor is a person or entity who has a direct contract with the Contractor or a subtier subcontractor who has a direct contract with a subcontractor to perform any of the Work associated with the Project The term subcontractor, does not include any separate contractor or any separate contractor's subcontractors.
- BBB. Submittals - The information which is specified for submission to the Construction Manager in accordance with these Contract Documents.

- CCC. Substantial Completion - “Substantial Completion” means that there is sufficient completion of the Project or an agreed to portion thereof that the City can effectively utilize. Determination of substantial completion is solely at the discretion of the City. Substantial Completion does not mean Complete in accordance with the Contract nor shall Substantial Completion of all or any part of the Project entitle the Contractor to Acceptance under the Contract.
- DDD. Substantial Completion Date - Date when the City puts into service, the Project, or that portion of the Project, which the City has been determined to be Substantially Complete.
- EEE. Sub-subcontractor - A sub-subcontractor is a person or entity who has a direct or indirect contract with a subcontractor to perform any of the Work at the Site. The term sub-subcontractor means a sub-subcontractor or an authorized representative thereof, also referred to as sub-tier-subcontractor.
- FFF. Supplier - Any person, firm, corporation, or organization who supplies materials or equipment for the Work, including that fabricated to a special design, and may also be a Subcontractor or a Sub-subcontractor.
- GGG. Surety - The person, firm, corporation, or organization that joins with the Contractor in assuming the liability for the faithful performance of the Work and for the payment of all obligations pertaining to the Work in accordance with the Contract Documents by issuing the Bonds required by the Contract Documents or by law.
- HHH. Total Base Bid - The original Contract Price as established from the **BID PROPOSAL** in the **BASE BID FORM** as completed by the Contractor as a part of his Bid for the Work.
- III. Warranty Period - Period where the Contractor is responsible for repairs to equipment or the Work at no cost to the City after Substantial Completion. Length of period is as established in Section 01740 **WARRANTIES AND BONDS**, and/or elsewhere in the Contract Documents.
- JJJ. Will - See definition of shall.
- KKK. Work - The term “Work” means all labor, materials, equipment, supplies, services, and other items necessary for the execution, completion and fulfillment of the Contract.
- LLL. Work Day - Any day except Saturday, Sunday, and legal holidays. For time extension purposes a work day is equivalent to 1.45 calendar days.

## 1.03 ABBREVIATIONS

Whenever the following terms are used, the intent and meaning shall be as follows:

### Abbreviation   Stands For

AASHTO	American Association of State and Highway and Transportation Officials
AAMA	Architectural Aluminum Manufacturers Association
ABMA	American Boiler Manufacturers Association
ACI	American Concrete Institute
ADC	Air Diffusion Council
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association
ANSI	American National Standard Institute (formerly United States of America Standards Institute)
APA	American Plywood Association
API	American Petroleum Institute
AREA	American Railway Engineers Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Construction Managers

### Abbreviation   Stands For

ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWPA	American Wood-Preserver's Association
AWS	American Welding Society
AWWA	American Water Works Association
BCDC	San Francisco Bay Conservation and Development Commission
CAGI	Compressed Air and Gas Institute CAL/OSHA State of California Department of Industrial Relations, Division of Industrial Safety
CBM	Certified Ballast Manufacturers
CBR	California Bearing Ratio
CI	Chlorine Institute
CISPI	Cast Iron Soil Pipe Institute
CMAA	Crane Manufacturers Association of America
CPSC	Consumer Products Safety Commission
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CTI	Cooling Tower Institute
DFPA	Douglas Fir Plywood Association
EIA	Electronic Industries Association
EPA	U.S. Environmental Protection Agency

ETL	Electronic Testing Laboratory
FM	Factory Mutual Insurance Company
FPS	Fluid Power Society
FS	Federal Specifications
GO 95	General Order No. 95, California Public Utilities Commission Rules for Overhead Electric Line Construction
HI	Hydraulic Institute
HMI	Hoist Manufacturers Institute
IAPMO	International Association of Plumbing and Mechanical Officials
IBR	Institute of Boiler and Radiator Manufacturers
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IPCE	International Power Cable Engineers Association
ISA	Instrument Society of America
MIL	Military Specifications
MSS	Manufacturer's Standardization Society
NAAMM	National Association of Architectural Metal Manufacturers
NBS	National Bureau of Standards
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Act

Abbreviation   Stands For

PCMAC	Prestressed Concrete Manufacturers Association of California
RWQCB	California Regional Water Quality Control Board
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Structural Steel Painting Council TCA Tile Council of America
UBC	Uniform Building Code
UFC	Uniform Fire Code
UPC	Uniform Plumbing Code
UL	Underwriters Laboratories
USACOE	U.S. Army Corps of Engineers
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## **SECTION 01200**

### **PROJECT MEETINGS**

#### **PART 1 - GENERAL**

##### **1.01 PRE-CONSTRUCTION CONFERENCE**

Prior to the start of construction, the City will conduct a pre-construction conference that shall be attended by the Contractor's Project Manager/Project Engineers, major subcontractors, major equipment, and material suppliers, affected utilities, and others as determined by the Contractor and Construction Manager. At the conference, the City will review the Contractor's proposed schedule of operations and the construction procedure and sequence requirements. Also discussed will be the Contractor's field organization, submittals, progress payments, change order procedures, safety requirements, permits and inspections, and other matters.

##### **1.02 PROGRESS MEETINGS**

The Construction Manager shall schedule, arrange, and conduct progress meetings. These meetings shall be conducted not more than once per week and shall be attended by the Contractor's superintendent and representatives of all subcontractors, utilities, and others, who are active in the execution of the Work. The purpose of these meetings shall be to review the Contractor's three (3) week schedule provided in accordance with Section 01310-1.07, **LOOK AHEAD SCHEDULE**, resolve conflicts, and in general, coordinate and expedite the execution of the Work.

The agenda of progress meetings shall include, as a minimum, review of progress and schedule, clarifications, changes, quality of work, progress payment request, and record documents. The Construction Manager shall prepare and distribute minutes of the meetings.

##### **1.03 PARTNERING MEETINGS (NOT USED)**

##### **1.04 OTHER PROJECT MEETINGS**

The Contractor shall attend and require the participation of other subcontractors or suppliers for other project related meetings when requested by the Construction Manager or the City.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## SECTION 01300

### SUBMITTALS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Where the Contractor is required by these Specifications to make submittals, they shall be made to the Construction Manager with a letter of transmittal and in accordance with the requirements of this Section.
- B. The Contractor shall submit the following items to the Construction Manager. One (1) hard copy and one electronic copy (PDF) are to be submitted unless other provisions of the Contract Document stipulate a different quantity.
  - 1. Safety Program
  - 2. Substitutions
  - 3. Shop Drawings
  - 4. Operation and Maintenance Manuals
  - 5. Working Drawings
  - 6. Warranty Data
  - 7. Others as Specified in the Technical Specifications
- C. A submittal review letter will be returned to the Contractor with review comments, if any, noted.
- D. Reviewed copies of the Construction Schedule and the Final Operation and Maintenance Manuals will not be returned to the Contractor. It shall be the Contractor's responsibility to copy and/or conform reviewed submittals in sufficient numbers for its files, subcontractors, and vendors.

##### 1.02 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall submit, at its own expense, samples, submittals and details of structural and reinforcing steel, equipment, material, electrical controls, architectural fabrications, pipe, pipe joints, special pipe sections, and any other appurtenances as required in Technical Specifications.
- B. All samples, submittals and supporting data, catalogs, schedules, etc., shall be submitted as the instruments of the Contractor, who shall be responsible for confirming their accuracy and completeness and coordination before submitting them to the Construction Manager. Such responsibility shall not be delegated in whole or part to subcontractors or suppliers. These submittals may be prepared by

the Contractor, subcontractors, or suppliers, but the Contractor shall ascertain that submittals meet all of the requirements of the Contract Documents, while conforming to structural, space, and access conditions at the point of installation. Designation of work "by others," if shown in submittals, shall mean that the work will be the responsibility of the Contractor rather than the subcontractor or supplier who prepared the submittals.

- C. The Contractor shall insure that there is no conflict between submittals and notify the Construction Manager in each case where a submittal may affect the Work of another contractor or the City. The Contractor shall insure coordination of submittals among the related crafts and subcontractors. The Contractor accepts the responsibility and expense for additional costs and delays which may result from Work performed without Favorably Reviewed submittals.
- D. Submittals shall be prepared in such form that data can be identified with the applicable Specification paragraph. The data shall clearly demonstrate compliance with the Contract Documents and shall relate to the specific material or equipment to be furnished. Where manufacturer's standard drawings are employed, they shall be marked clearly to show what portion of the data is applicable to this Project.

### 1.03 MATERIAL AND EQUIPMENT SUBSTITUTIONS

#### A. General

1. In preparing these Contract Documents, the Design Consultant has named those products which to its knowledge meet the Technical Specifications and are equivalent in construction, function, efficiency, and durability.
2. Wherever catalog numbers and specific brands or trade names preceded by "similar and equal" or followed by the designation "or equal" are used in conjunction with a designated material, product, thing, installation, or service mentioned in these Specifications, they are used to establish the standards of quality and utility required.
3. The first-named manufacturer is the basis for the project design and the use of alternative named or unnamed manufacturer's products proposed by the Contractor may require modifications in the project design and construction. Contractor shall be responsible for all costs of those modifications, including labor, material, equipment, and services performed by a design professional.
4. Where only one product has been named by brand, it is the only brand, trade name, or manufactured product known to the Design Consultant that meets the requirements of the Technical Specifications.

5. The City has made a determination that no substitution will be considered and that the following listed materials and/or equipment must be furnished as designated below in order to match others in use by the City or because it is a unique or novel product application required to be used by the City:

No Sole Source Materials or Equipment Identified

B. Substitutions

1. Substitutions, which are equal in quality and utility to those specified, will, at the City's sole discretion, be permitted, subject to the following provisions. For this purpose, the contractor shall submit to the Construction Manager within four (4) days of the Notice of Award a typewritten list containing a description of each proposed substitute item or material, along with sufficient data, drawings, samples, literature, calculations, or other detailed information as will demonstrate to the Design Consultant that the proposed substitute is equal in quality and utility to the material specified. The Design Consultant will Favorably Review only those proposed substitutions as are, in its opinion, equal in quality to the items or materials specified. In the event that a substitute is Favorably Reviewed, fifty (50) percent of all savings shall be credited to the City.
2. Failure of the Contractor to submit proposed substitutions for review in the manner described above and within the time prescribed shall be sufficient cause for rejection by the Construction Manager of any substitutions otherwise proposed.
3. When a proposed substitution is not accepted, Contractor shall provide the specified item or material without change to the Contract Sum or Contract Time.

C. Modifications and Costs

1. If alternative named or substitution materials or equipment is proposed by the Contractor and Favorably Reviewed by the Design Consultant, the Contractor is responsible for providing, at no additional cost to the City, any and all electrical, mechanical, structural, or other related changes or testing that may be required to accommodate or provide the particular material or equipment the Contractor desires to use. Contractor shall also compensate City for the costs of having Design Consultant and/or Construction Manager evaluate the proposed substitution. No change to the Specifications or the Drawings required to accommodate the substitution will entitle Contractor to additional compensation or extension of the Contract Time.

2. In addition, the Contractor is responsible for all additional costs to the City, and its agents and representatives, for evaluation of data submitted by the Contractor for alternative named or substitutions and any redesign necessary. The City shall deduct said costs from the Contract monies due the Contractor.

#### 1.04 SUBMITTAL AND MATERIAL LIST

- A. Within five (5) days after the Award of Contract and prior to the submission of the initial shop drawings, the Contractor shall submit a complete list of all required submittals to the Construction Manager for favorable review.
- B. The Submittal and Material List shall include a description of each item, Specification reference and the anticipated submittal date. The List shall include all items to be installed including but not limited to: materials for mechanical, piping, electrical, utilities, plumbing work; and the names of manufacturers with whom purchase orders have been placed.
- C. Items on the List shall be arranged in the same order as in these Specifications, and shall contain sufficient data to identify precisely the items of material and equipment the Contractor proposes to furnish. The List shall reference the applicable Specification section or Drawing.
- D. When a submission of this list is Favorably Reviewed and returned to the Contractor by the Construction Manager, Contractor shall use it as the basis for the submission of detailed manufacturer's drawings, catalog cuts, curves, diagrams, schematics, data, and information on each separate item for review.
- E. An incomplete submittal list shall not be the basis for avoiding a submittal required by the Contract Documents. No work shall proceed on any item until it has been submitted and favorably reviewed. An incomplete submittal list is not a basis for avoiding a submittal required by the Specifications.
- F. If Contractor proceeds with any part of the Work for which a submittal is required without having received a Favorably Reviewed submittal, Contractor does so at its own risk. Contractor shall be responsible for all costs and delay associated with correction or removal of work performed without a Favorably Reviewed submittal.

#### 1.05 TRANSMITTAL PROCEDURES

- A. Transmittal Form
  1. A separate transmittal form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required.

2. Submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.
3. The specification section and subsection or paragraph to which the submittal is related shall be indicated on the transmittal form.
4. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. Original submittal numbers shall have the following format: "XXX"; where "XXX" is the sequential number assigned by the Contractor. Resubmittals shall have the following format: "XXX-Y" where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for resubmittals, i.e., A, B, or C being the 1st, 2nd, and 3rd resubmittals, respectively. Submittal 25B, for example, is the second resubmittal of Submittal 25.

B. Deviations from the Contract

1. If a submittal shows any deviations from the Contract requirements, the Contractor shall submit with the submittal a separate written description of such deviations and the reasons therefore, and shall mark the submittal to show the specific location of each deviation.
2. If the City accepts such deviation, the City shall issue an appropriate Contract Change Order, except that, if the deviation is minor, or does not involve a change in price or in time of performance, a Change Order need not be issued.
3. If any deviations from the Contract requirements are not noted on the submittal, the review of the shop drawing shall not constitute acceptance of such deviations.

C. Submittal Completeness

1. The Contractor shall review and check all submittals before submitting them to the Construction Manager.
2. The Contractor shall stamp and certify on the transmittal letter and on each shop drawing that they have been checked, are in compliance with the Plans and Specifications, and all deviations from the Contract requirements are noted.
3. If the Contractor submits an incomplete submittal, the submittal will be returned to the Contractor without review.

4. A complete submittal shall contain sufficient data to demonstrate that the items comply with the Specifications, shall meet the minimum requirements for submissions cited in the Technical Specifications, shall include materials and equipment data and seismic anchorage certifications where required, and shall include any necessary revisions required for equipment other than first named.
5. It is considered reasonable that the Contractor shall make a complete and acceptable submittal to the Construction Manager at least by the second submission of data.
6. The City reserves the right to deduct monies from payments due the Contractor to cover additional costs of review beyond the second submission, including fees for the Design Consultant and Construction Manager.

D. Submittal Period

1. All submittals shall be completed within seven (7) days after the Notice to Proceed unless the Construction Manager accepts an alternate schedule for submission of submittals proposed by the Contractor.
2. Submittals shall be submitted in time to allow appropriate time for review and response to submittals as provided for herein prior to the incorporation of materials and equipment in the Work.

E. Certificates of Compliance

1. For materials furnished and installed in accordance with Division 2 of these Specifications and for standard “off-the-shelf” materials where the Contractor is furnishing the materials listed in the Contract Documents, the Contractor may furnish a Certificate of Compliance in lieu of a full shop drawing for such materials.
2. The Certificate of Compliance shall be submitted as otherwise stipulated in Section 01300-1.05, **TRANSMITTAL PROCEDURES**. The certificate shall be signed by the manufacturer or supplier of the material and shall state that the materials involved comply in all respects with the requirements of the Contract Documents.
3. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents.

F. Alternate Submittals

1. If a submittal is approved and the Contractor elects to submit an alternate item for review for the same application, the Contractor shall be responsible for the review costs for the alternate submittal.

## 1.06 REVIEW PROCEDURE

- A. Submittals shall be submitted to the Construction Manager for review and returned to the Contractor within three (3) days after receipt.
- B. Review of submittals by the Design Consultant has as its primary objective the completion for the City of a project in full conformance with the Contract Plans and Specifications, unmarred by field corrections, and within the time provided.
- C. In addition to this primary objective, submittal review as a secondary objective will assist the Contractor in its procurement of equipment that will meet all requirements of the Project Plans and Specifications, will fit the structures detailed on the Plans, will be completed with respect to piping, electrical, and control connections, will have the proper functional characteristics, and will become an integral part of a complete operating facility.
- D. After review by the Design Consultant of each of the Contractor's submissions, the material will be returned to the Contractor with actions defined as follows:
  - 1. **NO EXCEPTIONS NOTED (RESUBMITTAL NOT REQUIRED)** - Accepted subject to its compatibility with future submissions and additional partial submissions for portions of the Work not covered in this submission. Does not constitute approval or deletion of specified or required items not shown in the partial submission.
  - 2. **MAKE CORRECTIONS NOTED (RESUBMITTAL NOT REQUIRED)** - Same as A, except that minor corrections as noted shall be made by the Contractor.
  - 3. **MAKE CORRECTIONS NOTED (RESUBMIT)** - Rejected because of major inconsistencies or errors, which shall be resolved or corrected by the Contractor prior to subsequent review by the Design Consultant.
  - 4. **NOT ACCEPTABLE (RESUBMIT)** - Submitted material does not conform to Plans and Specifications in major respect, i.e.: wrong size, model, capacity, or material.
  - 5. **RECEIPT ACKNOWLEDGED: FILED FOR RECORD** - This is used in acknowledging receipt of informational submittals that address means and methods of construction such as schedules and work plans, conformance test reports, health and safety plans, etc.
- E. Items 1. and 2. above (no resubmittal required) are considered "Favorable Review." Items 3. and 4. above (correction and resubmittal required) are considered "Unfavorable Review." Item 5 is filed for record and will not be reviewed by Design Consultant.

## 1.07 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

- A. The Design Consultant's Favorable Review of submittals shall be obtained prior to the fabrication, delivery and construction of items requiring submittal review.
- B. Favorable Review of submittals does not constitute a change to the requirements of the Contract Documents.
- C. The Favorable Review of all submittals by the Design Consultant shall apply to general compliance with design criteria only and shall in no way relieve the Contractor from responsibility for errors or omissions contained therein.
- D. Favorable Review by the Design Consultant shall not relieve the Contractor of its obligation to meet safety requirements and all other requirements of laws, nor constitute a Contract Change Order.
- E. Favorable Review will not constitute acceptance of any responsibility for the accuracy, coordination, and completeness of the submittals or the items of equipment represented on the submittals.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**



## SECTION 01310

### PROGRESS SCHEDULES

#### PART 1 - GENERAL

##### 1.01 GENERAL

The Contractor shall provide a construction schedule that includes the sequential steps needed to reach the completion of the Contract Work. Contractor shall use the Critical Path Method (CPM) in planning, coordinating, performing and reporting on the Work, including all activities of Contractor, Subcontractors, equipment vendors, and suppliers, and in assisting Construction Manager and the City in monitoring the progress of the Work.

The construction schedule shall depict events and activities, their durations and their interrelationships, and shall recognize the progress that must be made in one task before subsequent tasks can begin. CPM network shall be comprehensive and shall include all activities, interdependencies and interactions required to perform the Work. Contractor shall submit the construction schedule to the Construction Manager for review.

##### 1.02 SCHEDULE REQUIREMENTS

- A. The Construction Schedule shall be created in the current version of one of the following scheduling programs:
  - 1. Primavera Project Planner (version P3 or P6).
  - 2. Suretrak Project Manager.
  - 3. Microsoft Project.
- B. All Construction Schedules, including the initial schedule, the baseline schedule, the monthly updates, and the Time Impact Analyses shall be submitted to the Construction Manager in both hard copy and electronic form. The electronic files shall be the actual scheduling program files, not a pdf version of the schedule.
- C. Contractor shall submit three hard copies of all Construction Schedules printed in a bar chart format on a timeline, showing the entire construction period. Bar chart shall include activity descriptions, early start and early finish dates, original duration, remaining duration, percent complete, and total float. Contractor shall submit three sets of tabular reports listing all activities sorted numerically including activity descriptions, predecessor and successor information and other activity information as requested by the Construction Manager.

## 1.03 CONSTRUCTION SCHEDULE (CPM)

### A. General

The Contractor shall designate, in writing, an authorized representative in its firm who will be responsible for the preparation, revising, and updating of the Construction Schedule. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the construction scheduling requirements set forth herein, and this person shall be assigned to the Project for the duration of the Project, unless the City requests that a different person be assigned. The requirements for the Construction Schedule are included to assure adequate planning and execution of the Work and to assist the Construction Manager in appraising the reasonableness of the proposed schedule and evaluating progress of the Work.

### B. Preliminary Construction Schedule

1. Within seven (7) calendar days after award of Contract, the Contractor shall submit a Preliminary Construction Schedule covering the following project phases and activities:
  - a. Contract required constraints per Section 01010, 1.08.
  - b. Procurement and Submittals, including shop drawings and fabrication and delivery of key and long lead time procurement activities.
  - c. All activities required for the execution of the Work.
  - d. The total duration of the summary activities shall equal the Contract Time.
  - e. Approximate duration for each summary activity representing the Contractor's best estimate for the work the summary activity represents.
2. The Preliminary Construction Schedule shall describe the activities to be accomplished and their dependency subject to all requirements under these Construction Schedule provisions. The Preliminary Construction Schedule will be used to record and monitor the progress of the Work until a Detailed Construction Schedule has been completely developed and Favorably Reviewed. Data recorded on the Preliminary Construction Schedule shall be incorporated into the Detailed Construction Schedule.

### C. Detailed Construction Schedule

1. Within fourteen (14) calendar days after the award of the Contract, the Contractor shall submit a Detailed Construction Schedule. The Detailed Construction Schedule shall be a computerized detailed task level CPM diagram in a precedence diagramming method (PDM) format. The work activities in the CPM shall be of sufficient detail to ensure adequate planning and execution of the Work and such that the schedules provide

an appropriate basis for monitoring and evaluating the progress of the Work and the forecast for completion.

2. Activity durations shall be no longer than 14 calendar days.
3. Contractor's schedule should take into account the City holidays and other work day limitations as defined in Section 01560, 1.07 WORKING HOURS.
4. Construction schedule should identify the critical path for the project.
5. Construction schedule should identify interim completion dates as well as the Contract completion date as milestones.
6. A Schedule showing the Work completed in less than the Contract Time (an "Early Completion Schedule") may be acceptable only if 1) the Construction Manager reviews the Early Completion Schedule and agrees, in writing, that it is reasonable, and 2) Contractor and the City execute a binding Contract Modification revising the Contract Time to that shown on the proposed Early Completion Schedule. Contractor shall have no claim for "delayed early completion" unless the City and Contractor enter into a Contract Modification revising the Contract Time as described in this paragraph. 3) The Contractor shall not be entitled to job-site or home office overhead beyond the Contractor's Early Completion Date, if completion of the project occurs within the specified Contract Time.
7. A Schedule showing completion beyond the Contract Time will not be acceptable.
8. Contract float is for the mutual benefit of both the City and the Contractor. Changes to the project that can be accomplished within this available period of float may be made by the City without extending the Contract time, by utilizing float. No time extensions shall be granted nor delay damages owed until Work extends beyond Contract completion date as adjusted by duly executed Amendment. Likewise, Contractor may utilize float to offset delays other than delays caused by the City. Mutual use of float shall continue until all available float shown by schedule has been utilized by either the City or Contractor, or both. At that time, extensions of the Contract Time will be granted by the City for excusable delays which affect the planned completion date and which have been properly documented and established by Contractor.
9. The Construction Manager shall review the Detailed Construction Schedule and provide any comments, its Favorable Review of the schedule, or request a meeting to review the Detailed Construction Schedule with the Contractor within ten (10) days of receipt of the schedule. If requested, the Contractor shall participate in a review and evaluation of the Detailed Construction Schedule with the Construction Manager. Contractor shall submit any revisions necessary as a result of this review to the Construction Manager within five (5) days.

10. Once the Detailed Construction Schedule has received a Favorable Review, as defined in Section 01300, 1.06 REVIEW PROCEDURE, from the Construction Manager, it will become the Baseline Schedule for the project. The Baseline Schedule shall be used in the implementation of the Work and progress of the Work will be compared to the Baseline Schedule at each weekly progress meeting.

#### 1.04 WEATHER CONDITIONS

Seasonal weather conditions shall be considered in the planning and scheduling of work influenced by high or low ambient temperatures, precipitation, wind, fog or water and tide conditions to ensure the completion of the Work within the Contract Time. No time extensions will be granted for the Contractor's failure to take into account such weather conditions for the location of the Work and for the period of time in which the Work is to be accomplished.

The expected loss of working days specified in the Supplementary General Conditions, Section 00800-1.03, **WEATHER DAYS**.

#### 1.05 CONSTRUCTION SCHEDULE UPDATES

##### A. Monthly Progress Updates

The Baseline Schedule shall be updated and submitted to the Construction Manager on a monthly basis for the purpose of recording and monitoring the actual progress of the Work. Each monthly update shall include actual dates of activities started and/or completed during the previous month, and the percentage of work completed to date on each activity started but not completed. The monthly update shall incorporate all changes mutually agreed upon by the Contractor and the Construction Manager during preceding periodic reviews and all changes resulting from approved Change Orders and Field Directives.

The monthly update shall also include a forecast of the remaining duration for each activity, if the remaining duration is expected to be greater than that calculated by the scheduling program based on the percentage complete.

##### A. Recovery Schedule

If the monthly schedule update forecasts or if, in the opinion of the Construction Manager, the Project is behind schedule, the Contractor shall provide a Recovery Schedule. The Recovery Schedule shall include a plan and timeline to complete the Project within the Contract Time as well as a summary of its plan to take some or all of the following actions at no additional cost to the City, unless authorized in writing:

1. Increase construction labor in such quantities and crafts as will substantially eliminate, in the judgment of the Contractor and Construction Manager, the backlog of work.

2. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate, in the judgment of the Contractor and Construction Manager, the backlog of work. This paragraph shall not be construed to permit Contractor to violate the work hour restrictions specified in Section 01560, 1.07 WORKING HOURS.
  3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.
- B. Favorable Review of the monthly schedule update will be a condition precedent to the payment of the monthly progress payment for work performed. If the Contractor does not submit its monthly schedule update, the City reserves the right to ask its Construction Manager to provide an interim schedule update, and to withhold the cost to do so from the Contractor's progress payment.

#### 1.06 TIME IMPACT ANALYSES

- A. When Change Orders are initiated or delays, as defined in Section 00700, 6.03 DELAYS, or any other event Contractor believes entitles it to an extension of the Contract Time occurs, the Contractor shall submit to the Construction Manager a written Time Impact Analysis illustrating the effect of each change, delay, or event on the Contract Time and/or completion date shown in the then-current Monthly Progress Schedule.
1. The analysis shall demonstrate the time impact based on the beginning and ending date of the change, delay or event; the status of construction at that point in time immediately preceding the change, delay or event; and the effect on the then-current critical path.
  2. The analysis shall include:
    - a. A fragmentary CPM type network (Fragnet) illustrating how Contractor proposes to incorporate the change or alleged delay into the then-current Monthly Progress Schedule.
    - b. Identification of the activities in the then-current Monthly Progress schedule which are proposed to be amended due to the change, alleged delay or other event, together with engineering estimates and other appropriate data justifying the proposal.
  3. The date or dates when the change was issued, or the alleged event or delay occurs that are used in the analysis or as adjusted shall be included in the Monthly Progress Schedule upon mutual agreement between the Construction Manager and Contractor.
- B. Delays in individual activities will not automatically mean that an extension of Contract Time is warranted or due the Contractor.

1. It is possible that an excusable delay or Contract modification will not affect activities on the critical path or cause noncritical activities to become critical, i.e., a delay or modification may only absorb a part of the available total float, and therefore, not affect the Contract completion date or Contract Time.
  2. The Contractor acknowledges and agrees that mitigation for changes to the Work, differing site conditions, and other events may require revision of preferential sequences of the Work. When a delay to the Project as a whole can be avoided by revising preferential sequencing, and the Contractor chooses not to implement the revisions, the Contractor will not be entitled to a time extension or to compensation for extended overhead.
  3. Actual delays in activities which do not affect the critical path work or which do not affect the Contractor's planned completion date, a milestone, or the Contract completion date will not be the basis for an adjustment to the Contract Time.
  4. Extensions of time will be considered for a delayed or impacted activity that is not on the critical path only to the extent that the duration of the time impact exceeds the total float for the schedule path wherein the activity is located, and the Contractor can demonstrate that the activity has become critical.
- C. Time Impact Analyses shall be submitted within fifteen (15) days after a delay occurs or with the Contractor's cost proposal in response to a notice of change from the Construction Manager. In cases where the Contractor does not submit a Time Impact Analysis for a specific Change Order, delay, event or other Contractor requested time extension within 15 days, then it is mutually agreed that the particular Change Order, delay, event or Contractor request has no time impact on the Contract completion date and no time extension is required.
1. Approval or rejection of Time Impact Analyses by the Construction Manager and the City will be made within fifteen (15) days after receipt of the Time Impact Analysis unless subsequent meetings and negotiations are necessary.
  2. Upon Favorable Review, a copy of the Time Impact Analysis signed by the Construction Manager and the City will be returned to the Contractor with a determination of the Time Extension to be granted to the Contractor pursuant to Section 00700, 6.04 TIME EXTENSIONS.
  3. Contractor will incorporate schedule revisions illustrating the influence of Change Orders, delays, events and/or Contractor requests into the next schedule update only if the Contractor and City have reached agreement on a time extension.

## 1.07 LOOK AHEAD SCHEDULE

On the last working day of every week the Contractor shall submit to the Construction Manager the Contractor's Look ahead Schedule for the following three weeks as well as the activities performed in the previous week. The Look ahead Schedule shall be a time scaled bar chart based on the current monthly progress update and shall include the activity description, location of the activity and the activity number as provided in the Detailed Construction Schedule. Look ahead Schedules shall also identify the Contractor or subcontractor performing each activity.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## **SECTION 01329**

### **SAFETY PLAN**

#### **PART 1 GENERAL**

##### **1.01 SUMMARY**

- A. Section includes: Development and maintenance of a Construction Safety Plan.

##### **1.02 REFERENCES**

- A. California Labor Code, Section 6401.7.
- B. National Fire Protection Association (NFPA):
  - 1. 70E - Standard for Electrical Safety in the Workplace.
- C. Occupational Safety and Health Standards (OSHA).

##### **1.03 CONSTRUCTION SAFETY PLAN**

- A. Detail the Methods and Procedures to comply with California Labor Code Section 6401.7, NFPA 70E, Federal, and Local Health and Safety Laws, Rules and Requirements for the duration of the Contract Times. Methods and procedures must also comply with the Owner's Safety Plan. Include the following:
  - 1. Identification of the Certified or Licensed Safety Consultant who will prepare, initiate, maintain and supervise safety programs, and procedures.
  - 2. Procedures for providing workers with an awareness of safety and health hazards expected to be encountered in the course of construction.
  - 3. Safety equipment appropriate to the safety and health hazards expected to be encountered during construction. Include warning devices, barricades, safety equipment in public right-of-way and protected areas, safety equipment used in multi-level structures, personal protective equipment (PPE) as required by NFPA 70E.
  - 4. Methods for minimizing employees' exposure to safety and health hazards expected during construction.
  - 5. Procedures for reporting safety or health hazards.
  - 6. Procedures to follow to correct a recognized safety and health hazard.
  - 7. Procedures for investigation of accidents, injuries, illnesses, and unusual events that have occurred at the construction site.
  - 8. Periodic and scheduled inspections of general work areas and specific workstations.
  - 9. Training for employees and workers at the jobsite.
  - 10. Methods of communication of safe working conditions, work practices and required personal protection equipment.
- B. Assume responsibility for every aspect of Health and Safety on the jobsite, including the health and safety of subcontractors, suppliers, and other persons on the jobsite:

1. Forward available information and reports to the Safety Consultant who shall make the necessary recommendations concerning worker health and safety at the jobsite.
  2. Employ additional health and safety measures specified by the Safety Consultant, as necessary, for workers in accordance with OSHA guidelines.
- C. Transmit to Owner and Engineer copies of reports and other documents related to accidents or injuries encountered during construction.

**PART 2 PRODUCTS**

Not Used.

**PART 3 EXECUTION**

Not Used.

END OF SECTION

## SECTION 01354

### HAZARDOUS MATERIAL PROCEDURES

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Procedures required when encountering hazardous materials at the Work site and CONTRACTOR'S requirements to provide plans, procedures, and controls to be used when encountering hazardous substances during performance of the work as well as all testing to determine if soil and groundwater is contaminated.

##### 1.02 REFERENCES

- A. American Conference of Government Industrial Hygienists (ACGHI).
- B. American National Standards Institute (ANSI).
- C. California Health and Safety Code, Section 25117.
- D. State of California Code of Regulations (CCR):
  - 1. Title 8. Industrial Relations.
  - 2. Title 22. Social Security.
- E. National Institute for Occupational Safety and Health (NIOSH).
- F. Occupational Safety and Health Administration (OSHA).
- G. Society for Protective Coatings (SPCC):
  - 1. Guide 6 - Guide for Containing Debris Generated During Paint Removal Operations.
  - 2. Guide 7 - Guide for the Disposal of Lead-Contamination Surface Preparation Debris.
- H. United States Environmental Protection Agency (EPA).
- I. United States Code of Federal Regulation (CFR):
  - 1. Title 29 - Labor:
    - a. 1926.62 - Lead.
  - 2. Title 40 - Protection of Environment:
    - a. 261 - Identification And Listing Of Hazardous Waste
- J. California Regional Water Quality Control Board (RWQCB), NPDES No. CAG912002 General Waste Discharge Requirements for Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds (VOC), Fuel Leaks and Other Related Wastes (VOC and Fuel General Permit).

### 1.03 SUBMITTALS

- A. Submit laboratory reports, hazardous material removal plans, and certifications.
- B. CONTRACTOR shall provide plans, procedures, and controls to be used when encountering hazardous substances during performance of the work. CONTRACTOR shall perform all testing to determine if soil is contaminated. All costs associated with testing and disposing of contaminated material along the pipeline alignments shall be borne by the CONTRACTOR. All costs associated with testing and stockpiling contaminated soil found within the sewer alignment shall be borne by the CONTRACTOR.
- C. Submit permission to dispose of material from landfill/disposal site owner prior to disposing of any material off-site. Include name, address, and telephone number of disposal site and of owner. Submit weigh tickets or volume calculations, as appropriate, for all disposed materials to the ENGINEER.
- D. Contaminated Soil Excavation and Disposal Work Plan (CSEDWP):
  - 1. The CONTRACTOR shall prepare and submit to the ENGINEER for approval a CSEDWP. The plan shall be approved prior to beginning any excavation work.
  - 2. The CSEDWP shall address the management of contaminated soils and ground water that may be encountered along the pipeline routes or at the other work sites. All contaminated material encountered along the pipeline alignments shall be disposed of at a landfill/disposal site approved for the type of material encountered.
  - 3. The CSEDWP shall address removal and disposal procedures for contaminated soils encountered along the pipeline alignments. The Plan will provide, at a minimum, the following information:
    - a. The name(s) and address(es) of Subcontractor(s) for work of this Section.
    - b. The methodology for all waste tracking activities to prevent the occurrence of cross contamination; excavation methods detailing operations necessary to ensure no blending of contaminated soil with non-contaminated soil; and temporary stockpiling methods at the work site.
    - c. Corporate name, address, and contact person information (name, telephone, and fax number) of all hazardous waste transporters. Include proof of current permit, license, and/or authorization to transport hazardous waste within the state.
    - d. Disposal facility information.
    - e. The CONTRACTOR shall submit documentation certifying that all contaminated soil materials were transported to, accepted, and disposed of, at the disposal facility.
- E. Contaminated Groundwater Treatment Plan:
  - 1. Contractor shall submit plan to treat contaminated groundwater in compliance with discharge requirements of RWQCB NPDES No. CAG912002.
- F. Removal and Legal Disposal of Asbestos Cement Pipe Plan:
  - a. Work plan shall include, but not be limited, to the following:
    - 1) Schedule of work.
    - 2) Security measures for work and disposal area.

- 3) Staff training: Contractor shall provide at least one competent person who is capable of identifying asbestos hazards at the job site for the entire duration of the AC pipe removal and disposal operation.
- 4) Trenching and removal of pipe procedure.

#### **1.04 DEFINITIONS**

- A. Contaminated Soil: Soil containing a petroleum or metal product and when tested contains levels such that it may not be disposed of at a Class III landfill/disposal site within a 50-mile radius of the project site.
- B. Contaminated Water: water containing a petroleum or metal product and when tested contains such levels of petroleum products or any other compounds that it may not be discharged into the existing sanitary sewer without on-site pretreatment.
- C. Adequately Wet: Penetration of the pipe wall with liquid to prevent release of particulates.
- D. Asbestos Cement Pipe: Also commonly referred to as AC Transite Pipe, AC pipe or ACP. Pipe that is generally composed of cement and asbestos fibers.
- E. Competent Person: A trained worker who is capable of identifying existing and predictable asbestos hazards, perform exposure assessment and monitoring, is qualified to train other workers, and has the authority to take immediate corrective action to eliminate a hazardous exposure.
- F. Non-friable Asbestos – Containing Material (NACM): Material containing more than 1 percent asbestos, that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- G. Regulated Asbestos – Containing Material (RACM): Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder in the course of work.

#### **1.05 JOB CONDITIONS**

- A. Contaminated Soil and Water:
  1. The CONTRACTOR will encounter contaminated soil and groundwater when performing work along the pipeline alignment.

#### **1.06 HAZARDOUS MATERIALS PROCEDURES**

- A. Hazardous materials are those defined by 40 CFR and California Health and Safety Code, Section 25117.
- B. When hazardous materials have been found:
  1. Prepare and initiate implementation of plan of action.
  2. Notify immediately Owner, Engineer, and other affected persons.
  3. Notify such agencies as are required to be notified by Laws and Regulations with the times stipulated by such Laws and Regulations.
  4. Designate a Certified Industrial Hygienist to issue pertinent instructions and recommendations for protection of workers and other affected persons' health and safety.

5. Identify and contact subcontractors and licensed personnel qualified to undertake storage, removal, transportation, disposal, and other remedial work required by, and in accordance with, laws and regulations.
- C. Forward to Engineer, copies of reports, permits, receipts, and other documentation related to remedial work.
- D. Assume responsibility for worker health and safety, including health and safety of subcontractors and their workers:
  1. Instruct workers on recognition and reporting of materials that may be hazardous.
- E. File requests for adjustments to Contract Times and Contract Price due to the finding of Hazardous Materials in the Work site in accordance with Contract Documents:
  1. Minimize delays by continuing performance of the Work in areas not affected by hazardous materials operations.

## **1.07 ASBESTOS MATERIALS**

- A. It is the specific intent of these Contract Documents to exclude from the Work any and all products or materials containing asbestos. No products containing asbestos shall be incorporated in the Work.
- B. Refer to drawings to identifying locations which have asbestos containing materials (ACM).
- C. Removal of existing ACM shall be performed by a firm that is registered by Cal-OSHA and certified by the State Contractors Licensing Board and shall be a Licensed Abatement Contractor in the state where the project is located.
- D. Submit 10 copies of plan for the removal, containment, and disposal of ACM.
- E. Submit 6 copies of abatement license of ACM removal contractor.

## **PART 2 PRODUCTS**

### **2.01 CONTAMINATED SOILS**

- A. The CONTRACTOR shall perform all work of this Section in accordance with the Construction Safety Plan in Section 01329.
- B. During excavation operations, if the CONTRACTOR encounters contaminated soil, the CONTRACTOR shall immediately implement the CSEDWP. Any non-contaminated soil that becomes mixed with contaminated soil shall be designated as contaminated soil and shall be handled and disposed as such at no additional cost to the OWNER. CONTRACTOR will not be paid for handling and disposal of the volume of non-contaminated soil at the contaminated soil price, if it is mixed with contaminated soil.
- C. The CONTRACTOR shall temporarily stockpile excavated contaminated soil at the job site in piles not exceeding a volume of 500 cubic yards pending soil

characterization and analytical results. Stockpiles shall be securely barricaded and clearly labeled.

- D. Contaminated soils stored at the temporary stockpile area shall be covered with visqueen material to prevent the migration of contaminants from the material. CONTRACTOR shall provide temporary berms constructed of clean soil or hay bales and covered with visqueen to contain runoff from the stockpiled soil. Visqueen material shall have a thickness of at least 10 milli-inches. CONTRACTOR shall recover all rainwater or other water that collects in the temporary stockpile area.
- E. Contaminated Soil Encountered Along Pipeline Alignments:
  - 1. The CONTRACTOR shall implement a material tracking system to track all contaminated soil between collection, excavation, stockpiling or storage, sampling and testing, and final disposition. The waste tracking system shall include identification of the source of the soil (location, depths, and date of excavation) and stockpile or storage location.
  - 2. The CONTRACTOR shall identify a minimum of one landfill that is permitted to and will accept the contaminated soils expected for disposal. The CONTRACTOR shall select landfills that are established, fully operational, and in full compliance with all applicable federal, state, and local regulations.
  - 3. The CONTRACTOR shall contain and properly dispose of all water generated from excavation work in contaminated areas, as described in this Section.
  - 4. All costs associated with testing, management, and disposal of the contaminated soil (as defined in Subsection 1.03A and 1.03B) shall be borne by the CONTRACTOR and included in Bid Item No. 4.
- F. All construction equipment used for the handling of contaminated material shall be decontaminated prior to use for other work elements or removal from site.

## **2.02 ASBESTOS CEMENT PIPE (ACP)**

- A. The pipe to be removed from the ground has been in service for approximately 45 years:
  - 1. The manufacturer and exact composition of the pipe to be removed is unknown.
  - 2. ACP is generally manufactured using portland cement or pozzolan cement and asbestos fiber.
  - 3. Common pipe lengths: 3 feet 3 inches, 6 feet 6 inches, 9 feet 9 inches, and 13 feet 0 inches.
- B. Pipe fittings. Separate from pipe brass, galvanized pipe, copper, cast iron, galvanized pipe or steel fittings and dispose of separately.

## **PART 3 EXECUTION**

### **3.01 ASBESTOS MATERIALS**

- A. Notifications:
  - 1. Notify Cal-OSHA 24 hours prior to performing asbestos material removal operations.
  - 2. Contractor shall notify Owner 3 working days in advance of commencing asbestos material removal operations.

- B. Work area:
  - 1. Establish a regulated work area, using at a minimum, construction warning tape to establish limits of work area for the asbestos material removal.
  - 2. On site stockpiling or storage of asbestos material designated for disposal shall not be allowed.
- C. Safety:
  - 1. Conduct an Initial Exposure Assessment (IEA).
  - 2. Provide a hand/face wash station.
- D. Worker qualifications:
  - 1. Asbestos removal shall be performed by trained employees in conformance with Section (g) Methods of Compliance, of CCR, Title 8, § 1529, "Asbestos," mandating wet methods, vacuum cleaners with HEPA filters to collect debris and prompt cleanup.
- E. Legal disposal:
  - 1. Legal disposal of asbestos material is the Owner's responsibility.
  - 2. Contractor shall transport the asbestos material to the location designated by the Owner and place into the location designated for this project. Disposal shall be paid for by owner.

### **3.02 EXCAVATION OF AC PIPE**

- A. Machine excavates to expose asbestos cement pipe.
- B. Hand excavates areas under pipe where breaks are planned.
- C. Pipe shall be pre-wetted prior to any breaks being made.
- D. Pipe shall be snapped using mechanical snapping methods.

### **3.03 AC PIPE REMOVAL**

- A. All required pipe breaking operations shall require adequate pre-wetting with potable water.
- B. The Contractor shall make every effort to minimize the number of pipe breaks. Wherever possible, the pipe should be removed by pulling the pipe out of the pipe joint collars.
- C. Remove sections of AC pipe intact at joint collars by mechanical snapping methods between collars.
- D. Wet and containerize waste materials as removed from the trench. Use lifting straps and methods that do not further damage the pipe.
- E. Sections of AC pipe that become cut, have broken edges or have any friable surface shall be wet at exposed fractures and immediately wrapped:
  - 1. The pipe ends shall be sealed completely using a minimum 6-mil poly film wrap, which is securely fastened, taped to completely enclose the pipe and ACP appurtenances and shall have conspicuous, legible labeling that has the



following or equivalent labeling: CAUTION: CONTAINS ASBESTOS FIBERS.  
BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM.

- F. AC Pipe sections shall not be left exposed in public view, either in trench or in disposal area.
- G. All connecting parts of pipe, rubber gaskets, and pipe couplings shall be discarded with pipe.
- H. AC pipe from this project only, shall be placed in the bin designated. Disposal will be paid for by owner.

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**SECTION 01400**  
**QUALITY CONTROL**

**PART 1 - GENERAL**

1.01 INSPECTION AND TESTING

A. General

Where the Contract Documents require work to be tested or approved, it shall be tested in the presence of the Construction Manager or its authorized representative. The Construction Manager shall have the right to witness all on-site tests performed by the Contractor and any shop tests. The results of any tests performed by the Contractor shall be made available for the information of the Construction Manager.

Inspections, tests or Favorable Reviews by the Construction Manager or others shall not relieve the Contractor from its obligation to perform the Work in accordance with the requirements of the Contract Documents or for its sole responsibility for the quality of workmanship and materials.

Except as specifically required under the Technical Specifications for testing and inspection, all tests for materials furnished by the Contractor will be done in accordance with commonly recognized standards of national organizations. Where tests are to be performed by the Construction Manager or by an independent laboratory or agency, the Contractor shall furnish such samples of all materials as required by the Construction Manager without charge. The sample or samples of materials to be tested shall be selected by such laboratory or agency, or the Construction Manager, and not by the Contractor. No material for which the Contract Documents require the submittal and approval of tests, certificates of compliance or other documentation shall be incorporated in the Work until such submittal has been made and approved.

The Contractor shall provide safe access for the Construction Manager and inspectors to adequately inspect the quality of work and the conformance with the Contract Documents. The Contractor shall furnish the Construction Manager the necessary labor and facilities for such things as excavation in the compacted fill to the depths required to take samples. The Contractor shall provide adequate lighting, ventilation, ladders and other protective facilities as may be necessary for the safe performance of inspections.

Records shall be available at all reasonable hours for inspection by other local or State agencies to ascertain compliance with laws and regulations.

Upon completion of the Work, the Construction Manager will conduct a final inspection as provided for in Section 00700-8.07, **FINAL INSPECTION AND PAYMENT**.

B. Notice

The Contractor shall notify the Construction Manager at least 24 hours before any field testing or special inspections are required to be performed by the Construction Manager or independent laboratory furnished by the City. The Contractor shall notify the Construction Manager at least two hours before any inspection is required to be performed or to witness the Contractor's on-site field testing.

Whenever the Contractor varies the period during which work is carried on each day, the Contractor shall give due notice to the Construction Manager so that proper inspection may be provided. Any work done in the absence of the Construction Manager shall be subject to rejection.

C. Costs of Testing

1. The Contractor shall be responsible for, and shall pay for, all quality control and off-site tests of materials required including all source and mix design tests for the approval of soil and concrete materials. The City will perform the soils and compaction tests detailed in the Technical Specifications during the performance of the Work. The City will retain and pay a qualified testing agency to perform soil compaction testing. All other testing required by the Technical Specifications shall be the responsibility of the Contractor.
2. The Contractor shall be responsible for, and shall pay for, all source quality control and all on-site tests of materials required, except those tests specifically noted to be performed and paid for by the City.
3. The Construction Manager shall have the authority to require additional tests or inspections due to the manner in which the Contractor executes its work. Examples of such additional tests and inspections include; tests of materials substituted for previously accepted materials, or substituted for specified materials, or retests made necessary by failure of material to comply with the requirements of the Specifications. Where such tests and inspections are required by Contract to be performed by the City, the City will pay for the additional tests and inspections but will issue a unilateral Change Order to deduct these costs from the Contract price.
4. In the event the Contractor prematurely notifies of testing, inspection, special inspection, or on-site inspection in accordance with Section 01400-1.01B, and the Contractor is not prepared or the Project has not progressed to the point requiring testing, inspection, special inspection, or on-site inspection, the Contractor shall pay for all costs associated with the premature notification of testing and inspection personnel and equipment.

D. Work Covered Prior to Inspection and/or Testing

Work requiring inspection and/or testing shall not be concealed or buried prior to the acceptance of such inspection or testing. Work covered without the favorable review or consent of the Construction Manager shall, if required by the Construction Manager, be uncovered for inspection and/or testing at the Contractor's expense.

E. Work Covered With Prior Inspection and/or Testing

If the Construction Manager considers it necessary or advisable that covered work which was favorably inspected and tested be uncovered for reinspection and/or retesting, the Contractor, at the Construction Manager's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Construction Manager may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such work is defective, the Contractor will bear all expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such work is not found to be defective the Contractor will be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributable to such uncovering, exposure, observation, testing and reconstruction, and a Change Order shall be issued for such additional work.

F. Coordination of Other Inspections

The Contractor is completely responsible for scheduling all agency inspections in accordance with the agency requirements. The Contractor shall notify the Construction Manager of all building and other work component inspection notices and schedules. Failure of the Contractor to properly coordinate and schedule these inspections shall not be cause for time extensions.

1.02 TEST WATER

The Contractor shall furnish and properly dispose of the water which is required for testing of piping and structures. The Contractor shall dispose of all testing water without damage to property, and in accordance with applicable regulations.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## **SECTION 01505**

### **MOBILIZATION AND DEMOBILIZATION**

#### **PART 1 - GENERAL**

##### **1.01 MOBILIZATION**

- A. Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the site; for the establishment of all facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site.
- B. Mobilization shall also include the construction of temporary access ways; temporary fencing; and the necessary preparatory work required to allow for the safe and stable movement of all vehicles that are required to construct the improvements as shown.

##### **1.02 DEMOBILIZATION**

- A. Demobilization shall consist of work and operations necessary to disband all mobilized items and clean up the site. The removal of all temporary access ways, signs, temporary fencing, and temporary facilities or works and the restoration of surfaces to an equal or better than existing condition shall also be included as part of demobilization.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## SECTION 01510

### TEMPORARY UTILITIES

#### PART 1 - GENERAL

##### 1.01 ELECTRICAL SERVICE

The Contractor shall arrange, at its own cost, with the local utility to provide adequate temporary electrical service at a mutually agreeable location. The Contractor shall then provide adequate job site distribution facilities conforming to applicable codes and safety regulations. The Contractor shall provide, at its own cost, all electric power required for construction, testing, general and security lighting, and all other purposes whether supplied through temporary or permanent facilities.

##### 1.02 WATER

The Contractor shall pay for and shall construct all facilities necessary to furnish water for its use during construction. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water. The Contractor shall pay for all water used for the Contractor's operations prior to final Acceptance.

##### 1.03 TEMPORARY LIGHTING

The Contractor shall provide temporary lighting in all work areas sufficient to maintain a lighting level during working hours not less than the lighting level required by Cal/OSHA standards. As permanent lighting facilities are completed they may be used in lieu of temporary facilities, provided however, that bulbs, lamps, or tubes of such facilities used by the Contractor shall be replaced prior to final Acceptance of the Work.

##### 1.04 HEATING AND VENTILATION

The Contractor shall provide means for heating and ventilating all work areas as may be required to protect the Work from damage by freezing, high temperatures, weather, or to provide a safe environment for workers. Un-vented direct fired heaters shall not be used in areas where freshly placed concrete will be exposed to the combustion gases until at least two hours after the concrete has attained its initial set.

##### 1.05 SANITARY CONVENIENCES

The Contractor shall provide suitable and adequate sanitary conveniences for the use of all persons at the site of the Work. Such conveniences shall include chemical toilets or water closets and shall be located at appropriate locations at the site of the Work. All sanitary conveniences shall conform to the regulations of the public authority having jurisdiction over such matters. At the completion of the Work, all such sanitary conveniences shall be removed and the Site left in a sanitary condition.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01550

### TRAFFIC CONTROL

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Providing safe and effective work areas and to warn, control, protect, and expedite vehicular and pedestrian traffic through the construction zone. It shall be the sole responsibility of the Contractor to provide for the safety of the traveling public within the limits of the project, including work in the public right-of-way and on private property.
  - 2. Section includes temporary construction, barricades and enclosures, fences, security, temporary controls, and traffic regulation.
  - 3. In this Section, reference to the "Public" also includes the Owner's personnel and representatives.
  - 4. Public Outreach.

##### 1.02 REFERENCES

- A. California Manual on Uniform Traffic Control Devices, California Department of Transportation (latest edition): In this Section it is referred to as CMUTCD.

##### 1.03 REQUIREMENTS

- A. General:
  - 1. Traffic control and lane closures must meet the standard requirements of the City of Sausalito Encroachment Permit as shown in Appendix A, and as specified in this Section.
  - 2. The Contractor shall maintain all required traffic control devices and trenches within the right-of-way at all times, 24 hours per day, 7 days per week including nights, holidays, and weekends.
  - 3. Access for emergency vehicles shall be maintained at all times.
  - 4. All signs and street marking damage caused by or related to the construction of this project shall be replaced in kind by the Contractor. In the case of partial damage to lane stripes and traffic lettering the whole stripe or marking in its entirety shall be replaced.
- B. Temporary surfaces:
  - 1. The Contractor shall be required to provide temporary surfacing of all excavated areas immediately after completing the backfilling of any section of the Work. If permitted by the government agency with jurisdiction of the right-of-way, the Contractor may be allowed to leave excavations open provided that traffic control devices, approved by the governmental agency maintaining the right-of-way, are in place and maintained, and excavations are covered with steel plates (non-skid surface type) at the close of each working day. The temporary steel plates shall comply with the requirements of the governmental agency controlling the right-of-way.
  - 2. Temporary gravel surfaces shall not be permitted.

3. All temporary detours and/or bypasses shall be hard surfaced with a minimum of 1-1/2 inches of asphalt-concrete pavement and maintained in a smooth and usable condition at all times for the duration of the detour and/or bypass.
- C. Barricades and enclosures:
1. Contractor shall effect and maintain at all times during the prosecution of the Work, barriers, and lights necessary for the protection of workmen and the public. Contractor shall provide suitable barricades, lights, signs, and watchmen at all places where the Work causes obstructions to the normal traffic or constitutes in any way a hazard to the public.
  2. Statutory Requirements: Contractor shall install and maintain all barricades, signs, lights, and other protective devices within rights-of-way in strict conformity with applicable statutory requirements by the government agency having jurisdiction in accordance with an approved Traffic Control Plan.
- D. Temporary bridges:
1. Contractor shall design and place suitable temporary bridges where necessary for the maintenance of vehicular and pedestrian traffic and to accommodate the use of temporary sewer bypass pipelines in accordance with the requirements of the encroachment permit issued by the government agency controlling the right-of-way. Contractor shall assume responsibility for the sufficiency and safety of all such temporary work on bridges and for any damage that may result from their failure or their improper construction, maintenance, or operation.
- E. Striping:
1. Placement of temporary pavement striping shall be by pilot line method and use limited to 14 calendar days and spaced every 40 feet. The double yellow line shall have 2 pieces of tape side by side with a 4-inch space between, and spaced to the above increments.
  2. Painted temporary striping shall be 4 inches wide and shall be in accordance with the CMUTCD. Painted temporary striping shall not be used on the existing pavement or on final wearing course of pavement.
  3. Existing pavement markings, either painted or raised pavement markers that are not applicable or are within the transverse limits of the temporary travel lanes shall be removed to the satisfaction of the Engineer. Painting over existing markings is not permitted.
- F. Traffic control devices:
1. All traffic control devices not in use, or that will not be used for a period greater than 24 hours, shall be removed by the Contractor from the work area. The sidewalk area shall not be used at any time to store unused traffic control devices unless the sidewalk is closed and an approved barricade plan is provided for rerouting pedestrians.
  2. Contractor shall maintain all barricades and other traffic control devices in clean and effective condition and replace devices in poor condition immediately.
  3. Contractor shall begin placing barricades in the direction of traffic and remove them in the direction of opposing traffic.
  4. Text message boards:
    - a. Fixed at each end of the project set and 2 moveable boards within the project setup area.

- G. Flaggers:
  - 1. As specified in CMUTCD.

#### **1.04 SUBMITTALS**

- A. Project-specific traffic control plan (TCP) shall be prepared by the Contractor:
  - 1. Plan shall include work hours. Including off peak hour work requirements.
  - 2. Plan shall address pedestrian access.
  - 3. For street closure, provide details related to the notification of all emergency services, such as police and fire. Provide details related to the notification of services, such as mail and garbage collection.
- B. For work in the City of Sausalito rights-of-way, the TCP must be submitted to the City as part of the encroachment permit application.
- C. A TCP shall be required for each phase or segment of the construction meeting the requirements of the CMUTCD. Each TCP shall be considered separately.
- D. At a minimum, the TCP shall provide, for each phase of the work, the placement and spacing of all traffic control devices (including signs, markings, channelizing devices, lighting devices, flaggers, etc.) and spacing/location of these within the following traffic control areas:
  - 1. Advance Warning Signs.
  - 2. Transition Areas.
  - 3. Buffer Spaces.
  - 4. Work Areas.
  - 5. Termination Areas.
- E. Additionally, the TCP must clearly show the following minimum information. Include location, size, height, text height, and color of each sign:
  - 1. Method for protecting excavations, work sites, and school zone crosswalks.
  - 2. Method of barricading at intersections.
  - 3. Driveway access plan.
  - 4. Provisions for emergency vehicle access.
  - 5. All set-up changes to accommodate different phasing of the work.
  - 6. Lane widths and transitions.
  - 7. Twenty-four-hour emergency contact information.
  - 8. Business access signs.
  - 9. Sidewalk "closed/cross here" signs.
  - 10. No parking signs.
  - 11. Project signs.
  - 12. Fresh oil signs.
  - 13. Duration of traffic control and barricade plan.
  - 14. All advance warning signs.
  - 15. Lane closures.
  - 16. Placement of "double penalty in work zones" warning signs.
  - 17. Detour locations.
  - 18. Required signage and barricading associated with bus stop closures.
  - 19. Required signage and barricading associated with school zone/safe route to school.
  - 20. Routing plan and signage for directing pedestrian around work area.

- F. Submit 2 copies of the approved TCP to the Engineer within 48 hours of approval.
- G. Provide Bus Stop Closure Schedule (BSCS) attached to TCP. BSCS shall identify specific durations and times of day for all proposed bus stop closures. Closures are not to exceed 2 consecutive bus stops at a time or 1,000 feet at a time.
- H. After installation of new or modified control, Contractor shall inspect and certify that controls are installed and operating as intended. Certification shall consist of a signed affidavit stating that the traffic control has been inspected and found to be in conformance with the TCP and contract requirements provided to the government agency with jurisdiction of the right-of-way.
- I. If, during the execution of the work, the Contractor determines that the traffic control is not functioning as intended, the Contractor may make revisions to the TCP as necessary, provided that the City accepts the changes.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Materials shall conform to the CMUTCD as applicable, and as specified in this Section.

### **2.02 TEMPORARY STRIPING**

- A. Temporary traffic striping tape material shall conform to CMUTCD. Tape shall be 4 inches wide and 4 feet long. The color of the tape shall match the color of the existing line.

### **2.03 PERMANENT STRIPING**

- A. Permanent striping shall conform to the requirements of Section 02952, as applicable.

## **PART 3 EXECUTION**

### **3.01 TRAFFIC CONTROL REQUIREMENTS**

- A. All traffic control within public rights-of-way shall conform to the requirements of the encroachment permits and traffic control plans approved by the government agency with jurisdiction in the right-of-way.
- B. All traffic control on private property shall warn, control, protect, and expedite vehicular and pedestrian traffic through the private property.

END OF SECTION

## SECTION 01560

### TEMPORARY CONTROLS

#### PART 1 - GENERAL

##### 1.01 TEMPORARY FACILITIES

Construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities shall be of ample size and capacity to adequately support and move the loads to which they will be subjected. Railings, enclosures, safety devices, and controls required by law or for adequate protection of life and property shall be provided.

##### 1.02 STAGING AND SHORING

Temporary supports shall be designed by a registered professional engineer with an adequate safety factor to assure adequate seismic and load bearing capability. The Contractor shall submit design calculations for staging and shoring prior to commencement of Work.

Excavation support shall be in accordance with Section 00700-4.07E, **Excavation Safety**.

##### 1.03 PROTECTION OF WORK, PROPERTY AND PERSONS

The Contractor shall be responsible for the care of all work until its completion and Final Acceptance; and the Contractor shall, at its own expense, replace damaged or lost material and repair damaged parts of the Work, or the same may be done by the City, and the Contractor and its sureties shall be liable therefore. The Contractor shall make its own provisions for properly storing and protecting all material and equipment against theft, injury, or damage from any and all causes. Damaged material and equipment shall not be used in the Work. The Contractor shall take all risks from floods and casualties, or for delays from such causes. The Contractor may, however, be allowed a reasonable extension of time on account of such delays, subject to the conditions herein before specified. The Contractor shall remove from the vicinity of the completed work all plants, buildings, rubbish, unused material, concrete forms, sheeting or equipment belonging to the Contractor or used under its discretion during construction; and in the event of the Contractor's failure to do so, the same may be removed by the City at the expense of the Contractor, and the Contractor and its sureties shall be liable therefore.

The Contractor shall adopt all practical means to minimize interference to traffic and inconvenience, discomfort, or damage. The Contractor shall protect against damage, any piling, duct or structures crossing trenching or encountered in the Work and shall be responsible for any damage done to such structures, or damage therefrom. The Contractor shall support or replace, any such structures without delay and without any additional compensation, to the entire satisfaction of the Construction Manager. All obstructions to traffic shall be guarded by flagmen as required and by barriers and illuminated at night.

The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations, and under all circumstances the Contractor shall comply with the regulations of the City or County, and the laws and regulations of the State of California, relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdiction, and the Contractor shall be solely responsible for any damages caused by failure to provide proper safety.

The Contractor will be held responsible for and be required to make restitution, at its own expense, for all damage to persons or property caused by Contractor or subcontractor, or agents, or employees of either during the progress of Work and until its final Acceptance.

1.04 FENCES – NOT USED

1.05 TEMPORARY ENCLOSURES

When sandblasting, spray painting, spraying of insulation, or other activities inconveniencing or dangerous to property or the health of employees or the public are in progress, the area of activity shall be enclosed adequately to contain dust, over-spray, or other hazard. In the event there are no permanent enclosures of the area, or such enclosures are incomplete or inadequate, the Contractor shall provide suitable temporary enclosures.

1.06 ABOVE GRADE PROTECTION (NOT USED).

1.07 WORKING HOURS

Construction shall be allowed only between the hours of 8:00 a.m. and 6:00 p.m., Monday through Friday. Work outside of these hours will require the Contractor to reimburse the City for direct costs, indirect costs, and associated mark up for inspection services and administrative costs. Contractor requests to work outside normally allowed work hours shall be submitted not less than 72 hours in advance. Requests to work outside normally allowed work hours are subject to approval by City Engineer.

Work outside normally allowed working hours shall be limited to 9:00 a.m. to 5:00 p.m. on Saturday, 9:00 a.m. to 7:00 p.m. on City holidays, not including those City holidays that fall on Sundays. No work will be allowed on Sunday. City holidays consist of:

- New Year's Day
- Martin Luther King, Jr.
- Presidents Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Friday following Thanksgiving Day
- Christmas Eve
- Christmas Day
- New Year's Eve



The Contractor shall be responsible for any inspection and additional administration costs incurred by the City, or its agents and representatives, for work by the Contractor outside the hours defined above on weekdays, or any work on weekends or holidays recognized by the City. If an inspection is required at any time other than during regular hours of business, Contractor shall notify the Construction Manager or shall make such request for overtime inspection at the office of the City at least one (1) hour prior to closing time. A fee shall be charged for overtime inspection and shall be determined as follows: the Inspector's hourly rate of pay in effect at that time shall be doubled; such double-time rate shall then be multiplied by a minimum chargeable time of two (2) hours. If the Inspector is required to stay on the job more than two hours, the double-time rate shall be paid for each hour thereafter; portions of hours shall be charged as a full hour. Such costs shall be withheld from the succeeding monthly progress payment. Any work in Section 01010, **SUMMARY OF WORK**, specifically required to be performed outside the normal working hours is excluded from the provisions of this paragraph. The City may also exclude other work performed outside the normal working hours from the provisions of this paragraph.

The Contractor shall notify the Construction Manager at least 24 hours prior to any work outside the normal working hours defined above, on weekends or holidays.

The Contractor shall be responsible for any inspection and additional administration costs incurred by the City, or its agents and representatives for the following conditions:

- A. For work by the Contractor outside the hours defined above on weekdays, or any work on weekends or holidays recognized by the City.
- B. For overtime costs beyond ten (10) hours in any one workday shift, regardless if the ten (10) hours occur in the allowed working hours.

Such costs shall be withheld from the succeeding monthly progress payment. Any work in Section 01010, **SUMMARY OF WORK**, specifically required to be performed outside the normal working hours is excluded from the provisions of this paragraph.

## 1.08 DUST CONTROL

During the performance of all Work under this Contract, the Contractor shall assume all responsibility for dust control and shall furnish all labor, equipment, and means required to carry out proper and efficient measures wherever and whenever dust control is necessary to prevent the Contractor's operations from producing dust damage and nuisance to persons and property.

Unless the construction dictates otherwise, and unless otherwise approved by the Construction Manager, the Contractor shall furnish and operate a self-loading motor sweeper with spray nozzle at least once each working day to keep paved areas acceptably clean whenever construction, including restoration, is incomplete.

If the contractor does not provide and/or conduct dust control as required above or otherwise approved in writing by the Construction Manager, the City has the right to contract such services separately and withhold those costs from the contractor.

Any claims resulting from dust damage or nuisance shall be borne solely by the Contractor.

#### 1.09 FIRE EXTINGUISHER

Sufficient number of fire extinguishers of the type and capacity required to protect the Work and ancillary facilities, shall be provided and maintained by the Contractor in readily accessible locations.

#### 1.10 USE OF EXPLOSIVES

The use of explosives is prohibited.

#### 1.11 REMOVED MATERIALS

All concrete, paving, reinforcing steel, fencing materials, rock, soil, strips, and other waste material and construction debris shall be removed from the Site by the Contractor and disposed of in accordance with applicable regulations and laws.

#### 1.12 CONSTRUCTION CLEANING

Throughout the period of construction the Contractor shall keep the Work site; including work, storage, parking, and employee areas; free and clean of all rubbish and debris, and shall promptly remove from the Site, or from property adjacent to the site of the Work, all unused and rejected materials, surplus earth, concrete, plaster, and debris. In particular the Contractor shall keep the Site clean to maintain safe access and to avoid fire hazard.

#### 1.13 NOISE ABATEMENT

Operations at the Work site shall be performed so as to minimize unnecessary noise. Special measures shall be taken to suppress noise during night hours. Noise levels due to construction activity shall not exceed the levels specified by local ordinance.

Internal combustion engines used on the Work shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated without said muffler.

#### 1.14 DRAINAGE CONTROL

In excavation, fill, and grading operations care shall be taken to disturb the pre-existing drainage pattern as little as possible. Particular care shall be taken not to direct drainage water onto private property, into the Bay, or into streets or drainage ways inadequate for the increase flow. Drainage means shall be provided to protect the Work.

#### 1.15 EROSION CONTROL

A. All excavated areas shall be provided with temporary erosion control measures.

- B. Temporary erosion control shall be required for all areas where natural ground cover is disturbed, all temporary excavation stockpiles, including structures and trench excavations.
- C. Erosion control shall be by means of filter fabric fences or hay bales placed to completely circumvent the down-slope side of any excavated stockpile.
- D. Protected areas shall be regularly inspected and maintained by the Contractor during the course of the Work.
- E. All excavations, spills, and waste materials shall not be placed in areas subject to washout, flooding or natural drainage.
- F. See Section 01060-1.03, **STORM WATER QUALITY CONTROLS**, for additional requirements

#### 1.16 WARNING DEVICES AND BARRICADES

The Contractor shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, as a minimum, conform to the requirements of Cal/OSHA.

The Contractor is responsible for providing and maintaining barricades necessary to prevent accidental falls through any unattended open hatches or trenches, or entrances into potentially hazardous work areas in the Contractor's work area.

#### 1.17 TRAFFIC REGULATIONS

##### A. General

The Contractor shall take all necessary steps to minimize inconvenience to the general public throughout all Work under this Contract. No driveways or private roads shall be blocked without notifying the property owner and access must be restored during all non-working hours. Safe access must be maintained for pedestrian traffic throughout the Work area at all times.

At least one lane of traffic must be kept open at all times unless prior approval is provided by the City. No roads shall be blocked or made inaccessible, due to the Contractor's work, without prior written approval of the City and the affected agencies. More stringent requirements may be imposed in the right-of-way permits.

The Contractor shall not block or obstruct fire lanes at any time.

The Contractor shall adopt all practical means to minimize interference to traffic and inconvenience, discomfort, or damage. The Contractor shall protect against damage, any piling, duct or structures crossing trenching or encountered in the Work and shall be responsible for any damage done to such structures or damage therefrom. The Contractor shall support or replace, any such structures without delay and without any additional compensation, to the entire satisfaction of the

Construction Manager. All obstructions to traffic shall be guarded by flagmen as required and by barriers and illuminated at night. The Contractor shall be responsible for all damage to persons and property directly or indirectly caused by its operations, and under all circumstances the Contractor shall comply with the regulations of the City or County, and the laws and regulations of the State of California, relative to safety of persons and property and the interruption of traffic and the convenience of the public within the respective jurisdiction, and the Contractor shall be solely responsible for any damages caused by failure to provide proper safety.

B. Haul Routes

In addition to any haul routes that may be designated in the Contract Documents, or at the preconstruction conference, the Contractor shall furnish evidence that the Public Agency(ies) which has authority for the right-of-ways proposed to be utilized by the Contractor for haul routes has approved the proposed route(s) for all construction traffic created by the Project. Upon approval, the Contractor shall strictly adhere to that route(s) only, unless written permission is obtained from such Public Agency(ies) to change the route(s).

C. Traffic Control

Traffic control shall be in accordance with the California Manual of Uniform Traffic Control Devices. The Contractor shall submit for approval, by the City, its traffic control plans prior to work on public streets.

Traffic control shall include signs, warning lights, reflectors, barriers, and other necessary safety devices and measures, including sufficient flaggers to direct vehicular traffic through the construction areas.

No material or equipment shall be stored/parked where it will interfere with the free and safe passage of public traffic, and at the end of each day's work, and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from the public right-of-way.

Should the Contractor appear to be negligent in furnishing warning and protective measures, as above provided, the Construction Manager may direct attention to the existence of a hazard, and the necessary warning and protective measures shall be furnished and installed by the Contractor at its expense.

## 1.18 ROADS AND FENCES

Roads subject to interference by the prosecution of the Work covered by this Contract shall be kept open, and fences subject to interference shall be maintained by the Contractor during the Work and shall be replaced to their original condition unless specifically shown otherwise on the Drawings. Such signs and barricades as are required by local laws and as necessary for the safe prosecution of the Work shall be provided.

Excavated dirt shall not be stored on roads, paths, or planted areas. Care shall be taken to protect improvements.

#### 1.19 PARKING AND STAGING AREAS (NOT USED)

#### 1.20 TREES AND SHRUBS

Except as noted on the Plans, the Contractor shall not remove trees or shrubs without authorization of the Construction Manager. Injuries to tree roots and limbs shall be avoided. No roots shall be cut or limbs pruned, without prior notification to and review of Contractor's proposed methods by the Construction Manager.

#### 1.21 OFFICE OF CONTRACTOR AT SITE

Owner will not provide space for Offices and field support. Contractor may provide an on-site field office facility for its field personnel; however, the Contractor shall acquire the space for this purpose.

The Contractor shall provide sanitary facilities at its cost. The Contractor will be responsible for providing sufficient fencing to enclose the assigned areas and for the security of these areas. The Contractor will be responsible for all costs and arrangements to extend, meter and service the required electrical power and telephone service to the assigned areas, and to provide drinking water in the offices. The Contractor must provide for any other yard or staging areas necessary for its performance of the Work at its own initiative and expense. The Contractor must complete the field office setup and equipping at least ten (10) calendar days prior to physical work start at the Project Site.

#### 1.22 CONTRACTOR'S WORK AND STORAGE AREA

The Contractor shall make its own arrangements for staging, storage and shop areas necessary for the proper execution of the Work.

The Contractor's construction equipment, vehicles, and materials shall not remain in public streets during non-working hours. It shall be the responsibility of the Contractor to transport and store such items at the Contractor's own facility or within construction easements on nonpublic areas at the end of each workday. Contractor may keep portolets on the street in the parking lane or sidewalk in lieu of daily transport if well maintained.

#### 1.23 CONSTRUCTION MANAGER'S FIELD OFFICE (NOT USED)

#### 1.24 PHOTOGRAPH AND VIDEO RECORDING OF SITE CONDITIONS

Existing conditions throughout the Project site and adjacent properties, including but not limited to

- Glen Court

shall be photographed and videotaped by Contractor before starting construction. Recording shall include and show every detail of existing location, including the current

condition of the curb, gutter, sidewalk, paving, landscaping, streetlights, and structures along the sewer alignment and near the Project including backyards, face of buildings, canopies, shades, decking, fences, concrete, irrigation systems, driveways, canals, access roads, plants and landscaping, and any other features within the limits of Work, including Contractor staging areas. Photos and videotape shall be performed in the presence of the Construction Manager.

The Contractor shall provide additional photos and video recording as deemed necessary by the Construction Manager at no additional cost to the Owner.

The Contractor shall not start any work on Site until the photos and video images are submitted and approved by Construction Manager.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01580**

### **MATERIAL AND EQUIPMENT**

#### **PART 1 - GENERAL**

##### **1.01 SALVAGING AND STORAGE OF MATERIALS**

Unless noted elsewhere no salvage of materials is anticipated in this project. All material and items, including all junk or scrap material produced by the Contractor in the performance of the Work and not suitable for reuse in the Work shall be removed from the Site no less often than daily and properly disposed of by the Contractor at its sole cost and expense.

##### **1.02 CONTRACTOR STORAGE AREAS**

The Contractor shall take all responsibility for storage of materials. No equipment for incorporation in the project may be stored in any area subject to natural or man-made flooding.

The Contractor's construction equipment, vehicles, and materials shall not remain in public streets during non-working hours unless approved by the Construction Manager in writing. It shall be the responsibility of the Contractor to transport and store such items at the Contractor's own facility or within construction easements on nonpublic areas at the end of each workday.

Should the Contractor elect to use private property or other property not owned by the City for construction purposes or storage of materials for the Project, the Contractor shall defend, indemnify and hold harmless the City from any claims arising from such storage or use, to the fullest extent permitted by law.

##### **1.03 HAZARDOUS MATERIALS**

All hazardous materials shall be stored and handled in strict accordance with the Material Safety Data Sheets for the products. Material Safety Data Sheets shall be submitted to the Construction Manager prior to the delivery of materials to the Project. The storage and handling of potential pollution-causing and hazardous materials, including but not necessarily limited to, gasoline, oil, asbestos and paint shall be in accordance with all local, state and federal requirements.

##### **1.04 DISPOSAL OF EXCAVATED MATERIAL**

The Contractor shall be responsible for making its own arrangements for disposal of all excavated material or other materials at a permitted disposal site.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**



## SECTION 01600

### PRODUCT REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Product requirements; product selection; product options and substitutions; quality assurance; delivery, handling, and storage; and manufacturer's instructions.
- B. Related section:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 09960 - High-Performance Coatings.

##### 1.02 REFERENCES

- A. American National Standards Institute (ANSI).

##### 1.03 PRODUCT REQUIREMENTS

- A. Comply with Specifications and referenced standards as minimum requirements.
- B. Provide products by same manufacturer when products are of similar nature, unless otherwise specified.
- C. Provide identical products when products are required in quantity.
- D. Provide products with interchangeable parts whenever possible.
- E. Require each equipment manufacturer to have maintenance facilities meeting the following requirements:
  - 1. Minimum 3 years operational experience.
  - 2. Location in continental United States.
  - 3. Equipment and tools capable of making repairs.
  - 4. Staff qualified to make repairs.
  - 5. Inventory of maintenance spare parts.

#### **1.04 PRODUCT SELECTION**

- A. When products are specified by standard or specification designations of technical societies, organizations, or associations only, provide products that meet or exceed reference standard and Specifications.
- B. When products are specified with names of manufacturers but no model numbers or catalog designations, provide:
  - 1. Products by one of named manufacturers that meet or exceed Specifications.
  - 2. Accepted or equal.
- C. When products are specified with names of manufacturers and model numbers or catalog designations, provide:
  - 1. Products with model numbers or catalog designations by one of named manufacturers.
  - 2. Accepted or equal.
- D. When products are specified with names of manufacturers, but with brand or trade names, model numbers, or catalog designations by one manufacturer only, provide:
  - 1. Products specified by brand or trade name, model number, or catalog designation.
  - 2. Products by one of named manufacturers proven in accordance with requirements for or equals to meet or exceed quality, appearance and performance of specified brand or trade name, model number, or catalog designation.
  - 3. Accepted or equal.
- E. When Products are specified with only one manufacturer followed by "or Equal," provide:
  - 1. Products meeting or exceeding Specifications by specified manufacturer.
  - 2. Accepted or equal.

#### **1.05 QUALITY ASSURANCE**

- A. Employ entities that meet or exceed specified qualifications to execute the Work.
- B. Inspect conditions before executing subsequent portions of the Work. Accept responsibility for correcting unsatisfactory conditions upon executing subsequent portions of the Work.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

#### **1.06 DELIVERY, HANDLING, STORAGE, AND PROTECTION**

- A. Prepare products for shipment by:
  - 1. Applying grease and lubricating oil to bearings and similar items.
  - 2. Separately packing or otherwise suitably protecting bearings.
  - 3. Tagging or marking products to agree with delivery schedule or shop drawings.
  - 4. Including complete packing lists and bills of material with each shipment.

5. Packaging products to facilitate handling and protection against damage during transit, handling, and storage.
  6. Securely attach special instructions for proper field handling, storage, and installation to each piece of equipment before packaging and shipment.
- B. Mandatory requirements prior to shipment of equipment:
1. Engineer accepted shop drawings.
  2. Submit draft operations and maintenance manuals.
- C. Transport products by methods that avoid product damage. Deliver products in undamaged condition in manufacturer's unopened containers or packaging.
- D. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- E. Upon delivery, promptly inspect shipments:
1. Verify compliance with Contract Documents, correct quantities, and undamaged condition of products.
  2. Immediately store and protect products and materials until installed in Work.
  3. Acceptance of shipment does not constitute final acceptance of equipment.
- F. Furnish covered, weather-protected storage structures providing a clean, dry, noncorrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment and special equipment to be incorporated into this project.
1. Storage of equipment shall be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including connection of heaters, placing of storage lubricants in equipment, etc.
  2. The Contractor shall furnish a copy of the manufacturer's instructions for storage to the Engineer prior to storage of all equipment and materials.
  3. Corroded, damaged, or deteriorated equipment and parts shall be replaced before acceptance of the project.
  4. Equipment and materials not properly stored will not be included in a application for payment.
- G. Store products with seals and legible labels intact.
- H. Store moisture sensitive products in weathertight enclosures.
- I. Maintain products within temperature and humidity ranges required or recommended by manufacturer.
- J. Maintain storage areas at ambient temperatures recommended by manufacturer.
- K. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Repaint damaged painted surfaces.
- L. Exterior storage of fabricated products:
1. Place on aboveground supports that allow for drainage.
  2. Cover products subject to deterioration with impervious sheet covering.
  3. Provide ventilation to prevent condensation under covering.

- M. Store loose granular materials on solid surfaces in well-drained area. Prevent materials mixing with foreign matter.
- N. Provide access for inspection.
- O. Maintain equipment per the manufacturer's recommendation and industry standards, including oil changes, rotation, etc. Provide a log of equipment maintenance to the Engineer on a monthly basis.
  - 1. Rotation log shall include, as a minimum, the equipment identification, date stored, date removed from storage, copy of manufacturer's recommended storage guidelines, date of rotation of equipment, and signature of party performing rotation.
- P. Protection after installation:
  - 1. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove covering when no longer needed.

### **1.07 MANUFACTURER'S INSTRUCTIONS**

- A. Deliver, handle, store, install, erect, or apply products in accordance with manufacturer's instructions, Contract Documents, and industry standards.
- B. Periodically inspect to assure products are undamaged and maintained under required conditions.
- C. Provide operations and maintenance manuals:
  - 1. Draft versions submitted prior to equipment shipment to project.
  - 2. Final version submitted and accepted no later than 60 days prior to Owner Training.

### **1.08 SPARE PARTS, MAINTENANCE PRODUCTS, AND SPECIAL TOOLS**

- A. Provide spare parts, maintenance products, and special tools as required by Specifications.
- B. Box, tag, and clearly mark items.
- C. Store spare parts, maintenance products, and special tools in enclosed, weather-proof, and lighted facility during the construction period.
  - 1. Contractor is responsible for spare parts and special tools until acceptance by Owner.
  - 2. Protect parts subject to deterioration, such as ferrous metal items and electrical components with appropriate lubricants, desiccants, or hermetic sealing.

## **PART 2 PRODUCTS**

### **2.01 SPARE PARTS AND SPECIAL TOOLS**

- A. Spare parts and special tools inventory list, see Appendix A:
  - 1. Equipment tag number.

2. Equipment manufacturer.
  3. Subassembly component, if appropriate.
  4. Quantity.
  5. Storage location.
- B. Large items:
1. Weight: Greater than 50 pounds.
  2. Size: Greater than 24 inches wide by 18 inches high by 36 inches long.
  3. Stored individually.
  4. Clearly labeled:
    - a. Equipment tag number.
    - b. Equipment manufacturer.
    - c. Subassembly component, if appropriate.
- C. Smaller items:
1. Weight: Less than 50 pounds.
  2. Size: Less than 24 inches wide by 18 inches high by 36 inches long.
  3. Stored in spare parts box.
  4. Clearly labeled:
    - a. Equipment tag number.
    - b. Equipment manufacturer.
    - c. Subassembly component, if appropriate.
- D. Spare parts and special tools box:
1. Wooden box:
    - a. Size: 24 inches wide by 18 inches high by 36 inches long.
  2. Hinged wooden cover:
    - a. Strap type hinges.
    - b. Locking hasp.
    - c. Spare parts inventory list taped to underside of cover.
  3. Coating: As specified in Section 09960.
  4. Clearly labeled:
    - a. The words "Spare Parts and/or Special Tools."
    - b. Equipment tag number.
    - c. Equipment manufacturer.

## **PART 3 EXECUTION**

### **3.01 CLOSEOUT ACTIVITIES**

- A. Owner may request advanced delivery of spare parts and special tools.
1. Deduct the delivered items from inventory and provide transmittal documentation.
- B. Immediately prior to the date of Substantial Completion, arrange to deliver spare parts and special tools to Owner at a location on site chosen by the Owner:
1. Provide itemized list of spare parts and special tools that matches the identification tag attached to each item.
  2. Owner and Engineer will review the inventory and the itemized list to confirm it is complete and in good condition prior to signing for acceptance.

### **3.02 ATTACHMENTS**

- A. Appendix A - Spare Parts and Special Tools Inventory List.
- B. Appendix B - Sample Substitution Request Form.

END OF SECTION

APPENDIX A  
SPARE PARTS AND SPECIAL TOOLS INVENTORY LIST

<b>[Specification Number and Title]</b>				
<b>[Equipment Tag Number]</b>				
<b>[Equipment Manufacturer]</b>				
Quantity	Subassembly Component	Description	Manufacturer's Part Number	Storage Location

Project: \_\_\_\_\_ Substitution Request Number: \_\_\_\_\_  
 \_\_\_\_\_ From: \_\_\_\_\_  
 To: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ Engineer Project Number: \_\_\_\_\_  
 Re: \_\_\_\_\_ Contract For: \_\_\_\_\_

Specification Title: \_\_\_\_\_ Description: \_\_\_\_\_  
 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Article/Paragraph: \_\_\_\_\_

Proposed Substitution: \_\_\_\_\_  
 Manufacturer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Trade Name: \_\_\_\_\_ Model No: \_\_\_\_\_  
 Installer: \_\_\_\_\_ Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 History:  New product  2-5 years old  5-10 years old  More than 10 years old  
 Differences between proposed substitution and specified product \_\_\_\_\_

Point-by-point comparative data attached - REQUIRED BY ENGINEER

Reason for not providing specified item: \_\_\_\_\_

Similar Installation:  
 Project: \_\_\_\_\_ Architect: \_\_\_\_\_  
 Address: \_\_\_\_\_ Owner: \_\_\_\_\_  
 \_\_\_\_\_ Date Installed: \_\_\_\_\_

Proposed substitution affects other parts of Work?  No  Yes, explain: \_\_\_\_\_

Savings to Owner for accepting substitution: \_\_\_\_\_ (\$ \_\_\_\_\_)

Proposed substitution changes Contract Time:  No  Yes [Add] [Deduct] \_\_\_\_\_ days

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The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
  - Same warranty will be furnished for proposed substitution as for specified product.
  - Same maintenance service and source of replacement parts, as applicable, is available.
  - Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
  - Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
  - Proposed substitution does not affect dimensions and functional clearances.
  - Payment will be made for changes to building design, including Engineer design, detailing, and construction costs caused by the substitution.
  - Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
- 

Submitted by: \_\_\_\_\_

Signed by: \_\_\_\_\_

Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Attachments: \_\_\_\_\_

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**ENGINEER'S REVIEW AND ACTION**

- Substitution accepted - Make submittals in accordance with Specification Section 01300.
- Substitution accepted as noted - Make submittals in accordance with Specification Section 01300
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: \_\_\_\_\_

Date: \_\_\_\_\_

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Additional Comments:  Contractor  Subcontractor  Supplier  Manufacturer  Engineer  \_\_\_\_\_

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## SECTION 01720

### PROJECT RECORD DOCUMENTS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section contains instructions for creating and maintaining Project Records.

##### 1.02 RECORD DOCUMENTS

- A. Maintain at the Project site, available to the City and Construction Manager, one (1) copy of the Contract Documents, shop drawings and other submittals, in good order.
  - 1. Mark and record field changes and detailed information contained in submittals and Change Orders.
  - 2. Record actual depths, horizontal and vertical location of underground pipes, duct banks and other buried utilities. Reference dimensions to permanent surface features.
  - 3. Identify specific details of pipe connections, location of existing buried features located during excavation, and the final locations of piping, equipment, electrical conduits, manholes, and pull boxes.
  - 4. Identify location of spare conduits including beginning, ending and routing through pull boxes, and manholes. Record spare conductors, including number and size, within spare conduits, and filled conduits.
  - 5. Provide schedules, lists, layout drawings, and wiring diagrams.
  - 6. Make annotations with erasable colored pencil conforming to the following color code:
    - a. Additions: Red
    - b. Deletions: Green
    - c. Comments Blue
    - d. Dimensions: Graphite
  - 7. Prior to owner's acceptance of work, Contractors shall provide owner As-Built/Record drawings documenting changes made to the plan during the course of construction.  
Compensation for conforming to this specification will be considered as included in the various items and no additional compensation will be allowed.
- B. Maintain documents separate from those used for construction. Label documents "RECORD DOCUMENTS."

- C. Record Documents shall be updated at least once each week and shall be available to the Construction Manager for review. Keep documents current. Record required information at the time the material and equipment is installed and before permanently concealing.
- D. Deliver Record Documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor prior to request for Final Payment.
- E. Record Documents shall be available for the Construction Manager to review to ascertain that changes have been recorded.
- F. Failure of the Contractor to keep current with the updating of the Record Documents shall be grounds for withholding monies from partial payment estimates as specified in Section 00700-8.03B, **Other Withholds**.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01732**  
**CUTTING AND PATCHING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes: Cutting and patching existing and new construction.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.

**1.02 SUBMITTALS**

- A. Submit as specified in Section 01300.
- B. Cutting and patching plan:
  - 1. Submit details of proposed construction before cutting and patching construction commences affecting:
    - a. Work of Owner or of others.
    - b. Structural integrity of element of Project.
  - 2. Cutting and patching plan shall include the following:
    - a. Identification of Work.
    - b. Description of affected construction.
    - c. Necessity for cutting, patching, alteration, or excavation.
    - d. Description of proposed construction.
    - e. Scope of cutting, patching, alteration, or excavation.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Comply with specifications and standards for products involved.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Provide adequate temporary support as necessary to ensure structural integrity of affected portion of Work.
- B. Provide devices and methods to protect other portions of Project from damage and persons from injury.
- C. Provide protection from elements for that portion of Project which may be exposed by cutting and patching, and maintain excavations free from water.

### **3.02 CUTTING AND PATCHING**

- A. Cut, fit, and patch when required to:
  - 1. Make its several parts fit together properly.
  - 2. Remove and replace construction not conforming to Contract Documents.
  - 3. Remove samples of installed construction as specified for testing.
  - 4. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
- B. Execute cutting and demolition by methods which will prevent damage and will provide proper surfaces to receive installation of repairs.
- C. Openings in existing concrete and masonry:
  - 1. Create openings by:
    - a. Saw cutting completely through concrete or masonry.
    - b. Scoring edges of opening with saw to at least 1-inch depth on both surfaces (when accessible) and removing concrete or masonry by chipping.
  - 2. Do not allow saw cuts to extend beyond limits of opening.
  - 3. Make corners square and true by combination of core drilling and grinding or chipping.
  - 4. Prevent debris from falling into adjacent tanks or channels in service or from damaging existing equipment and other facilities.
- D. Sizing of openings in existing concrete or masonry:
  - 1. Make openings sufficiently large to permit final alignment of pipe and fittings without deflections.
  - 2. Allow adequate space for packing around pipes and conduit to ensure watertightness.
- E. Grouting pipes in place:
  - 1. Sandblast concrete surfaces and thoroughly clean sand and other foreign material from surfaces prior to placing grout.
  - 2. Grout pipes, sleeves, castings, and conduits in place by pouring grout under a head of at least 4 inches. Vibrate grout into place. Completely fill the spaces occupied by pipes, sleeves, castings, and conduits.
  - 3. Water cure the grout.

- F. Connections to existing pipes:
  - 1. Cut existing pipe square.
  - 2. Properly prepare the ends for the connection indicated on the Drawings.
  - 3. Repair any damage to existing lining and coating.
  
- G. Rehabilitate all areas affected by removal of existing equipment, equipment pads and bases, piping, supports, electrical panels, electric devices, and conduits such that little or no evidence of the previous installation remains:
  - 1. Fill areas in existing floors, walls, and ceilings from removed piping, conduit and fasteners with non-shrink grout and finish smooth.
  - 2. Remove concrete bases for equipment and supports by:
    - a. Saw cutting clean, straight lines with a depth equal to the concrete cover over reinforcement minus 1/2 inch below finished surface. Do not cut existing reinforcement on floors.
    - b. Chip concrete within scored lines and cut exposed reinforcing steel and anchor bolts.
    - c. Patch with non-shrink grout to match adjacent grade and finish.
  - 3. Terminate abandoned piping and conduits with blind flanges, caps, or plugs.
  
- H. Treat existing concrete reinforcement as follows:
  - 1. Where existing reinforcement is to remain, protect, clean, and extend into new concrete.
  - 2. Where existing reinforcement is not to be retained, cut off as follows:
    - a. Where new concrete joins existing concrete at the removal line, cut reinforcement flush with concrete surface at the removal line.
    - b. Where concrete surface at the removal line is the finished surface, cut reinforcement 2 inches below the surface, paint ends with epoxy, and patch holes with dry pack mortar.

END OF SECTION

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## SECTION 01734

### WORK WITHIN PUBLIC RIGHT-OF-WAY

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Requirements for maintenance, support, protection, relocation, reconstruction and adjusting-to-grade, restoration, construction of temporary and new facilities, and abandonment of existing utilities affected by construction work within the public right-of-way.

##### 1.02 DEFINITIONS

- A. Utility: For purpose of this Section, utility means any public or private service, such as electric light and power systems; gas distribution systems; telephone, telegraph, cable television and other communication services; water distribution; storm drain and sanitary sewer services; police and fire communication systems; street lighting and traffic signs and signals; parking meters; and steam distribution systems.
- B. Trenching:
  - 1. Open trench:
    - a. General: Includes excavation, pipe laying, backfilling, and pavement replacement.
  - 2. Any excavated areas shall be considered as "open trench" until all pavement replacement has been made, or until all trenches outside of pavement replacement areas have been backfilled and compacted in accordance with these Contract Documents.

##### 1.03 DESIGN REQUIREMENTS

- A. Trenching:
  - 1. Except where otherwise specified, indicated on the Drawings, or accepted in writing by the Engineer, the maximum length of open trench, where construction is in any stage of completion, shall not exceed the linear footage as set forth below. Descriptions under following area designations are general in nature and may be amended in writing by the Engineer due to particular or peculiar field conditions:
    - a. Residential Areas maximum 400 linear feet, whichever is the least: Single and multi-family residences, apartments, and condominiums.
    - b. Undeveloped Areas maximum 1,000 linear feet: Parks, golf courses, farms, undeveloped subdivided land.
  - 2. Completely backfill trenches across streets and install temporary or permanent pavement as soon as possible after pipe laying.
- B. Site conditions:
  - 1. Use substantial steel plates with adequate trench bracing to bridge across trenches at street and alley crossings, commercial driveways, and residential driveways where trench backfill and temporary patch have not been completed during regular working hours.
  - 2. Provide safe and convenient passage for pedestrians.

3. Maintain access to fire stations, fire hydrant, and hospitals at all times.
4. Provide traffic control devices, barricades, and signage as required by the regulating agency.

#### **1.04 SUBMITTALS**

- A. Traffic control plan: Submit detailed traffic control plan for acceptance by jurisdictional agency.

#### **PART 2 PRODUCTS**

Not Used.

#### **PART 3 EXECUTION**

Not Used.

END OF SECTION



## SECTION 01740

### WARRANTIES AND BONDS

#### PART 1 - GENERAL

##### 1.01 GUARANTEE OF WORK

The Contractor hereby agrees to make, at its own expense, all repairs or replacements necessitated by defects in materials or workmanship supplied under terms of this Contract, and pay for any damage to other works resulting from such defects, which becomes evident within two (2) years after the date of the Substantial Completion date of the Project, or Acceptance date of the Project for items of work listed on the Punch List(s) or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents. The Contractor's guarantee applies to all work and materials provided by Contractor, subcontractors or manufacturers of packaged equipment components. The Contractor also agrees to indemnify, defend, and hold the City harmless from liability of any kind arising from damage due to defects in the Work.

Specific items of equipment or work may be placed in continuous service by the City prior to the Substantial Completion of the Project. At the City's discretion, the specific items may be accepted as Substantially Complete, commencing the warranty period for those specific items.

The Contractor shall execute and submit a completed Warranty Form in the format as appended to this Section for the Work, and any portion of the Work possessed in accordance with Section 00700-3.04, **CITY'S RIGHT TO USE OR OCCUPY**. The Warranty Form shall be submitted prior to the Substantial Completion date or the final acceptance of the Project or within five (5) days of the occupancy or use of a portion of the Work, whichever is applicable.

The Contractor shall, upon the receipt of notice in writing from the City, promptly make all repairs arising out of defective materials, workmanship, or equipment. The City is hereby authorized to make such repairs and the Contractor and its Surety shall be liable for the cost thereof, if ten (10) days after giving of such notice to the Contractor, the Contractor has failed to make or undertake the repairs with due diligence. In case of emergency, where in the opinion of the City delay could cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and the expense in connection therewith shall be charged to the Contractor, and its Surety shall be liable for the cost thereof.

Prior to the expiration of the Warranty period, the City reserves the right to hold a meeting and require the attendance of the Contractor. The purpose of the meeting is to review warranties, bonds and maintenance requirements and determine required repair or replacement of defective items.

For the purpose of this paragraph, Acceptance of the Work or a portion of the Work by the City, shall not extinguish any covenant or agreement on the part of the Contractor to be performed or fulfilled under this Contract which has not, in fact, been performed or fulfilled at the time of such Acceptance. All covenants and agreements shall continue to be binding on the Contractor until they have been fulfilled.

The City and the Contractor agree that warranty on the parts of the work possessed and used by the City in accordance with Section 00700-3.04, **CITY'S RIGHT TO USE OR OCCUPY**, shall commence on the date that the City takes possession of such Work and so notifies the Contractor in writing. The City and the Contractor further agree that such possession and use of the Work shall not be deemed as Substantial Completion or Acceptance of any other part of the Work.

If, after installation, the operation or use of the materials or equipment furnished under this Contract proves to be unsatisfactory to the Construction Manager or the City, the City shall have the right to operate and use such materials or equipment until it can, without damage to the City, be taken out of service for correction or replacement. Such period of use of the defective materials or equipment pending correction or replacement shall in no way decrease the Warranty Period. Warranty Period for equipment shall be extended by the number days from the date the equipment is found by the City to be non-functional or defective to the date the Contractor repairs and makes fully operational the same equipment.

Nothing in this Section shall be construed to limit, relieve or release the Contractor's, subcontractor's and equipment supplier's liability to the City for damages sustained as the result of latent defects in the materials and equipment furnished or work performed; nor shall it be deemed to be a waiver by the City of any rights or remedies, or time limits in which to enforce such rights or remedies, it may have against the Contractor, subcontractors, or suppliers of the equipment to be furnished under these Specifications.

## 1.02 BONDS

Contractor shall furnish the Payment and Performance Bonds required under 00700-1.08, **BONDS**, in the forms included in the Contract Documents: Section 00610 – PERFORMANCE BOND and Section 00620 – PAYMENT BOND.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION (NOT USED)**

## WARRANTY FORM

### Warranty For Glen Court Sewer Replacement Project

City of Sausalito, California

[Contractor's Name] hereby unconditionally guarantees that the work performed on the **Glen Court Sewer Replacement Project (the "Project")**, has been done in accordance with the requirements of the Contract Documents and further guarantees the Project in its entirety for a period of two years from the date on which the Project is accepted by the City of Sausalito's City Council, unless a longer period is specified in the Contract Documents (the "Warranty Period"). Contractor hereby agrees that it will, during the Warranty Period:

- 1) Repair and/or replace any of the materials, equipment or workmanship in the Work that are defective or do not meet the requirements of the Contract Documents, or
- 2) If the Work as a whole does not operate properly, as originally intended and in accordance with the Contract Documents due to defective or nonconforming material, equipment or workmanship, repair or replace any such material, equipment or workmanship.

Contractor shall, within fifteen (15) days after receipt of written notice thereof from City, repair and/or replace any such materials, equipment, work or workmanship at its own expense and without cost to the City. This obligation applies whether the materials, equipment or work were furnished, installed, performed or constructed by Contractor or a Subcontractor or Supplier of any tier.

In addition, Contractor shall repair and replace any adjacent portions of the Work damaged as a result of the repair or replacement of defective materials, equipment or workmanship, or the Work itself.

If Contractor fails to remedy any such defect or nonconformance within fifteen (15) days after receipt of the City's written notice (unless Contractor has commenced the repair and is diligently pursuing the repair to completion), City may, without further notice to Contractor or its surety, proceed to have such defects remedied at Contractor's expense and Contractor shall pay all costs and charges incurred thereby. The City of Sausalito shall have the sole option to make any needed replacements or repairs itself or to have such replacements or repairs done by the undersigned.

Neither acceptance of the Work nor any payment to Contractor nor any provision of the Contract Documents shall be deemed to be a waiver by City or relieve Contractor of any responsibility under this contract.

In the event of any emergency constituting an immediate hazard to health, safety, property, or public services during the Warranty Period due to materials, equipment or workmanship that are

defective or do not meet the requirements of the Contract Documents, or if the Work as a whole does not operate properly, as originally intended and in accordance with the Contract Documents due to defective or nonconforming material, equipment or workmanship, City may undertake at Contractor's expense, and without prior notice to Contractor, all Work necessary to correct such condition.

Contractor agrees to pay the City of Sausalito, no later than thirty (30) days from the City's written demand, for all costs and expenses the City incurs in repairing, replacing and/or restoring the Work to the conditions contemplated in the Contract Documents, including but not limited to the cost of any such equipment or materials replaced, the cost of removing and replacing any other work necessary to make such replacement or repairs, and all administrative and legal expenses. City's records of the costs of repairing, replacing, rebuilding or restoring any damage or defects by performed by a party other than Contractor shall be binding and conclusive evidence of the amount Contractor shall pay City.

Defective or nonconforming work remedied under this section shall be subject to an extended warranty obligation identical in terms to that provided by this Section, starting from the date the City accepts the remedial work.

Nothing contained in this Section shall be construed to establish a period of limitation with respect to other obligations Contractor may have under the Contract Documents or applicable law. The period established above relates only to the specific obligation of Contractor to correct work on the Project and has no relationship to the time within which City may enforce the obligation to comply with the Contract Documents.

SIGNED: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

By: \_\_\_\_\_ Title: \_\_\_\_\_

Dated this: \_\_\_\_\_ day of \_\_\_\_\_, 201\_\_

Contractor: \_\_\_\_\_  
Signed: \_\_\_\_\_  
Titled: \_\_\_\_\_  
Date: \_\_\_\_\_

**END OF SECTION**

## SECTION 01770

### CLOSEOUT PROCEDURES

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Contract closeout requirements including:
  - 1. Final cleaning.
  - 2. Waste disposal.
  - 3. Touch-up and repair.
  - 4. Disinfection of systems.
  - 5. Preparation and submittal of closeout documents.
  - 6. Final completion certification.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01310 -Progress Schedule.
    - b. Section 01720 - Project Record Documents.
    - c. Section 01740 - Warranties and Bonds.

##### 1.02 REFERENCES

- A. American Water Works Association (AWWA).

##### 1.03 FINAL CLEANING

- A. Perform final cleaning prior to inspections for Final Acceptance.
- B. Employ skilled workers who are experienced in cleaning operations.
- C. Use cleaning materials which are recommended by manufacturers of surfaces to be cleaned.
- D. Prevent scratching, discoloring, and otherwise damaging surfaces being cleaned.
- E. Clean roofs, gutters, downspouts, and drainage systems.
- F. Broom clean exterior paved surfaces and rake clean other surfaces of site work:
  - 1. Police yards and grounds to keep clean.

- G. Remove dust, cobwebs, and traces of insects and dirt.
- H. Clean grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, blemishes, sealants, plaster, concrete, and other foreign materials from sight-exposed surfaces, and fixtures and equipment.

#### **1.04 WASTE DISPOSAL**

- A. Arrange for and dispose of surplus materials, waste products, and debris off-site:
  - 1. Prior to making disposal on private property, obtain written permission from Owner of such property.
- B. Do not fill ditches, washes, or drainage ways which may create drainage problems.
- C. Do not create unsightly or unsanitary nuisances during disposal operations.
- D. Maintain disposal site in safe condition and good appearance.
- E. Complete leveling and cleanup prior to final acceptance of the Work.

#### **1.05 TOUCH-UP AND REPAIR**

- A. Touch-up or repair finished surfaces on structures, equipment, fixtures, and installations that have been damaged prior to inspection for Substantial Completion.
- B. Refinish or replace entire surfaces which cannot be touched-up or repaired satisfactorily.

#### **1.06 CLOSEOUT DOCUMENTS**

- A. Submit following Closeout Submittals upon Substantial Completion and at least 7 days prior to submitting Application for Final Payment:
  - 1. Evidence of Compliance with Requirements of Governing Authorities.
  - 2. Project Record Documents.
  - 3. Operation and Maintenance Manuals.
  - 4. Warranties and Bonds.
  - 5. Evidence of Payment and Release of Liens as outlined in Conditions of the Contract.
  - 6. Release of claims as outlined in Conditions of the Contract.
  - 7. Certificate of Final Completion.

#### **1.07 EVIDENCE OF COMPLIANCE WITH REQUIREMENTS OF GOVERNING AUTHORITIES**

- A. Submit the following:
  - 1. Encroachment permit inspector sign-off.

#### **1.08 PROJECT RECORD DOCUMENTS**

- A. Submit final project record documents per Section 01720.

## **1.09 WARRANTIES AND BONDS**

- A. Provide executed Warranty Form as required by Section 01740.
- B. Provide specified additional warranties, guarantees, and bonds from manufacturers and suppliers.

## **1.10 CERTIFICATE OF FINAL COMPLETION**

- A. When Process Operational Test has been successfully completed, Engineer will certify that new facilities can be utilized for the purposes for which it is intended, therefore the Project has reached Substantial Completion:
  - 1. Engineer will submit a list of known items (punch list) still to be completed or corrected prior to contract completion.
- B. List of items to be completed or corrected will be amended as items are resolved by Contractor.
- C. When all items have been completed or corrected, submit written certification that the entire work is complete in accordance with the Contract Documents and request final inspection.
- D. Upon completion of final inspection, Engineer will either prepare a written acceptance of the entire work or advise Contractor of work not complete. If necessary, inspection procedures will be repeated.

## **PART 2 PRODUCTS**

Not Used.

## **PART 3 EXECUTION**

Not Used.

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## SECTION 02050

### SOILS AND AGGREGATES FOR EARTHWORK

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Aggregate base course.
  - 2. Native material.
  - 3. Stabilization material.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. C 117 - Standard Test Method for Materials Finer than 75- $\mu$ m (No. 200) Sieve in Mineral Aggregates by Washing.
  - 2. C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - 3. D 422 - Standard Test Method for Particle-Size Analysis of Soils.
  - 4. D 4829 - Standard Test Method for Expansion Index of Soils.
- B. California Department of Transportation:
  - 1. Standard Specifications.
  - 2. California Test 205.
  - 3. California Test 211.
  - 4. California Test 217.
  - 5. California Test 229.
  - 6. California Test 301.

##### 1.03 SUBMITTALS

- A. Product data:
  - 1. Material source.
  - 2. Gradation.
  - 3. Testing data.
- B. Quality control for aggregate base course:
  - 1. Test reports: Reports for tests required by Sections of Standard Specifications.
  - 2. Certificates of Compliance: Certificates as required by Sections of Standard Specifications.

##### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Storage and protection: Protect from segregation and excessive moisture during delivery, storage, and handling.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. General:
  - 1. Provide material having maximum particle size not exceeding 4 inches and that is free of trash, lumber, debris, leaves, grass, roots, stumps, and other organic matter.
  - 2. Materials derived from processing demolished or removed asphalt concrete are not acceptable.
  
- B. Aggregate base course:
  - 1. Class 2, 3/4-inch maximum aggregate size, free from organic matter and other deleterious substances, and of such nature that aggregate can be compacted readily under watering and rolling to form a firm, stable base.
  - 2. Aggregate base course for structures:
    - a. Consist of crushed or fragmented particles.
    - b. Coarse aggregate material retained in Number 4 sieve shall consist of material of which at least 25 percent by weight shall be crushed particles when tested in accordance with California Test 205.
  - 3. Aggregate shall not be treated with lime, cement, or other chemical material.
  - 4. Durability index: Not less than 35 when tested in accordance with California Test 229.
  - 5. Aggregate grading and sand equivalent tests shall be performed to represent not more than 500 cubic yards or 1 day's production of material, whichever is smaller.
  - 6. Sand equivalent: Not less than 25 when tested in accordance with California Test 217.
  - 7. Resistance (R-value): Not less than 78 when tested in accordance with California Test 301.
  - 8. Conforms to size and grade within the following limits when tested in accordance with ASTM C 117 and ASTM C 136:

<b>Sieve Sizes (Square Openings)</b>	<b>Percent by Weight Passing Sieve</b>
1 inch	100
3/4 inch	90 - 100
Number 4	35 - 60
Number 30	10 - 30
Number 200	2 - 9

- C. Native material:
  - 1. Sound, earthen material passing 1-inch sieve.
  - 2. Percent of material by weight passing Number 200 sieve shall not exceed 30 when tested in accordance with ASTM D 422.
  - 3. Expansion index less than 35 when tested in accordance with ASTM D 4829.
  
- D. Stabilization material:
  - 1. Durability percentage of wear not greater than 40 percent when tested in accordance with California Test 211.

2. Consists of clean, hard, durable particles of crushed rock or gravel; screened or crushed to the specified sizes and gradations; and free of any detrimental quantity of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance.
3. Shall be free of slaking or decomposition under the action of alternate wetting and drying.
4. The portion of material retained on the 3/8-inch sieve shall contain at least 50 percent of particles having 3 or more fractured faces. Not over 5 percent shall be pieces that show no such faces resulting from crushing. Of that portion which passes the 3/8-inch sieve but is retained on the Number 4 sieve, not more than 10 percent shall be pieces that show no faces resulting from crushing.
5. Conforms to size and grade when tested in accordance with ASTM C 117 and ASTM C 136:

Sieve Size (Square Openings)	Percent by Weight Passing Sieve
1 inch	100
3/4 inch	90 - 100
Number 4	0 - 10
Number 200	0 - 2

**PART 3 EXECUTION**

Not Used.

END OF SECTION

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## SECTION 02084

### PRECAST CONCRETE STRUCTURES

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: utility structures:
  - 1. Precast concrete manholes.
  - 2. Precast drainage inlets.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 02318 - Trenching.
    - b. Section 03300 - Cast-in-Place Concrete.
    - c. Section 05500 - Metal Fabrications.
    - d. Section 07900 - Joint Sealants.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. C 361 - Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.
  - 2. C 478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - 3. C 857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
  - 4. C 858 - Standard Specification for Underground Precast Concrete Utility Structures.

##### 1.03 SYSTEM DESCRIPTION

- A. Performance requirements:
  - 1. Manholes and appurtenances: Manholes and appurtenances shall be watertight and free from infiltration or exfiltration.

##### 1.04 SUBMITTALS

- A. Shop drawings: Submit shop drawings for precast utility structures.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURED UNITS**

- A. Precast concrete manholes:
  - 1. Construct precast concrete manholes in accordance with design, size, shape, form, details, and at locations indicated on the Drawings and specified.
  - 2. Construct manholes of precast eccentric or concentric manhole units in accordance with the requirements indicated on the Drawings and specified.
  - 3. Provide precast, cylinder units, taper sections, and eccentric flat top sections meeting strength requirements in accordance with ASTM C 478.
  - 4. Base design and manufacture to A-16 (HS 20-44) loading in accordance with ASTM C 857.
  - 5. Construct precast manhole sections of Class D concrete as specified in Section 03300 to form and dimensions indicated on the Drawings.
  
- B. Precast drainage inlets:
  - 1. Construct precast concrete drainage inlets in accordance with the size, shape, form, details, and at locations indicated on the Drawings and specified.
  - 2. Base design and manufacture to A-16 (HS 20-44) loading in accordance with ASTM C 857.
  - 3. In accordance with ASTM C 858.
  - 4. Construct precast drainage inlets of Class D concrete as specified in Section 03300 to form and dimensions indicated on the Drawings.

### **2.02 ACCESSORIES**

- A. Precast concrete manholes:
  - 1. Joint sealant: Use precast concrete joint sealant as specified in Section 07900.
  - 2. Manhole frames and cover sets: Type, size, and quality as specified in Section 05500 or as indicated on the Drawings.
  - 3. Drop manhole fittings:
    - a. Drop tee and other fittings: PVC pipe or as otherwise specified or indicated on the Drawings.
  - 4. Piping penetrations through cylinder units:
    - a. Install Kor-N-Seal, or equivalent, rubber gasket boots with steel clamps.
    - b. Piping connections to manhole bases shall be as indicated on Drawings.
  - 5. Coat interior of manhole with SewperCoat 200HS by Kerneo Inc. with a minimum 1/2" thickness or MasterProtect-100CR by BASF with a minimum 80 mil thickness. Surface preparation and curing shall be per manufacturer's recommendations.
  
- B. Precast drainage inlets:
  - 1. Covers: As indicated on the Drawings.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Concrete manholes:
  - 1. Excavation and backfill: As specified in Section 02318.
  - 2. Precast concrete manholes:
    - a. Manhole bases:

- 1) Form and place concrete on undisturbed soil and/or on aggregate base course compacted to 95 percent of maximum density.
  - 2) Form that portion of base above invert elevation of sewer pipe to provide smooth channel section as indicated on the Drawings.
  - 3) Check forms for accuracy of dimensions and relative smoothness prior to placing concrete for base. Channels shall vary uniformly in size and shape from inlet to outlet if required.
  - 4) Construct of Class A concrete as specified in Section 03300 to form and dimensions indicated on the Drawings.
  - 5) Place base concrete as monolith.
- b. Manhole sections:
- 1) Set each manhole section plumb.
  - 2) Use sections of various heights and adjustment rings to bring top of manhole ring and cover to required elevation.
- c. Joints:
- 1) Seal joints with precast concrete joint sealant as specified in Section 07900 unless otherwise indicated on the Drawings.
  - 2) Clean joints with brush and prime.
  - 3) Apply precast concrete joint sealant as follows, except where instructions differ from manufacturer's printed instructions. Where these instructions differ from manufacturer's instructions, install precast concrete joint sealant in accordance with manufacturer's written instructions:
    - a) Remove silicon treated protective paper from one side of preformed rope and lay preformed rope, paper side up, on cleaned joint surface. Press surface firmly end-to-end around entire joint, making minimum 1-inch laps where necessary.
    - b) Remove protective paper from preformed rope and lower next section into place.
  - 4) Seal joints watertight.
- d. Manhole frame and cover sets:
- 1) Install manhole frames and cover sets at locations indicated on the Drawings.
  - 2) Setting:
    - a) Set manhole frames and covers at elevations and requirements indicated on the Drawings:
      - (1) Set manhole covers flush with paving.
    - b) Where structure is outside limits of traveled shoulder but not in roadside ditch, place structure 1/10 foot or more above existing ground surface.
    - c) Where cover is in existing pavement or in traveled way of existing road shoulder, place cover flush with existing surface.
    - d) Where manhole cover falls in existing roadside ditch or right of way, place manhole cover approximately 1-1/2 feet above existing ground surface.
    - e) Set manhole frames at required grade and securely attach to top of precast manhole shaft unit or on adjustment rings, using cement mortar.
    - f) Setting covers:
      - (1) After frames are securely set in place in accordance with requirements specified, install covers and perform necessary cleaning and scraping of foreign materials from

frames and covers as required to accomplish and to ensure proper fit.

- (2) Any frame and cover which creates noise when passed over by traffic shall be replaced.
  3. Drop manholes:
    - a. Construct drop manholes at locations and in accordance with details indicated on the Drawings.
    - b. Provide inside diameter of drop inlet pipe the same as intercepted sewer unless otherwise indicated on the Drawings or specified in this Section.
    - c. Furnish and set fittings as indicated on the Drawings.
  4. Pipe stubs:
    - a. Provide pipe stubs at manhole locations and in conformance with details indicated on the Drawings and as specified.
    - b. Plugging stubs:
      - 1) Unless otherwise indicated on the Drawings, comply with following:
        - a) Stubs up to and including 21 inches: Vitrified clay stoppers.
- B. Precast drainage inlets:
1. Excavation and backfill: As specified in Section 02318.

### 3.02 FIELD QUALITY CONTROL

- A. Tests:
1. Sanitary sewer manholes: Vacuum test all sanitary sewer manholes. Use following vacuum test procedures and requirements:
    - a. After completion of the manhole barrels but prior to backfilling and grade ring installation, seal all openings in the manhole with plugs and a rubber ring "donut" type plug inserted inside the opening of the cone.
    - b. Attach a small vacuum pump to a hose connected to the plug and apply 4 pounds per square inch of vacuum:
      - 1) Allow vacuum to stabilize at 3.5 pounds per square inch for 1 minute, then begin the test.
      - 2) The manhole must maintain vacuum such that no greater than 0.5 pounds per square inch of vacuum is lost during the specified test period.
    - c. The specified test period is as follows:
- | Manhole Depth (Feet) | Minimum Test Period (Minutes) |
|----------------------|-------------------------------|
| 0-5                  | 4.5                           |
| 5-10                 | 5.5                           |
| 10-15                | 6.0                           |
| Greater than 15      | 6.5                           |
- d. Patch as required and retest manholes that fail the test.
  - e. Provide a vacuum regulator on the vacuum pump such that no greater than 4 pounds per square inch can be applied to the manhole during the test.
  - f. Repair all manholes that do not meet the leakage test, or are unsatisfactory from visual inspection:
    - 1) Retest after repair is completed.

END OF SECTION



## SECTION 02240

### DEWATERING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Installation and maintenance of dewatering systems.
  - 2. Disposal of water entering excavation or other parts of the work.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 03300 - Cast-in-Place Concrete.
    - b. Section 03600 - Grouting.

##### 1.02 REFERENCES

- A. National Electrical Manufacturers Association (NEMA):
  - 1. 250 – Enclosures for Electrical Equipment (1000 V Maximum).

##### 1.03 DEFINITIONS

- A. NEMA Type 4X enclosure in accordance with NEMA 250.

##### 1.04 SYSTEM DESCRIPTION

- A. Design requirements:
  - 1. Keep excavations reasonably free from water. Draw down static groundwater level to minimum of 3 feet below anticipated bottom of excavations before the excavation reaches bottom elevation.
  - 2. Dewatering design analysis. Include following:
    - a. Evaluation of anticipated subsurface conditions.
    - b. Required well spacing.
    - c. Diameter of wells.
    - d. Depth to screen, screen height, and mesh size.
    - e. Backfill and filter pack.
    - f. Pump size.
    - g. Drawdown duration.
    - h. Drawdown and steady state flow rates.
    - i. Plans for de-silting of groundwater before discharge.
    - j. Expected settlements.

3. Include water drawdown curves in dewatering calculations.
  4. Coordinate dewatering design with excavation and shoring design. Excavation and shoring design shall consider changes in groundwater conditions and associated earth pressures.
  5. Do not place concrete or masonry foundations or concrete slabs in water. Do not allow water to rise over these elements until concrete or mortar has set for at least 24 hours.
  6. Maintain operation of dewatering system until complete structure -- including walls, slabs, and other structural elements -- has been constructed; concrete has attained its specified compressive strength; and backfill has been completed to finished grade.
  7. Provide standby power to ensure continuous dewatering in case of power failure.
- B. Dewatering shored excavations:
1. Dewater from within shoring.
  2. Use impermeable shoring system to minimize lowering of groundwater outside shoring.
  3. Extend impermeable shoring below bottom of excavation sufficient amount to:
    - a. Minimize lowering of groundwater outside shoring.
    - b. Prevent unstable excavation due to piping and heave.
  4. To minimize settlement outside shoring due to dewatering, do not lower groundwater outside shoring more than 1 foot. Provide groundwater recharge if required to maintain this groundwater elevation outside of shoring.
  5. Provide monitoring wells located outside shoring for monitoring groundwater elevation.
- C. Obtain written permission from Engineer before locating wells, well points, or drain lines for dewatering within the limits of a structure's foundation.
- D. Locate dewatering facilities where they will not interfere with utilities and construction work to be performed by others.
- E. Discharge.
1. Discharge water to sanitary sewer.
  2. Discharged water must meet regional water quality control board discharge permit requirements for Sausalito-Marín City Sanitary District Wastewater Treatment Plant as outlined in appendix C.

## 1.05 SUBMITTALS

- A. Dewatering plan:
1. Dewatering design analysis.
  2. Required permits.
  3. Arrangement, location, and depths of dewatering system components.
  4. Type and sizes of filters.
  5. Identify proposed alignment, support, and protection for discharge pipe. Identify location of discharge and provide details for that location.
- B. Well construction logs. Include:
1. Descriptions of actual materials encountered, categorized in accordance with an accepted standard.
  2. Construction details.

3. Well development procedures and results.
  4. Deviations from original design.
- C. Qualifications:
1. Dewatering contractor.
  2. Dewatering design engineer.
  3. Testing laboratory.

## **1.06 QUALITY ASSURANCE**

- A. Dewatering plan and dewatering system analysis:
1. Prepared by a qualified Civil Engineer, licensed in the state where the Project is located:
    - a. The dewatering design engineer shall have at least 8 years of experience in designing similar systems.
- B. Submit qualifications of Dewatering Contractor, the Dewatering Design Engineer, sampling service, and testing laboratory.
- C. Regulatory requirements:
1. Obtain required water discharge permits.

## **PART 2 PRODUCTS**

Not Used

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. During construction, provide and maintain ample means and devices to promptly remove and properly dispose of water entering excavation or other parts of the work, whether water is surface water or underground water.
- B. Keep excavations reasonably free of water.
- C. Make provisions to maintain continuous dewatering:
1. Provide standby power to maintain dewatering during power outages and interruptions.
  2. Provide 24-hour monitoring by personnel skilled in operation and maintenance of the system, and capable of providing or obtaining work required to maintain system operation.
- D. Intercept and divert precipitation and surface water away from excavations. Use dikes, curb walls, ditches, pipes, sumps, or other means acceptable to Engineer.
- E. Disposal of water:
1. Dispose of water from the work in suitable manner without damage to adjacent property.

2. Do not drain water into work built or under construction.
  3. Dispose of water in such manner that it will not be a menace to public health or safety.
- F. Wells, well points, and drain lines for dewatering:
1. Provide after receiving Engineer's written acceptance.
  2. Fill dewatering wells, pipes, and french drains to be left in place within structure foundation limits with Class "C" concrete as specified in Section 03300 or grout as specified in Section 03600.

### **3.02 CONSTRUCTION**

- A. Prior to release of groundwater to its static level: Confirm that:
1. All groundwater pressure relief devices for structure are fully operational.
  2. Construction of structure is complete and concrete has reached its specified compressive strength.
  3. Backfill of structure is complete.
- B. Control release of groundwater to its static level to prevent disturbance of natural foundation soils or compacted backfills and fills and to prevent flotation or movement of structures, pipelines, or other facilities.

END OF SECTION

## SECTION 02260

### EXCAVATION SUPPORT AND PROTECTION

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Requirements for designing, providing, maintaining, and removing excavation support and protection.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01060 - Regulatory Requirements and Permits.
    - b. Section 02240 - Dewatering.
    - c. Section 02312 - Controlled Low Strength Material (CLSM).

##### 1.02 REFERENCES

- A. American Society of Civil Engineers (ASCE):
    - 1. Guidelines of Engineering Practice for Braced and Tied-Back Excavations.
  - A. California Code of Regulations (CCR):
    - 1. Title 8 - Industrial Relations:
      - a. Division 1. Department of Industrial Relations:
        - 1) Chapter 4. Division of Industrial Safety:
          - a) Subchapter 4. Construction Safety Orders:
            - (1) Article 6. Excavations.
- B. Department of the Navy Naval Facilities Engineering Command (NAVFAC):
  - 1. Design Manual 7.2 - Foundations and Earth Structures.
  - 2. Design Manual 7.3 - Soil Dynamics and Special Design Aspects
- C. State of California Department of Transportation (Caltrans):
  - 1. Caltrans California Trenching and Shoring Manual.
- D. United States Steel Corporation (USS):
  - 1. Steel Sheet Piling Design Manual.

### 1.03 DEFINITIONS

- A. General Engineering Design Practice: General engineering design practice in area of the Project, performed in accordance with recent engineering literature on subject of shoring and stability of excavations.
- B. Shoring: A temporary structural system designed to support vertical faces, or nearly vertical faces, of soil or rock for purposes of excavation. Shoring includes cantilevered sheet piling, internally braced sheet piling, slurry walls, soldier piles and lagging, and other similar shoring systems. Sloping of the soil is not shoring.
- C. Support levels: Level of tiebacks, wales, rackers, bottom of excavation, and other types of support.

### 1.04 SYSTEM DESCRIPTION

- A. Where General Engineering Design Practice is specified, provide drawings and calculations that are performed and signed performed by civil or structural engineer registered in State where Project is located:
  - 1. Clearly disclose assumptions made, criteria followed, and stress values used for materials being used in design calculations.
  - 2. Submit list of references acceptable to Engineer that substantiating appropriateness of design assumptions, criteria, and stress values.
- B. Design requirements:
  - 1. General:
    - a. In accordance with requirements in CCR, Title 8, Chapter 4, Subchapter 4, Article 6 for trench excavations 5 feet or more in depth and for trenches less than 5 feet in depth when there is potential for cave-in:
      - 1) Where such designs vary from excavation support standards set forth in CCR, Title 8, Chapter 4, Subchapter 4, Article 6, submit design calculations pursuant to general engineering design practice.
      - 2) Provide means for safe and stable excavations that are not less effective than required in CCR, Title 8, Chapter 4, Subchapter 4, Article 6.
      - 3) The preceding requirement do not apply to trench excavation support conforming to standards set forth CCR, Title 8, Chapter 4, Subchapter 4, Article 6.
    - b. Dewatering:
      - 1) Dewater soil inside shoring as specified in Section 02240.
      - 2) Do not lower groundwater outside of shoring more than 1 foot.
      - 3) Recharge groundwater outside shoring to limit groundwater draw down outside of shoring to amount specified above.
    - c. When electing to design with material stresses for temporary construction higher than allowable stresses prescribed in California Building Code (CBC), Title 24, Part 2 – 2013, increase in such stresses shall not exceed 10 percent of value of prescribed stresses.
    - d. Minimum safety factor used for design shall not be less than 1.5.
    - e. The calculated minimum depth of penetration of shoring below bottom of excavation shall be increased not less than 30 percent if full value of allowable passive pressure is used in design.

- f. Maximum height of cantilever shoring above bottom of excavation shall not exceed 15 feet. Use braced shoring when height of shoring above bottom of excavation exceeds 15 feet.
  - g. The location of point of fixity for shoring shall not be less than half calculated minimum embedment depth below bottom of excavation.
  - h. Generally acceptable references for design of shoring and excavations are as follows:
    - 1) ASCE Guidelines of Engineering Practice for Braced and Tied-Back Excavations.
    - 2) Caltrans California Trenching and Shoring Manual.
    - 3) NAVFAC Design Manual 7.2.
    - 4) NAVFAC Design Manual 7.3.
    - 5) USS Steel Sheet Piling Design Manual.
  - i. Maximum total deflection of shoring at any point on shoring shall not be more than 3/4 inch.
  - j. Shoring engineering firm shall obtain errors and omissions insurance for Project for an amount of not less than 500,000 dollars.
2. Soldier piles and lagging:
- a. Provide lagging over full face of excavation. Joints between pieces of lagging shall be tight to prevent loss of soil.
  - b. Provide full face lagging all around penetrations through lagging.
  - c. If the soldier piles are installed in predrilled holes and are not concrete encased, fill predrilled holes with controlled low strength material as specified in Section 02312 after soldiers piles are installed.
  - d. Assumed effective width for passive soil resistance:
    - 1) Effective width of driven soldier piles shall not exceed 2 times width of pile.
    - 2) Effective width of CLSM encased soldier piles in drilled holes shall not exceed 2 times width of pile.
    - 3) Effective width of concrete encased soldier piles shall not exceed 2 times width of concrete encasement.
  - e. Fill voids behind lagging with gravel or other material acceptable to Engineer.
  - f. Apply loads from tie back soil, rock, or deadman anchors concentrically to soldier piles or wales spanning between soldier piles:
    - 1) Wales shall be back-to-back double channels or other members acceptable to Engineer.
    - 2) Do not eccentrically load structural section of soldier piles or wales.
  - g. Design soldier piles for downward loads including vertical loads from tieback anchors.
3. Soil anchors, rock anchors, and deadmen anchors:
- a. Design tieback anchors for a safety factor of not less than 2 times calculated load from shoring.
  - b. Proof load all production anchors to 125 percent of calculated load from shoring.
  - c. Lock off production anchors at calculated load from shoring.
  - d. Length of soil anchors used to calculate resistance to load from shoring shall not include any length within potential active pressure soil failure zone behind face of shoring.
  - e. Design tie rods for tieback anchors for 130 percent of calculated load from shoring.

- f. Design tie rods for tieback anchors for 150 percent of the calculated load from shoring when tie rod couplers are used and for other conditions where stress concentrations can develop.
  - 4. Set inside face of shoring back from structure not less than greater of following:
    - a. 5 feet from face of wall.
    - b. 2 foot 6 inches from edge of foundation.
    - c. Depth of excavation below bottom of foundation.
- C. Performance requirements:
- 1. General:
    - a. Support faces of excavations and protect structures and improvements in vicinity of excavations from damage and loss of function due to settlement or movement of soils, alterations in ground water level caused by such excavations, and related operations.
    - b. Specified provisions:
      - 1) Complement, but do not substitute or diminish, obligations of Contractor for furnishing of safe place of work pursuant to provisions of the Occupational Safety and Health Act of 1970 and its subsequent amendments and regulations and for protection of Work, structures, and other improvements.
      - 2) Represent minimum requirement for:
        - a) Number and types of means needed to maintain soil stability.
        - b) Strength of such required means.
        - c) Methods and frequency of maintenance and observation of means used for maintaining soil stability.
  - 2. Provide safe and stable excavations by means of sheeting, shoring, bracing, sloping, and other means and procedures, such as draining and recharging groundwater and routing and disposing of surface runoff, required to maintain stability of soils and rock.
  - 3. Provide support for trench excavations for protection of workers from hazard of caving ground.
  - 4. Provide shoring:
    - a. Where, as result of excavation work and analysis performed pursuant to general engineering design practice, as defined in this Section:
      - 1) Excavated face or surrounding soil mass may be subject to slides, caving, or other types of failures.
      - 2) Stability and integrity of structures and other improvements may be compromised by settlement or movement of soils, or changes in soil load on structures and other improvements.
    - b. For trenches 5 feet and deeper.
    - c. For trenches less than 5 feet in depth, when there is potential for cave-in.
  - 5. For safe and stable excavations, use appropriate design, construction, and maintenance procedures to minimize settlement of supported ground and to prevent damage to structures and other improvements, including:
    - a. Using stiff shoring systems.
    - b. Following appropriate construction sequence.
    - c. Using shoring system that is tight enough to prevent soil loss through the shoring.
    - d. Using shoring system that extends far enough below bottom of excavation to prevent piping, heave, or flow of soil under shoring.
    - e. Design for safety factor of not less than 1.50.



- f. Providing surface runoff routing and discharge away from excavations.
- g. Where dewatering inside shoring is necessary, recharge groundwater outside shoring as necessary to prevent settlement in area surrounding shored excavation.
- h. Where sheet piling is used, use interlocking type sheets:
  - 1) Sheet piles shall be continuous and driven in interlock.
  - 2) If bottom of the excavation is located below the water table, use "ball and socket" or "thumb and finger" type interlock.
- i. Not applying shoring loads to existing structures and other improvements.
- j. Not changing existing soil loading on existing structures and other improvements.
- k. Provide welded steel packing between soil retaining members such as sheet piles and wales and similar members when gap exceeds 1/2 inch before wales are loaded.

## 1.05 SUBMITTALS

- A. Shop drawings and calculations:
  - 1. Calculations for different load, support, and other conditions that occur during the sequence of installation of shoring, construction of facilities protected by shoring, and sequence of removal of shoring.
  - 2. Sketches showing the condition at various stages of installation and removal of shoring.
  - 3. Show on plan shoring, structures, pipelines, and other improvements located near shoring.
  - 4. When utilities penetrate shoring, show location of penetrations on elevation of all sides of shoring.
  - 5. Show details for ground support and sealing around utility penetrations.
  - 6. Indicate method used for installing driven shoring.
- B. Written geotechnical report with soil characteristics and shoring design recommendations.
- C. Control points and schedule of measurements:
  - 1. Submit location and details of control points and method and schedule of measurements.
  - 2. Survey data.
- D. Detailed sequence of installation and removal of shoring:
  - 1. Consider effects of ground settlement in sequence of installation and removal of shoring.
  - 2. Provide sketches showing conditions at various stages in sequence of installation and removal of shoring.
- E. Submit submittals for excavation support and protection as complete package and include all items required in this Section:
  - 1. Incomplete submittals will not be reviewed and will be returned for resubmittal as complete package.
- F. Submit dewatering submittals as specified in Section 02240 with submittals for excavation support and protection.

## 1.06 SEQUENCING

- A. Do not begin construction of any shoring or excavation operations until:
  - 1. Submittals for shoring and dewatering have been accepted.
  - 2. Control points as specified in this Section have been established and surveyed to document initial elevations and locations.
  - 3. Materials necessary for installation are on site.
- B. Submit submittals minimum of 30 days prior to scheduled date to begin excavation work.

## PART 2 PRODUCTS

Not Used.

## PART 3 EXECUTION

### 3.01 CONSTRUCTION

- A. Installation of shoring:
  - 1. Install means for providing safe and stable excavations as indicated in submittals.
- B. Removal of shoring:
  - 1. Except for concrete encased soldier piles, slurry walls, and similar shoring systems, remove shoring by completion of Work.
  - 2. Select shoring system and method of removal, which will minimize soil that sticks to shoring from creating voids and causing settlement.
  - 3. To prevent settlement caused by pulling shoring, fill voids with pressure injected grout:
    - a. Inject grout starting at bottom of void and progressively fill void to grade.
    - b. Minimize length of shoring removed ahead of grouting operation and limit time void is left ungrouted to prevent void from closing up before being grouted.
  - 4. Pressure preservative treated wood lagging may be left in place if acceptable to Engineer.
- C. Control points:
  - 1. Establish control points on shoring and on structures and other improvements in vicinity of excavation for measurement of horizontal and vertical movement:
    - a. Set control points on shoring support system:
      - 1) Set points at distances not exceeding 25 feet at each support level.
  - 2. Promptly upon completion of construction of control points survey control points. Submit copy of field notes with measurement.
  - 3. Perform horizontal and vertical survey and measurement of control points at least once every week:
    - a. Field notes shall show current measurement and change in measurement from first measurement taken.

D. Maintenance:

1. Where loss of soil occurs, plug gap in shoring and replace lost soil with fill material acceptable to Engineer.
2. Where measurements and observations indicate possibility of failure or excessive movement of excavation support, determined in accordance with general engineering design practice, take appropriate action immediately.

END OF SECTION

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## SECTION 02312

### CONTROLLED LOW STRENGTH MATERIAL (CLSM)

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Controlled low strength material (CLSM), also known as “flowable fill” to be used for filling abandoned pipelines and backfilling utility stress relief pits.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor’s responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor’s Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01400 - Quality Control.

##### 1.02 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. 229R - Report on Controlled Low-Strength Materials.
  - 2. 301 - Specifications for Structural Concrete.
- B. ASTM International (ASTM):
  - 1. C 94 - Standard Specification for Ready Mix Concrete.
  - 2. C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
  - 3. C 150 - Standard Specification for Portland Cement.
  - 4. C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
  - 5. C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
  - 6. D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>(2,700 kN-m/m<sup>3</sup>)).
  - 7. D 4832 - Standard Test Method of Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
  - 8. D 5971 - Standard Practice for Sampling Freshly Mixed Controlled Low Strength Material.
  - 9. D 6023 - Standard Test Method for Density (Unit Weight), Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low-Strength Material.

##### 1.03 SYSTEM DESCRIPTION

- A. Mixture of portland cement, water, pozzolan, fine aggregate and admixtures, proportioned in accordance with the recommendations of ACI 229 to produce a homogeneous mixture that is flowable, that will readily work into corners and

angles; that will not segregate in the plastic state; and that is self-compacting at the time of placement without the use of mechanical vibration.

- B. Performance requirements:
  - 1. Air content, total calculated in accordance with ASTM D 6023: Not less than 8.0 percent, nor greater than 12.0 percent.
  - 2. Compressive strength, measured in accordance with ASTM D 4832 at 28 days: Not less than 50 pounds per square inch, nor greater than 150 pounds per square inch.
  - 3. Wet density: Not greater than 132 pounds per cubic foot.
  - 4. Slump, measured in accordance with ASTM C 143 at the point of placement: Greater than 9 inches and that allows CLSM to flow freely and to be self-compacting during placement.

#### **1.04 SUBMITTALS**

- A. Product data: Submit data completely describing materials in the mix and demonstrating compliance with the requirements of this Section:
  - 1. Cement: Mill tests. Indicate alkali content representative of each shipment.
  - 2. Fly ash: Identify source and type of fly ash.
  - 3. Water: Identify source and quality if not from a municipal treatment source.
  - 4. Admixtures: Manufacturer's product data indicating suitability for use in CLSM mixes and recommended dosage rates.
  - 5. Aggregate:
    - a. Submit source, type, and sieve analyses. Resubmit at any time there is a significant change in grading of materials.
- B. Mix design:
  - 1. Submit full details, including mix design calculations for mix proposed for use.
  - 2. Trial batch test data:
    - a. Submit data for each test cylinder.
    - b. Submit data that identifies mix and slump for each test cylinder.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- A. Store or stockpile cement, fly ash, and aggregate in accordance with ACI 301.
- B. Store admixtures in accordance with the manufacturer's recommendations.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Cement:
  - 1. Portland cement in accordance with ASTM C 150, Type I or Type II.
  - 2. Having total alkali content not more than 0.60 percent.
- B. Fly ash: Class C or Class F fly ash in accordance with ASTM C 618.
- C. Water:
  - 1. Potable water. Clean and free from oil and deleterious amounts of alkali, acid, organic matter, or other substances.

- D. Admixtures: Products of a single manufacturer, specifically manufactured or recommended by that manufacturer for use in CLSM:
  - 1. Air entraining admixture: In accordance with ASTM C 260.
- E. Aggregate:
  - 1. Non-expansive, non-reactive, inert natural sand conforming to the following requirements:
    - a. Not more than 12 percent passing a No. 200 sieve.
    - b. No plastic fines present.
    - c. Including pea gravel no larger than 3/8 inch.

## **2.02 MIXES**

- A. See System Description for performance requirements of the plastic and hardened mix.

## **2.03 SOURCE QUALITY CONTROL**

- A. Trial batch:
  - 1. After mix design has been accepted by Engineer, have trial batch of the accepted mix design prepared by testing laboratory acceptable to Engineer.
  - 2. Prepare trial batches using the specific cement, fly ash, admixtures, aggregates, and water proposed for the Work.
  - 3. Prepare trial batch with quantity sufficient to determine slump, workability, and consistency; and to provide test cylinders as indicated in the following paragraphs.
- B. Trial batch testing:
  - 1. Determine slump in accordance with ASTM C 143, with the following modifications:
    - a. Do not rod the concrete material.
    - b. Place material in slump cone in one semi-continuous filling operation, slightly overfill, tap lightly, strike off, and then measure and record slump.
  - 2. Prepare and test trial batch specimens in accordance with ASTM D 4832, with the following modifications:
    - a. Provide cylindrical test specimens, each 6-inches in diameter by 12-inch high.
    - b. Provide a minimum of 8 cylinders for testing of each trial batch.
    - c. Fill the molds to overflowing and tap sides lightly to settle the mix.
    - d. Do not rod the mix for consolidation in the cylinder.
    - e. Strike off the excess material.
  - 3. Place test cylinders in a moist curing room. Exercise caution in moving and transporting the cylinders since they are fragile and will withstand only minimal bumping, banging, or jolting without damage.
  - 4. Do not remove the test cylinder from mold until that cylinder is to be capped and tested:
    - a. Perform the capping carefully to prevent premature fractures.
    - b. Do not perform initial compression test until the cylinders reach a minimum age of 3 days.

5. Provide compressive strength tests:
  - a. Test 4 test cylinders at 7 days after casting, and another 4 cylinders at 28 days after casting.
  - b. The compression strength of the 4 test cylinders tested at 28 days shall be equal to or greater than the minimum required compression strength, but shall not exceed maximum compression strength.
- C. If the trial batch tests do not meet the Specifications for strength or density, revise and re-submit the mix design, prepare additional trial batch(es), and complete additional trial batch tests. Repeat until an acceptable trial batch is that conforms to the Specifications is produced:
  1. All the trial batches and acceptability of materials shall be paid by the Contractor.
  2. After acceptance, do not change the mix design without submitting a new mix design, trial batches, and test information.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Do not place CLSM until preparation and condition of surfaces receiving the fill have been observed and accepted by the Engineer.
- B. Remove debris foreign matter, and standing or running water from excavations and areas receiving CLSM before placement.
- C. Pipes and trenches:
  1. Where CLSM is placed around and over pipes, secure pipes in place, or place CLSM in lifts to prevent pipe flotation.
  2. Where CLSM is placed in long, open trenches, confine material using bulkheads of sandbags, earth dams, or stiffer concrete at open ends of placement.

### **3.02 MEASURING, BATCHING, MIXING AND TRANSPORTING**

- A. Measure, batch, mix and transport CLSM in accordance with the requirements of ASTM C 94 and this Section.
- B. Mix until there is uniform distribution of materials.
- C. Discharge mixer completely prior to recharging.
- D. After trial batch testing and mix acceptance, maintain slump during construction within plus or minus 1 inch of the design slump.

### **3.03 PLACING**

- A. Place controlled low strength material by method that preserves the quality of the material in terms of compressive strength and density.



- B. Maintain fluid properties of the mix during placement:
  - 1. At point of placement, provide material that flows easily around, beneath, or through walls, pipes, conduits, or other structures.
  - 2. Do not place CLSM that has partially hardened or that has been contaminated by foreign materials.
  - 3. Handle and place CLSM using methods that minimize segregation of the mix.
  - 4. Deposit mix as near its final position as possible to avoid segregation due to rehandling or flowing.
  - 5. Contain and confine mix while it is fluid. Design containment structures and bracing at walls and forms to withstand lateral pressures of wet mix.
- C. Water conditions:
  - 1. Do not place CLSM in standing or flowing water.
  - 2. Do not permit water to flow over the surface of freshly placed or un-hardened CLSM.
  - 3. Do not submerge CLSM in water within 24 hours after placement.
- D. Manage CLSM bleed water:
  - 1. Grade top surface of CLSM to drain away from the fill.
  - 2. Provide side containment that permits bleed water to drain to a contained management area away from the fill.

### **3.04 CURING AND PROTECTION**

- A. Protect CLSM from:
  - 1. Damage from the elements.
  - 2. Damage of any nature during surrounding construction operations.

### **3.05 FIELD QUALITY CONTROL**

- A. Provide quality control over the Work of this Section as specified in Section 01400 and as specified in this Section.
- B. General:
  - 1. Engineer inspection and acceptance required prior to placement.
  - 2. Make provisions for and furnish all material for the test specimens.

### **3.06 FIELD QUALITY ASSURANCE**

- A. Provide quality control over the work of this Section as specified in Sections 01400.
- B. Field inspections:
  - 1. Engineer shall provide on-site inspection for the Work of this Section.
  - 2. Advise Engineer of readiness to proceed at least 24 hours prior to each placement of CLSM.
  - 3. Required inspections:
    - a. Engineer will observe the prepared areas. Do not place CLSM until Engineer has observed and accepted preparations.
  - 4. Record of inspections.

- C. Field sampling and testing:
1. During construction, Contractor shall provide sampling and testing to determine whether the CLSM, as produced and placed, complies with the requirements specified.
  2. Sample CLSM for testing in accordance with ASTM D 5971.
  3. Required tests:
    - a. Air content: Prepare sample and test in accordance with ASTM D 6023.
    - b. Compressive strength: Prepare and test cylinder specimens in accordance with ASTM D 4832:
      - 1) Prepare 6-inch diameter by 12-inch high specimens for testing:
        - a) Provide one set of specimens for each 150 cubic yards of CLSM placed, but not less than 1 set for each half day's placement.
        - b) Prepare and test not less than 3 cylinders for each set.
        - c) Place CLSM in the molds in accordance with ASTM D 4832. Do not rod or otherwise consolidate the material in the mold.
        - d) In accordance with ASTM D 4832 recommendations for displacing bleed water at the top of the molds and refilling the molds before covering with a lid. Do not use air-tight lids.
      - 2) Place the cylinders in a safe location away from construction activities.
        - a) Protect cylinders from bumping and impact.
        - b) Maintain temperature surrounding cylinders between 60 and 80 degrees Fahrenheit until delivery to the laboratory for testing.
        - c) After the first day, surround molds with a high humidity environment by covering with wet burlap, or equivalent highly absorptive material. Maintain saturation of the cover. Do not sprinkle water directly on the cylinders.
      - 3) After 4 days, place the cylinders in a protective container for transport to the laboratory for testing:
        - a) Exercise caution in moving and transporting the cylinders since they are fragile and will withstand only minimal bumping, banging, or jolting without damage.
        - b) Transport container may be a box with a Styrofoam or similar lining that will limit jarring and bumping of the cylinders.
      - 4) Upon receipt at the testing laboratory, place test cylinders in a moist curing room until dates for testing.
      - 5) Do not remove test cylinders from molds until the day that cylinders are to be capped and tested.
      - 6) Cap and test for compressive strength in accordance with ASTM D 4832:
        - a) Do not perform initial compression test until the cylinders reach an age of at least 4 days.
        - b) Test 1 cylinder at 7 days and 2 at 28 days.
      - 7) Compressive strength of the cylinders tested at 28 days shall be equal to or greater than the minimum required compression strength, but shall not exceed maximum compression strength specified.

### **3.07 NON-CONFORMING WORK**

- A. When testing or observation indicates CLSM with properties outside the specified and accepted range, Engineer will issue instructions regarding disposition of nonconforming materials.
- B. Engineer may:
  - 1. Reject CLSM represented by those test specimens and require its removal and replacement.
  - 2. Require modification of the mix design to provide CLSM with the properties specified.
- C. Make such modifications at no additional expense to the Owner and with no adjustment to the schedule.

END OF SECTION

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## SECTION 02318

### TRENCHING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Trench excavation, fine grading, pipe bedding, backfilling, and compaction for the following, including requirements for ditch crossings:
  - 1. Pipes.
  - 2. Manholes, valves, or other accessories.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 02050 - Soils and Aggregates for Earthwork.
    - b. Section 02240 - Dewatering.
    - c. Section 02260 - Excavation Support and Protection.
    - d. Section 02620 - Filter Fabric.
    - e. Section 15956 - Piping Systems Testing.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
  - 2. D 1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3  - 3. D 6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).</sup>

##### 1.03 SUBMITTALS

- A. Lab certification.
  
- B. Confirmation test reports.

## 1.04 QUALITY ASSURANCE

- A. Initial compaction demonstration:
  - 1. Adequacy of compaction equipment and procedures: Demonstrate adequacy of compaction equipment and procedures before exceeding any of following amounts of earthwork quantities:
    - a. 200 linear feet of trench backfill.
  - 2. Compaction sequence requirements: Until specified degree of compaction on previously specified amounts of earthwork is achieved, do not perform additional earthwork of the same kind.
  - 3. After satisfactory conclusion of initial compaction demonstration and at any time during construction, provide confirmation tests as specified under "FIELD QUALITY CONTROL."

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Soil and rock materials:
  - 1. Aggregate base course material: As specified in Section 02050.
  - 2. Native material: As specified in Section 02050.
  - 3. Stabilization material: As specified in Section 02050.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. General:
  - 1. Embankment condition:
    - a. Exists where width of trench exceeds limits specified in this Section.
    - b. Before laying pipes in fill, place fill and compact it to not less than 2 feet above top of pipe.
    - c. After placing and compacting fill, excavate pipe trench through fill.
- B. Protection: Stabilize trench excavations as specified in Section 02260.

### 3.02 INSTALLATION

- A. Trench excavation:
  - 1. General requirements:
    - a. If, because of soil conditions, safety requirements, or other reasons, trench width at top of pipe is increased beyond width specified in this Section, upgrade laying conditions or install stronger pipe designed in conformance with Specifications for increased trench width, without additional cost to Owner.
    - b. Excavate bottom of trench to depth indicated on the Drawings. The bottom of the trench excavation shall be firm and dry.
  - 2. The trench may be excavated by machinery to the grade indicated on the Drawings provided that the soil material remaining in the bottom of the trench is no more than slightly disturbed.

3. Rock:
  - a. Pipe: If bottom of trench excavation is found to consist of rock or any material that by reason of its hardness cannot be excavated to provide uniform bearing surface, remove such rock or other material to a depth of not less than 4 inches below bottom of fine grading material. Backfill overcut with aggregate base course material compacted to 95 percent of maximum density up to bottom of fine grading material.
4. Overcut of trench bottom: Where the bottom of the trench is excavated below the depth indicated on the Drawings, restore trench bottom to proper grade by back filling with aggregate base course material compacted to 95 percent of maximum density, at no additional cost to Owner.
5. Soft or unstable material:
  - a. If bottom of excavation is found to consist of soft or unstable material which is incapable of providing proper support, remove such material to a depth and for the length required, as determined by the Engineer. Backfill trench to bottom of fine grading material with stabilization material wrapped in trench filter fabric per Section 02620 and compacted to 90 percent of maximum density.
6. Trench widths:
  - a. Minimum clear width of trench for pipe (measured at top of pipe):
    - 1) For pipe sizes 4 inches to and including 24 inches: Not less than outside diameter of pipe plus 18 inches.
  - b. Maximum clear width of trench for pipe (measured at top of pipe):
    - 1) For pipe sizes 4 inches to and including 24 inches: Not to exceed outside diameter of pipe plus 24 inches.
7. Maximum length of open trench:
  - a. The maximum length of open trench where prefabricated pipe is to laid shall be the distance necessary to accommodate that amount of pipe, which can be installed and backfilled in that same day, but in no case shall exceed 400 feet:
    - 1) Plates and plating supplies for the immediate work zone must be readily available to provide emergency access if necessary.
  - b. During the work day, the trench shall be plated over with properly secured, traffic rated trench plates, except in the immediate work zone.
  - c. At the end of each working day, there shall be no open trench unless it is plated in accordance with these Specifications. Contractor may use hot asphalt temporary paving in lieu of plating as allowed by City encroachment permit.
  - d. Trench plating requirements apply to sewer mains, storm drains, and lateral trenches.
8. For manholes or other accessories:
  - a. Provide excavations sufficient to leave at least 12 inches clear between their outer surfaces and sides of trench or shoring.
  - b. Backfilling of manhole excavation: Conform to backfilling requirements as specified for trenches in this Section.
  - c. Backfill under manholes or catch basins with aggregate base course material. Do not backfill with soil.
  - d. Fill any unauthorized excess excavation below elevation indicated on the Drawings for foundation of any structure with aggregate base course material at no additional cost to Owner.

9. At road crossings or existing driveways:
  - a. Make provision for trench crossings at these points, either by means of backfills, tunnels, or temporary bridges.
- B. Dewatering: As specified in Section 02240.
- C. Pipe fine grading:
  1. Schedule fine grading material as specified in this Section.
  2. For pipes 16 inches in nominal diameter and under:
    - a. Place 4 inches of fine grading material below bottom of pipe.
    - b. Place fine grading material at uniform density, with minimum possible compaction.
  3. For pipe over 16 inches in diameter:
    - a. Place 4 inches, or 1/12 the outside diameter of pipe, whichever is greater, of fine grading material below bottom of pipe.
    - b. Place fine grading material at uniform density, with minimum possible compaction.
  4. Bell or coupling holes:
    - a. Dig holes after trench bottom has been graded.
    - b. Provide holes of sufficient width to provide ample room for grouting, banding, or welding.
    - c. Excavate holes only as necessary for making joints and to ensure that pipe rests upon prepared trench bottom and not supported by any portion of the joint.
  5. Depressions for joints, other than bell-and-spigot:
    - a. Make in accordance with recommendations of joint manufacturer for particular joint used.
- D. Pipe bedding:
  1. Schedule bedding material as specified in this Section.
  2. After pipe laid:
    - a. Place bedding material under and around pipe in 6 inch maximum lifts of bedding material, to level 12 inches above top of pipe. Compact to 90 percent of maximum density.
  3. Pipe displacement:
    - a. Take necessary precautions in placement and compaction of bedding material to prevent displacement of piping.
    - b. In event there is movement or floating of the piping, re-excavate, re-lay, and backfill the pipe.
- E. Trench backfill above pipe bedding:
  1. Under structures:
    - a. Backfill trench up to underside of structure with aggregate base course material as specified in Section 02050 compacted to 95 percent of maximum density.
  2. Cuts across roadways and paved streets:
    - a. Backfill trench to underside of pavement with aggregate base course material as specified in Section 02050 compacted to 95 percent of maximum density.



3. Under and parallel to roadways, paved areas, or storage areas:
    - a. Backfill trench up to within 2 feet of finish grade with aggregate base course material as specified in Section 02050 compacted to 90 percent of maximum density.
    - b. Then backfill from 2 feet below finish grade to finish grade, or underside of aggregate base course or pavement as indicated on the Drawings with aggregate base course material as specified in Section 02050, compacted to 95 percent of maximum density.
  4. Through earth slopes adjacent to, or supporting structures:
    - a. Backfill to finish grade with aggregate base course material or select material compacted to 95 percent of maximum density.
- F. Under existing intersecting pipes or conduits larger than 3 inches in diameter:
1. Backfill from bottom of new pipe trench to spring line of intersecting pipe or conduit with aggregate base course material, as specified in Section 02050, compacted to 90 percent of maximum density.
  2. Extend aggregate base course material as specified in Section 02050 two feet on either side of intersecting pipe or conduit to ensure that material remains in place while other backfill is being placed.
  3. Backfill remainder of trench as specified in "Trench backfill above pipe bedding and for conduits and duct banks" above.
- G. Compaction:
1. In-place density of compacted trench backfill, and bedding determined in accordance with ASTM D 1556, or with ASTM D 6938.
  2. Maximum density obtained in laboratory when tested in accordance with ASTM D 1557.
  3. Consolidation:
    - a. Do not use water settling methods such as flooding, poling, or jetting.
- H. Excess material:
1. Remove excess excavated material from the Project site and dispose of legally off site.
  2. Include wasting of excess material, if required, in cost of work to be performed.

### 3.03 FIELD QUALITY CONTROL

- A. Tests:
1. Confirmation tests: Performed by Owner:
    - a. Contractor's responsibilities:
      - 1) Accomplish specified compaction of trench backfill.
      - 2) Control operations by confirmation tests to verify and confirm that compaction work complies, and is complying at all times, with requirements specified in this Section concerning compaction, control, and testing.
      - 3) Cost of confirmation tests: Paid for by the Owner.
      - 4) Copies of confirmation test reports: Submit promptly to the Engineer.
    - b. Frequency of confirmation testing:
      - 1) Perform testing not less than as follows:
        - a) For trenches: At each test location include tests for each type or class of backfill from bedding to finish grade.
        - b) Crossing paved roads: 2 locations along each crossing.

- c) Under pavement cuts or within 2 feet of pavement edges:  
1 location every 400 linear feet.
  - 2. Compliance tests:
    - a. Frequency of testing: Periodic compliance tests will be made by the Engineer to verify that compaction is meeting requirements previously specified.
    - b. If compaction fails to meet specified requirements: Perform remedial work by one of the following methods:
      - 1) Remove and replace backfill at proper density.
      - 2) Bring density up to specified level by other means acceptable to the Engineer.
  - 3. Retesting:
    - a. Costs of retesting: Contractor is responsible for the costs of retesting required to confirm and verify that remedial work has brought compaction within specified requirements.
    - b. Contractor's confirmation tests during performance of remedial work:
      - 1) Performance: Perform tests in manner acceptable to the Engineer.
      - 2) Frequency: Double amount specified for initial confirmation tests.
- B. Piping system testing:
- 1. As specified in Section 15956.

### **3.04 SCHEDULES**

- A. Pipe fine grading materials:
  - 1. Fine grading material shall be the same as bedding material.
- B. Bedding materials:
  - 1. Pipes:
    - a. For pipe less than 16-inch nominal size: Except as otherwise specified, use aggregate base course material.
    - b. For pipe from 16- inch to 48-inch nominal size: Except as otherwise specified, use aggregate base course material.

END OF SECTION

## SECTION 02501

### SEWER CLEANING AND CCTV INSPECTION

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. This specification defines the requirements for cleaning and internal closed circuit television (CCTV) inspection of sewer pipelines and laterals.
- B. Provide all materials, labor and equipment necessary to complete the sewer and lateral cleaning and CCTV work in a safe and responsible manner in accordance with all laws and regulations.
- C. Related Sections:
  - 1. Section 01300 - Submittals.
  - 2. Section 01550 - Traffic Control.
  - 3. Section 02552 - Temporary Bypass Pumping.

##### 1.02 SYSTEM DESCRIPTION

- A. General:
  - 1. Inspect new pipeline interior to identify defects using CCTV equipment.
- B. Equipment:
  - 1. CCTV Equipment:
    - a. Lights, lens, cables, etc. shall be intrinsically safe and operational in submerged, partially submerged and 100 percent humidity conditions.
    - b. Designed to be completely operational in sanitary sewage environments found in sewer pipelines including but not limited to floating and submerged debris, high hydrogen sulfide concentrations, varying liquid levels, and varying temperatures.
    - c. Designed for use in pipelines of the same size and water depth as those anticipated in this project.
    - d. Maximum rate of travel while recording: 30 feet per minute.
    - e. Provide footage counter device measuring the distance traveled by the camera in the pipeline with a minimum accuracy of plus or minus 2 feet in 1,000 feet.
    - f. Provide a clear and in-focus view of the entire inside periphery of the pipeline.
    - g. Include pan and zoom capabilities.
    - h. Record in full color.
    - i. Camera lens with a minimum 65 degree viewing angle and either automatic or remain in focus and iris controls.
    - j. Image down the center axis of the pipe when the camera is in motion to provide a 360-degree view of the pipe interior.
  - 2. Cabling System:
    - a. Pull CCTV equipment through the pipeline using a mechanical or power driven winch.

- b. Provide a camera capable of being pulled through the pipeline in either direction.
- c. Use a cabling system that will not obstruct the camera view or interfere with proper documentation of the pipeline conditions.
- d. The CONTRACTOR shall be responsible for modifications to his equipment and/or inspection procedures to achieve video and report materials of acceptable quality. No work shall commence prior to approval of the video and report materials by the OWNER or OWNER's Representative. Once accepted, the video and report materials shall serve as a standard for the remaining work.

### **1.03 SUBMITTALS**

- A. Shop drawings or informational literature on the proposed debris basket or cleaning equipment.
- B. Qualifications of the personnel assigned to perform the pipeline cleaning and CCTV inspection work.
- C. Catalog cuts and supporting information on the proposed CCTV equipment to be used for this project.
- D. Documentation that the proposed equipment is of suitable size and construction to be used for the pipeline diameters and flows anticipated.
- E. Work example:
  - 1. One CD or DVD of previous inspection work completed with audio commentary and inspection logs.
  - 2. Showing operations and structural defects in pipelines of the same size and materials as the pipelines in this project.
  - 3. From the same equipment as that proposed for this project.
- F. Three copies of each finished CD or DVD showing the inspected pipelines:
  - 1. If the Engineer determines the video is defective or not of adequate quality, perform CCTV inspection of the pipeline again at no cost to the OWNER.

### **1.04 QUALIFICATIONS**

- A. Minimum of 5 years of experience or 10,000 linear feet of pipeline cleaning and CCTV inspection experience.
- B. National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP) certified.

## **PART 2 PRODUCTS**

### **2.01 DIGITAL MEDIA**

- A. High capacity CD or DVDs.
- B. Recordings of all sewer line inspections shall be made in high quality .MPG Format on, -R/+R disks formatted for use with PC systems. The Audio portion of the composite CD or DVD shall be sufficiently free from electrical interference and background noise to provide complete intelligibility of the oral report.
- C. Recordings shall be per PACP Standards.
- D. Digital Video equipment shall include genlocking capabilities to the extent that computer generated data, (i.e., footage, date, size, address, and location, etc.) as determined by the Owner can be overlaid onto video, and both indicated on the television monitor and permanently recorded on the inspection videotape.

## **PART 3 EXECUTION**

### **3.01 SEWER CLEANING**

- A. All sludge, debris, sand, rocks, bricks, wood, mud, grease, and any other solid or semi-solid material shall be removed from the sewer being cleaned. In no event shall any material be returned to the sewer or any adjacent storm drain.
- B. A debris basket or similar device designed to minimize debris from escaping down the sewer line shall be used in all cleaning operations. When hydraulic equipment is used, a suitable sand trap, weir, or dam shall be constructed in the downstream manhole in such a manner that the solids will be trapped.
- C. All debris removed from the sewer prior to construction shall be transferred to and accumulated in an appropriate covered leak proof container to be provided by CITY at its Corporation Yard at 530 Nevada Street for profiling and disposal at CITY expense. Liquid waste from the sewer may be disposed of back into the sanitary sewer system.
- D. Transportation of any removed material shall be done in vehicles or equipment specifically designed to transport this type of material in an environmentally safe and acceptable manner without dripping, spilling, scattering, leaking or blowing any material from the vehicle.
- E. CONTRACTOR is responsible for cleaning up any debris or material that falls, drips, splashes, blows or otherwise leaves the vehicles that are transporting the debris.
- F. CONTRACTOR shall be responsible for all damage to public and private property as a result of cleaning operations. The cost of restoring any damaged areas shall be borne by the CONTRACTOR at no additional cost to the OWNER.
- G. If CCTV inspection shows the cleaning to be unsatisfactory, the CONTRACTOR shall re-clean the pipeline, at no additional cost to the OWNER.

### 3.02 CCTV INSPECTION

- A. Clean the pipeline prior to start of CCTV inspection.
- B. Implement a bypass pumping system as specified in Section 02552 to provide temporary dry conditions in the pipeline:
  - 1. Coordinate any evening, night or weekend work with the OWNER.
- C. Provide the OWNER or ENGINEER access to observe the video monitor and all other CCTV operations at all times.
- D. Video Documentation:
  - 1. Automatically record position of camera within the pipeline on the video.
  - 2. Include the audio report of the operator's descriptive narrative of condition observed and stationing along sewer.
  - 3. Stop the camera at each pipe joint, service, pipe defect, and structure and use pan and zoom to record a view of each:
    - a. For structures, direct the camera upward to view the interior of each structure from the pipe level to the inside of the cover.
    - b. At pipe joints pan and zoom the camera as necessary to clearly show a 360 degree view of the joint.
    - c. At services position the camera to clearly view the inside of the service if possible.
    - d. At pipe defects, position the camera to show the extent of the defect.
  - 4. Use PACP coding and databases.
- E. Written inspection log:
  - 1. Provide in a form acceptable to the OWNER.
  - 2. Provide a separate log for each reach inspected.
  - 3. If an intermediate structure is discovered during CCTV operations, provide a separate log for the additional pipe beyond the structure.
  - 4. Provide a separate log if a reverse set-up is required.
  - 5. Provide, at a minimum, the mandatory information required by PACP.

END OF SECTION

## SECTION 02552

### TEMPORARY BYPASS PUMPING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. This section describes the requirements for temporary bypass pumping of wastewater flows as needed to complete the WORK.
- B. Related section:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01060 - Regulatory Requirement and Permits.
    - b. Section 01300 - Submittals.
    - c. Section 01550 - Traffic Control.
    - d. Section 02952 - Pavement Restoration and Rehabilitation.

##### 1.02 REFERENCES

- A. American Water Works Association (AWWA):
  - 1. C150 - Standard for Thickness Design of Ductile-Iron Pipe.
  - 2. C151 - Standard for Ductile-Iron Pipe, Centrifugally Cast.
- B. ASTM International (ASTM):
  - 1. B 241 - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
  - 2. D 3350 - Standard Specification for Polyethylene Plastic Pipe and Fittings Material.
- C. National Fire Protection Association (NFPA):
  - 1. 820 - Standard for Fire Protection in Wastewater Treatment and Collection Facilities.

##### 1.03 REQUIREMENTS

- A. Provide all services related to, but not limited to, mobilization, setup, around the clock operations and maintenance, demobilization, traffic control, permits, and all other materials, labor and equipment to install, maintain, and operate a complete continuous pumping and transport system for wastewater 24 hours per day, 7 days per week, until the portion(s) of the WORK have been completed to the satisfaction of the Engineer.

- B. The means and methods of accomplishing and maintaining the temporary bypass pumping and associated facilities is the sole responsibility of the Contractor.
- C. The temporary bypass pumping system shall be installed as a complete stand-alone system:
  - 1. Provide fuel and backup pumps for operation of the system.
- D. The temporary bypass pumping operation shall be limited to the months or seasons indicated in the WORK, unless approved in writing by the Owner.
- E. The temporary bypass pumping shall be continuously monitored.
- F. The Contractor shall be responsible for bypassing wastewater in a way that ensures that no wastewater is allowed to leak outside of the sanitary sewer system or the bypass pipelines:
  - 1. Bypass pumping shall be done in such a manner as not to damage private or public property, or create a nuisance or public menace.
  - 2. The pumped wastewater shall be in an enclosed pipe that is adequately protected from traffic, and shall be redirected into sanitary sewer system.
- G. No bypassing to the ground surface, receiving waters, storm drains, or bypassing which results in soil or groundwater contamination or any potential health hazards shall be permitted:
  - 1. The Contractor shall adhere to all agency restrictions regarding the transport and conveyance of wastewater.
- H. The Contractor shall be liable for all cleanup, damages, and resultant fines in the event of spills, leaks or backups associated with bypass pumping activities, which includes commissioning, operation, and decommissioning of bypass pumping facilities.
- I. No interruption of wastewater flow shall be permitted throughout the duration of the project. Contractor is responsible for all sanitary sewer overflows during construction of this WORK and bypass operations.
- J. Coordinate the placement of the bypass piping and pumping equipment with the Owner.
- K. Where bypass pipelines are required to cross traffic lanes, and will be in place for more than 3 days, the piping and fittings shall be buried a minimum of 4 inches below the pavement surface and backfilled with temporary asphalt concrete surfacing or use an approved flow through drivable apparatus approved by Engineer:
  - 1. At no time shall traffic lanes be blocked or closed, unless specifically allowed in writing by the Owner.
- L. For purposes of bypass pumping lateral flows, right of entry onto private property is not permitted without right-of-entry/right-of-access agreement:
  - 1. Laterals indicated on the Drawings are based on CCTV data from Owner.



- M. Contractor is responsible to identify additional laterals not indicated on the Drawings that may require bypass pumping.
- N. After the WORK is completed, flow shall be returned to the sewer and all temporary equipment removed.

**1.04 DESIGN CRITERIA**

- A. The Contractor shall collect flow data or request flow data from the Owner to determine the appropriate range of design flows and design total dynamic head (TDH). The following criteria shall be determined at a minimum:

Location	Minimum Flow (gpm)	Average Daily Flow (gpm)	Peak Flow (gpm)	Discharge Pressure (psi)
Glen Court	0.1	0.3	1	0
Glen Drive	5	15	26	0

- B. The Contractor shall contact the Pat Guasco at the City of Sausalito to confirm all proposed flow values prior to the WORK.

**1.05 SUBMITTALS**

- A. The Contractor shall submit a temporary bypass pumping plan as required to complete the WORK to the Engineer and Owner, 10 days prior to bypass pipe installation, for review as specified in Section 01300.
- B. The temporary bypass pumping plan submittal shall be satisfactory to the Engineer and Owner prior to the Contractor commencing the bypass pumping operation:
  - 1. The Contractor shall notify the Engineer and Owner 24-hours prior to commencing the bypass pumping operation.
- C. The temporary bypass pumping plan must provide for accessibility to pedestrians and vehicular traffic in accordance with encroachment permit requirements.
- D. The temporary bypass pumping plan shall include the following at a minimum:
  - 1. Number, type, capacity and size of pumps, standby equipment, pipe material, pipe layout with pressure relief and air/vacuum valves locations and power requirements if applicable.
  - 2. Design calculations of the system and selected equipment, including flow, TDH with static head including all friction and minor losses, pump curves showing operating range of flow and TDH.
  - 3. Standby power generator size and location for electrically driven bypass pumps.
  - 4. Downstream Discharge Plan.

5. Pipe thrust and restraint block sizes and locations.
6. Temporary pipe supports and anchoring required:
  - a. The bypass corridor lies within a flood zone, therefore buoyancy restraint is required.
  - b. Buoyancy calculations are required.
7. Schedule that shows duration of temporary bypass pumping including milestones for installation, maintenance, and removal of equipment and accessories.
8. Means and methods of installing, operating, monitoring, and maintaining the temporary bypass pumping shall be provided.
9. Plan indicating bypass pumping line locations:
  - a. Plan shall include details showing methods used to protect and identify the bypass pumping lines through the length of the bypass corridor.
10. Plans for access to bypass pumping locations.
11. Detailed plans of a redundant backup system.
12. Address access for pedestrians and vehicular traffic.
13. Mechanical plan showing equipment, valves, pipe sizes and locations, pipe materials, dimensions, vehicle access (where applicable), pedestrian access (where applicable).
14. Proposed type, catalog cut sheets, and location of collection system plugs.
15. Emergency Response Plan.
16. Staffing Plan.
17. Spill prevention and cleanup plan.
18. Odor Control Plan.
19. Method of noise control.
20. Health and Safety Plan.
21. Catalog cut sheets for all pumping equipment including pump performance curves, all pipe and fittings, all valves, noise reduction system, odor control system, and health and safety plan.

## **1.06 QUALITY ASSURANCE**

- A. Contractor's qualifications:
  1. Minimum 5 years of experience in performing substantially similar temporary bypass pumping operations.
  2. Submit list at least 5 separate construction projects completed within the last 10 years that include the satisfactory set-up, operation, and maintenance of a pumping and piping system used to bypass wastewater during construction similar to the specified WORK.
- B. Fulfillment of the specified experience requirements shall be a condition of acceptance.

## **PART 2 PRODUCTS**

### **2.01 CAPACITY**

- A. Pumps, piping and accessories shall be of adequate capacity and size to handle the range of wastewater flows from Minimum Flow to Peak Flow.
- B. All piping, fittings and all accessories shall withstand 1.5 times the maximum pressure.

- C. Contractor shall maintain on site sufficient equipment and materials to ensure continuous and successful operation of the bypass system:
  - 1. The Contractor shall have standby pump(s) incorporated into the system that provide 100 percent redundancy of the bypass system design Peak Flow:
    - a. The redundant pump(s) shall be plumbed, fueled, and available for operation in 20 minutes upon emergency backup.
  - 2. The Contractor shall install sufficient bypass lines to provide 100 percent redundancy of the bypass system design Peak Flow:
    - a. The bypass lines and separate redundant lines shall be connected via a combined header that enables the shutdown and isolation of each individual line should a leak or rupture occur.
  - 3. The Contractor shall maintain on site a sufficient number of valves, tees, elbows, connections, tools, pipe plugs, piping, and other parts or system hardware to ensure immediate repair or modification of any part of the bypass system as necessary.

## **2.02 BYPASS PUMPS**

- A. A minimum of 2 pumps shall be provided, each capable of transporting 100 percent of the peak flow.
- B. Pump capacity shall be sufficient to pump the anticipated peak hour flow with the largest pump out of service.
- C. Pumps shall be a packaged unit with a skid base or 2-wheel trailer.
- D. Pumps shall be fully automatic, self-priming, close-coupled centrifugal units that do not require use of foot valves or vacuum pumps for priming.
- E. Pumps shall utilize oil-lubricated mechanical seal.
- F. Pump materials shall be as follows:
  - 1. Volute: Cast iron.
  - 2. Impeller: Cast iron.
  - 3. Pump shaft: Type 431 stainless steel.
  - 4. Mechanical seal faces: Silicon carbide.
- G. Pumps shall be capable of passing 3-inch diameter solids, rags, rocks, hair and other debris encountered in municipal wastewater.
- H. Pumps shall be operated by diesel engine and include the following:
  - 1. Minimum 24-hour capacity diesel fuel tank as defined by fuel consumption during peak pumping rate.
  - 2. Fuel gauge with red warning light when tank approaches empty.
- I. Pumps shall be capable of dry operation for up to 5 hours to accommodate large fluctuations in flow.
- J. Maximum pump speed shall not exceed 2,200 revolutions per minute.

- K. The system shall include the following features:
  1. START/STOP operation.
  2. Instrumentation and controls for operation and monitoring for each pump.
- L. All electrical equipment, instrumentation, and accessories shall be suitable for Class 1 Division 1 service as defined by NFPA 820.

**2.03 BYPASS PIPING**

- A. Contractor shall use HDPE or aluminum piping for the temporary bypass pumping system.
- B. All piping shall have 0 leakage and shall include spill containment vessels or 'spill guards'.
- C. HDPE Piping shall be as follows:
  1. In accordance with ASTM D 3350.
  2. Minimum SDR of 32.5.
  3. Joints shall be butt-fusion welded.
- D. Aluminum piping:
  1. In accordance with ASTM B 241 or approved by Engineer.
  2. Fittings: Standard pipefittings made of aluminum alloy suitable for 30 percent above maximum shutoff pressure.
  3. Joints shall be rubber.

**2.04 PIPE PLUGS**

- A. Pipe diameters 24 inches and smaller shall use mechanical plugs with rubber gaskets.
- B. Pipe diameters larger than 24 inches shall use inflatable bag stoppers with 2 or more pieces.

**2.05 ODOR CONTROL**

- A. Contractor shall provide all equipment necessary to provide odor control during temporary bypass pumping.
- B. Contractor shall furnish all labor and supervision to set up and operate the odor control system:
  1. Odor control system shall be of adequate capacity and size to handle odor control measures for the full range of flows.
- C. Odor control system shall be granular activated carbon packaged system.
- D. General design criteria:

PARAMETER	VALUE
Operating Temperature, deg Fahrenheit	0 to 120
Airflow Rate, cfm	100
Internal Positive Pressure, in. WC	10

PARAMETER	VALUE
Average H <sub>2</sub> S inlet concentration, ppm	10
Peak H <sub>2</sub> S inlet concentration, ppm	50
Outlet H <sub>2</sub> S concentration, ppm	< 0.1

- E. All electrical equipment and instrumentation shall be suitable for Class 1 Division 1 service as defined by NFPA 820.

## 2.06 NOISE CONTROL

- A. Pump equipment shall be equipped with devices or enclosures for noise attenuation, which includes but is not limited to mufflers and/or plywood/Styrofoam noise panels.
- B. The noise level shall be at or below 55 dBA at 20 feet from the pumping equipment for the duration of the WORK.

## PART 3 EXECUTION

### 3.01 GENERAL

- A. The Contractor shall notify the Owner a minimum of 14 days prior to the WORK requiring temporary bypass pumping and notify the Engineer at least 48 hours prior to bypassing or diverting flow in any of the pipelines or laterals or structures.
- B. All pumps, generators, and other equipment shall be placed on a plastic tarp to protect against spills of petroleum products used by the equipment.
- C. Before taking interceptor out of service, Contractor shall verify that bypass system is fully operational and acceptable to Engineer.
- D. The odor control system shall be operated any time the bypass system is in service for the duration of the project.
- E. Traffic control as specified in Section 01550.
- F. Flow in the existing sewers shall not be restricted or dammed for any period of time without the approval of the Engineer.
- G. All wastewater facilities, including laterals, shall remain in continuous and full operation during construction.

### 3.02 PROTECTION

- A. All pumps and piping shall be sized to adequately convey the flows anticipated at each bypass application:
1. The bypass system shall be watertight; no leakage will be allowed.

- B. The Contractor shall be responsible for all bypass flows:
  - 1. The Contractor shall inspect the entire bypass pumping and piping system for leaks or spills at a frequency of not less than 1 times per hour.
  - 2. The temporary bypass system shall not be shut down between shifts, on holidays or weekends, or during work stoppages without written permission from the Engineer.
- C. The temporary bypass system will have trained and qualified attendants available 24 hours per day 7 days per week whose only duty is to maintain the bypass system until the bypassing of the system is no longer required. The attendants shall:
  - 1. Be capable of performing pump and piping maintenance required.
  - 2. Have a cellular phone for communication with the Contractor and the Engineer in the event of emergencies.
- D. In the event of any wastewater spill, the Contractor shall be responsible for the prompt cleanup and disinfecting of the spill as called for in the temporary bypass pumping plan:
  - 1. The Contractor shall compensate the Owner for the cost of any fines levied as the result of a spill or unauthorized discharge.
- E. The Contractor shall implement measures to prevent interference between the public and the bypass pumping equipment, pipelines and wastewater.
- F. Contractor shall take precautions to protect all bypass lines from damage:
  - 1. Any above ground portions of the bypass lines shall be clearly identified by flashers, fencing, or other means to warn the public of their presence.

### **3.03 FIELD QUALITY CONTROL**

- A. Hydrostatic Pressure Test:
  - 1. Prior to operation, test each section of discharge piping with maximum pressure equal to 1.5 times the maximum operating pressure.
  - 2. The test shall run for a duration of 2 hours.
  - 3. The Contractor shall fill the line with water.
  - 4. The line shall be sealed on the discharge end.
  - 5. The line may be put in service if after the specified test duration, the pressure has been maintained and there are no observable leaks.
  - 6. Notify Engineer at least 48 hours prior to testing.
- B. Inspection:
  - 1. An attendant/operator shall inspect temporary bypass piping system at a minimum of every hour 24 hours per day.
  - 2. An attendant/operator shall be present to monitor the operation of the bypass pumps at all times 24 hours per day.
  - 3. Inspection Log: Keep at each pumping location.

### **3.04 CLEAN-UP**

- A. The temporary bypass pumping system shall be cleaned and drained prior to being dismantled.
- B. The Contractor shall alternate pigging and purging of the system to remove all loose material:
  - 1. After the Contractor has cleaned the pipe, and prior to dismantling of the piping for removal from the project site, the Contractor shall disinfect the pipe with 10 percent chlorine solution.
- C. Disturbed Areas:
  - 1. Upon completion of bypass pumping operation, clean disturbed areas, restoring to original condition, including pavement restoration, at least equal to that which existed prior to start of WORK.

### **3.05 SCHEDULING**

- A. The temporary bypass pumping system shall not be shut down between shifts, on holidays or weekends, or during work stoppages when any sewer is out of service.
- B. When a sewer is out of service, the bypass system shall have trained and qualified attendants 24 hours per day, 7 days per week whose only duty is to maintain the bypass system from the start of bypass until the bypassing of the system is no longer required.

END OF SECTION

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## **SECTION 02620**

### **FILTER FABRIC**

#### **PART 1 GENERAL**

##### **1.01 SUMMARY**

- A. Section includes: Nonwoven filter fabric.

##### **1.02 REFERENCES**

- A. ASTM International (ASTM):
  1. D 4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
  2. D 4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  3. D 4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
  4. D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
  5. D 4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.
  6. D 5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles.
  7. D 6241 - Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.

##### **1.03 DEFINITIONS**

- A. Filter fabric: Nonwoven geotextile fabric manufactured from polypropylene fibers.

##### **1.04 SUBMITTALS**

- A. Product data.
- B. Samples.
- C. Quality control submittals:
  1. Certificates of Compliance.
  2. Manufacturer's Instructions.

##### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Storage and protection:
  1. Furnish filter fabric in protective covers capable of protecting the fabric from ultraviolet rays, abrasion, and water.

##### **1.06 PROJECT CONDITIONS**

- A. Take field measurements to determine the lengths and dimensions of the surfaces to receive the fabric.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. One of the following or equal:
1. Propex, Geotex 401.
  2. Ten Cate Geosynthetics, Mirafi 140N.

### 2.02 MATERIAL REQUIREMENTS

- A. Physical properties: Meet the following minimum requirements:

Property <sup>(1)</sup>	Test Method	Unit	Requirements <sup>(1)</sup>
Minimum Weight	ASTM D 5261	oz	4.0
Grab Tensile Strength	ASTM D 4632	lbs	100
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs	50
CBR Puncture Resistance	ASTM D 6241	lbs	300
UV Resistance (strength retained at 500 hrs)	ASTM D 4355	%	70
Apparent Opening Size (AOS)	ASTM D 4751	US sieve	70
Permittivity	ASTM D 4491	sec <sup>-1</sup>	1.7
Flow Rate	ASTM D 4491	gpm/ft <sup>2</sup>	130

Note:  
(1) Minimum average roll values.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verification of conditions: Verify that conditions are satisfactory for the installation of filter fabric.

### 3.02 PREPARATION

- A. Surface preparation:
1. During grading operations, take care not to disturb the subgrade.
  2. This may require use of lightweight dozers for low strength soils such as saturated, cohesionless, or low cohesion soils.
- B. Prior to placement of fabric: Prepare surface to smooth condition free of debris, depressions, or obstructions that may damage the fabric.

### 3.03 INSTALLATION

- A. Follow manufacturer's installation instructions and as complimented herein.
- B. Place the filter fabric smoothly without folds or wrinkles.

- C. Use special care when placing the filter in contact with the soil so that no void spaces occur between the filter and the prepared surface.
- D. Overlap the parallel rolls and ends of rolls a minimum of 24 inches and not less than manufacturer's instructions.
- E. Do not drag filter fabric across subgrade.
- F. Make overlaps at ends of rolls in the direction of the aggregate placement with the previous roll on top.
- G. Use lightweight dozers if necessary. Do not allow equipment directly on filter fabric.

#### **3.04 FIELD QUALITY CONTROL**

- A. Inspection:
  - 1. Before covering, the condition of the fabric will be observed by the Engineer to determine that no holes or rips exist in the fabric.
  - 2. Repair all holes and rips by placing a new layer of fabric extending beyond the defect in all directions a distance equal to the minimum overlap required for adjacent rolls.

END OF SECTION

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## SECTION 02742

### ASPHALTIC CONCRETE PAVING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Asphalt pavement on prepared subgrade or aggregate base course to lines, grades and compacted thickness as indicated on the Drawings.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 02050 - Soils and Aggregates for Earthwork.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. D 1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft. lbf/ft<sup>3</sup>)(2,700 kN-m<sup>3</sup>).
  - 2. D 1561 - Standard Practice for Preparation of Bituminous Mixture Test Specimens by Means of California Kneading Compactor.
- B. Caltrans Standard Test Methods:
  - 1. Calif Test 202 - Sieve Analysis of Fine and Coarse Aggregates.
  - 2. Calif Test 304 - Preparation of Bituminous Mixtures for Testing.
  - 3. Calif Test 362 - Determining Asphalt Content in Bituminous Mixtures by Vacuum Extraction.
  - 4. Calif Test 375 - Determining the In-Place Density and Relative Compaction of AC Pavement.
  - 5. Calif Test 379 - Determining Asphalt Content in Bituminous Mixtures (Troloxer Nuclear Gauge Model 3241).
- C. State of California Department of Transportation Standard Specifications, latest edition (Caltrans Standard Specifications):
  - 1. Section 37 - Bituminous Seals.
  - 2. Section 39 - Hot Mix Asphalt.
  - 3. Section 88 - Geosynthetics.
  - 4. Section 92 - Asphalts.
  - 5. Section 93 - Liquid Asphalts.

### **1.03 SYSTEM DESCRIPTION**

- A. This Work shall consist of furnishing and mixing aggregate and asphalt binder at a central mixing plant, spreading and compaction of the mixture as specified and as indicated on the Drawings.
- B. In general, asphalt concrete and asphalt concrete base shall conform to Section 39 "Hot Mix Asphalt," and all applicable referenced sections, of the Caltrans Standard Specifications:
  - 1. Where conflicts exist, this specification shall govern.

### **1.04 DEFINITIONS**

- A. "Asphalt Concrete" as used by Caltrans shall be considered the "Surface Course," or the final lift of the pavement section.
- B. "Asphalt Concrete Base" as used by Caltrans shall be the remaining portion of the asphalt pavement section excluding the final lift.
- C. "Asphalt Pavement" shall be the total pavement section of asphalt including Asphalt Concrete and Asphalt Concrete Base.

### **1.05 SUBMITTALS**

- A. Mix design.
- B. Shop drawings.
- C. Product Data:
  - 1. Asphalt.
  - 2. Asphalt aggregate.
  - 3. Pavement reinforcing fabric.
- D. Quality control submittals:
  - 1. Test results.
  - 2. Certificate of Compliance.
  - 3. Certificate of Competence.
- E. Equipment list.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Asphalt pavement delivery:
  - 1. Transport the mixture from the mixing plant to the point of use in vehicles having tight bodies previously cleaned of all foreign materials.
  - 2. Treat bodies as necessary to prevent material from sticking to the bodies.
  - 3. Cover each load with canvas or other suitable material of sufficient size and thickness to protect the asphalt mixture from the weather.

## **1.07 PROJECT CONDITIONS**

- A. Environmental requirements:
  - 1. Asphalt concrete:
    - a. Place asphalt concrete only when surface is dry, when atmospheric temperature in the shade is 40 degrees Fahrenheit and rising, or above 50 degrees Fahrenheit if falling.
    - b. Do not place asphalt concrete when weather is foggy or rainy nor when base on which material is to be placed is in wet or frozen conditions or when, in the opinion of the Engineer, weather conditions will prevent proper handling, finishing, compaction of the mixtures.

## **PART 2 PRODUCTS**

### **2.01 ASPHALT PAVEMENT MATERIALS**

- A. Asphalts:
  - 1. Asphalt binder: Steam-refined paving asphalt, PG 64-10 conforming to Section 92-1.02C "Grades" of the Caltrans Standard Specifications.
  - 2. Tack coat: Grade SC-70, conforming to Section 93 of the Caltrans Standard Specifications.
- B. Asphalt aggregate:
  - 1. Aggregate for asphalt concrete shall conform to Section 39-1.02E of the Caltrans Standard Specifications for Type B grading, 1/2-inch maximum, medium.
  - 2. Aggregate for asphalt concrete base shall conform to Section 39-1.02E of the Caltrans Standard Specifications for Type B grading.
  - 3. The use of reclaimed asphalt pavement (RAP) in asphalt concrete and asphalt concrete base is prohibited.
- C. Asphalt pavement shall be produced in a batch mixing plant, a continuous pugmill mixing plant, or drier-drum mixing plant:
  - 1. Proportioning shall conform to Section 39-3.03 of the Caltrans Standard Specifications.
  - 2. Mixing shall conform to Section 39-3.04 of the Caltrans Standard Specifications.

### **2.02 SLURRY SEAL**

- A. Slurry seal, Type II, shall be applied in conformance with the provisions in Section 37-2, and all applicable referenced sections of the Caltrans Standard Specifications, at the following locations:
  - 1. At all locations indicated on the Drawings.

### **2.03 AGGREGATE BASE COURSE**

- A. Aggregate base course: As specified in Section 02050.

- B. Aggregate base course shall be placed at the following locations:
  - 1. At all locations indicated on the Drawings.
- C. Compacted thickness of aggregate base course shall be as indicated on the Drawings.

## **2.04 EQUIPMENT**

- A. Spreading and compacting equipment:
  - 1. Spreading equipment shall conform to Section 39-1.10 and all applicable referenced sections, of the Caltrans Standard Specifications:
    - a. Only in areas inaccessible to the machine, by approval of the Engineer, will hand spreading be permitted.
  - 2. Compaction equipment shall conform to Section 39-1.10 and all applicable referenced sections, of the Caltrans Standard Specifications.

## **2.05 SOURCE QUALITY CONTROL**

- A. The Engineer will perform sampling and tests of materials in accordance with California Test Method Number 304 and California Test Method Number 362 or 379, as applicable. Samples will be taken from materials as delivered to the site.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of conditions: Verify surfaces and site conditions are ready to receive work. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning application means acceptance of existing conditions.

### **3.02 PREPARATION**

- A. Protection:
  - 1. Protect concrete pavements and walks, curbs and bases, and other improvements adjacent to the operations with suitable materials.
  - 2. Building and other surfaces shall be covered with paper or other protection, when required.
  - 3. Contractor shall be responsible for any damage caused by Contractor's employees. All damage caused by the Contractor's operations shall be repaired to the satisfaction of the Engineer at no additional cost to Owner.
- B. Subgrade preparation:
  - 1. Immediately prior to applying tack coat, or immediately prior to placing the asphalt pavement when tack coat is not required, the subgrade to receive asphalt pavement shall conform to the compaction requirement and elevation tolerances specified for the material involved and shall be cleaned to remove any loose or extraneous material.
  - 2. If the asphalt pavement is to be placed on an existing base or pavement which was not constructed as part of the contract, the Contractor shall clean the surface by sweeping, flushing or other means to remove all loose particles of



paving, all dirt and all other extraneous material immediately before applying the tack coat.

### 3.03 TACK COAT

- A. Tack coat:
1. A tack coat of asphaltic emulsion shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, or as otherwise specified in this Section.
  2. Tack coat shall be applied in one application at a rate of 0.1 gallons per square yard of surface covered.

### 3.04 ASPHALT PAVEMENT

- A. Placing materials in a windrow, then picking it up and placing it in the asphalt paver with loading equipment will be permitted provided that:
1. The asphalt paver is of such design that the material will fall into a hopper which has a movable bottom conveyor to feed and screed.
  2. The loader is constructed and operated so that substantially all of the material deposited into windrows is picked up and deposited into the paving machine.
  3. The windrow is deposited only so far in advance of the paver to provide for continuous operation of the paver and not so far as to allow the temperature of the asphalt pavement in the windrow to fall below 260 degrees Fahrenheit.
- B. Unless lower temperatures are directed by the Engineer, asphalt concrete shall be spread, and the first coverage of initial or breakdown compaction shall be performed when the temperature of the mixture is not less than 250 degrees Fahrenheit, and all breakdown compaction shall be completed before the temperature of the mixture drops below 205 degrees Fahrenheit.
- C. Asphalt pavement shall be spread and compacted in the number of layers and of the thicknesses indicated in the following table:
1. A thickness tolerance of within 0.1 inches is allowed for asphalt concrete.
  2. A total thickness tolerance of within 0.2 inches is allowed for asphalt concrete base:

Total Thickness Indicated on Drawings <sup>a</sup>	Number of Lifts	Top Layer Thickness		Next Lower Layer Thickness		All Other Lower Layer Thicknesses	
		Min	Max	Min	Max	Min	Max
3-1/4" - 4-3/4"	2	1-3/4"	2-1/4"	1-3/4"	3"	-----	-----
>5	<sup>c</sup>	1-3/4"	2-1/4"	1-3/4"	3"	1-3/4"	4-3/4"

**Notes:**

- <sup>a</sup> When pavement reinforcing fabric is shown to be placed between layers of asphalt pavement, the thickness of asphalt pavement above the pavement reinforcing fabric shall be considered to be the "Total Thickness Indicated on the Drawings" for the purpose of spreading and compacting the asphalt pavement above the pavement reinforcing fabric.
- <sup>b</sup> If approved by the Engineer, one lift of 3 inches may be placed.
- <sup>c</sup> At least 2 layers shall be placed if the total thickness is less than 5 inches. At least 3 layers shall be placed if the total thickness is more than 5 inches, and less than 10-1/2 inches. At least 4 layers shall be placed if the total thickness is greater than 10-1/2 inches.

- D. A layer shall not be placed over another layer which exceeds 3 inches in compacted thickness until the temperature of the layer which exceeds 3 inches in compacted thickness is less than 160 degrees Fahrenheit at mid depth:
  - 1. If the temperature of any layer drops below 140 degrees Fahrenheit, or if directed by the Engineer, apply tack coat before placing next layer.
- E. Unless otherwise indicated on the Drawings, asphalt mixtures shall not be handled, spread, or windrowed in a manner that will stain the finished surface of any pavement or other improvements.
- F. The completed mixture shall be deposited on the prepared subgrade at a uniform quantity per linear foot, as necessary to provide the required compacted thickness without resorting to spotting, picking-up or otherwise shifting the mixture.
- G. Spreading:
  - 1. All layers of asphalt pavement shall be spread with an asphalt paver and shall conform to Section 39-1.11 and all applicable referenced sections of the Caltrans Standard Specifications.
  - 2. At locations where the asphalt pavement is to be placed over areas inaccessible to spreading and rolling equipment, all layers of asphalt pavement shall be distributed directly out of the back of the dump truck and spread by hand:
    - a. Asphalt pavement spread by hand shall be compacted thoroughly to the required lines, grades, and cross-sections by means of pneumatic tampers, or by other methods that will produce the same degree of compaction as pneumatic tampers.
- H. Compaction:
  - 1. Compaction of asphalt pavement shall conform to Section 39-1.11, 39-3.03, 39-3.04, and all applicable referenced sections of the Caltrans Standard Specifications.
  - 2. Minimum required density for each layer of asphalt pavement shall be 95 percent of that obtained in the laboratory in accordance with ASTM Test Method D 1561.
- I. Segregation shall be avoided and the surfacing shall be free of pockets of coarse or fine material. Asphalt pavement containing hardened lumps shall not be used:
  - 1. In areas inaccessible to paving and compacting equipment where spreading is done by hand, minimize the amount of segregation.
- J. Location of longitudinal joints in the top layer will be determined by the Engineer and shall not adversely affect the quality of the finished product.
- K. At all locations, or as directed by the Engineer, the asphalt concrete shall be square and at least 1 inch thick when conforming to existing surfacing. Tapering or feathering is not allowed.

### **3.05 FIELD QUALITY CONTROL**

- A. The Contractor shall control the quality of Work and shall provide adequate testing to assure compliance with these Specifications:
  - 1. The type and size of the samples shall be suitable to determine conformance with stability, density, thickness and other specified requirements. Use an

approved power saw or core drill for cutting samples. Furnish all tools, labor, and materials for cutting samples, testing, and replacing the pavement where samples were removed. Take a minimum of 1 sample for every 4,000 square feet of asphalt pavement placed.

- B. All asphalt pavement shall match the grades indicated on the Drawings and shall be completely free from unintended hollows and high spots:
  - 1. After completion of paving work, all paving shall be flooded with water. Any ponding that results in standing water greater than 3/4 inch in depth shall be ringed with chalk. Such hollows shall be corrected by removing and replacing the asphalt concrete. The asphalt concrete patch shall be square and at least 1 inch thick when conforming to existing surfacing. Tapering or feathering is not allowed.
- C. Contractor shall perform in-place density and compaction tests of the completed pavement in accordance with California Test Method Number 375, to determine compliance with the specified requirements. Submit test results to Engineer for approval.
- D. Cracks, settling of surface, improper drainage, improper compaction, and sloppy connection to previously laid surfaces will be construed as improper workmanship and will not be accepted.

### **3.06 MAINTENANCE OF PAVEMENT**

- A. Upon completion of final rolling, traffic shall not be permitted on the finished pavement for at least 6 hours, or until the asphalt pavement has cooled sufficiently to withstand traffic without being deformed.

### **3.07 WORKMANSHIP AND WARRANTY**

- A. Contractor shall provide written warranty against defects in materials or workmanship for a period of not less than 1 year upon completion of Work.

END OF SECTION

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## SECTION 02762

### PAVEMENT MARKINGS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Pavement marking requirements for striping, text, and graphics; traffic signs.

##### 1.02 SUBMITTALS

- A. Product data.
- B. Manufacturer's instructions.

##### 1.03 QUALITY ASSURANCE

- A. Applicator qualifications: Minimum 5 years of experience of applying traffic markings with satisfactory performance record.
- B. Regulatory requirements: Comply with applicable requirements of governmental agencies having jurisdiction, including airborne emissions and industrial waste disposal requirements.

##### 1.04 PROJECT CONDITIONS

- A. Apply pavement marking paint when:
  - 1. Pavement is clean and thoroughly dry.
  - 2. Ambient temperature is above 40 degrees Fahrenheit.
  - 3. Precipitation is not expected within 12 hours of completion of application.

#### PART 2 PRODUCTS

##### 2.01 PAVEMENT MARKING PAINT

- A. Manufacturers: One of the following manufacturers or equal:
  - 1. Dunn-Edwards Corporation, Los Angeles, CA.
  - 2. Glidden Company, Cleveland, OH.
  - 3. Sherwin Williams Company, Cleveland, OH.
- B. Materials:
  - 1. Pavement marking paint, latex based: One of the following or equal:
    - a. Dunn-Edwards: No. W 801, Vin-L-Stripe, epoxy-modified acrylic-latex based paint.
    - b. Glidden: 63240 Series, UltraHide Latex Traffic Paint.
    - c. Sherwin Williams: Set fast acrylic water borne traffic marking paint.
  - 2. Masonry conditioner: One of the following or equal:
    - a. Sherwin Williams: B46WZ1000, Masonry Conditioner.

3. Colors:
  - a. Text: White.
  - b. Parking dividers: White.
  - c. No parking zone markings: Yellow.
  - d. No parking curb: Red.
  - e. Handicap zone markings: Blue and white:
    - 1) Blue paint: Match color No. 15090 in Federal Standard 595A as specified in Section 2-1720 of California Administrative Code Title 24 Handicap Regulations.
  - f. Accessible parking dividers and accessible route: Yellow.
  - g. Directional arrows: White.
  - h. Driving lane dividers: White.

## **2.02 TRAFFIC SIGNS**

- A. Manufacturers: One of the following or equal:
  1. Seton Name Plate Co., Branford, Connecticut.
  2. Emedco, Buffalo, New York.
- B. Material, shapes, and graphics: Post mounted baked enamel on steel sheet, reflectorized to show the same shape and color both day and night, with mounting holes, in accordance with the Uniform Traffic Control Devices manual. Fasten sign to post with stainless steel bolts.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Remove dirt, oil, grease, and other materials which may affect paint adhesion.
- B. Apply masonry conditioner on weathered or sandblasted surfaces, brick, or stucco.

### **3.02 APPLICATION**

- A. Apply paint at package consistency whenever possible. Thin paint as little as possible.
- B. Apply paint with specifically designed and manufactured equipment for pavement marking. Provide:
  1. Uniform straight edges without overspray.
  2. Four inch wide lines, unless indicated otherwise.
  3. Hatching in handicap parking areas.
- C. Provide striping between parking stalls as indicated on the Drawings:
  1. Identify parking spaces with text as indicated on the Drawings:
    - a. Compact spaces: COMPACT.
    - b. Carpool spaces: CARPOOL.
    - c. Motorcycle spaces: MOTORCYCLE.
    - d. Visitor spaces: VISITOR.
- D. Apply paint to obtain thickness recommended by paint manufacturer.

- E. Paint traffic control markings, including striping, directional arrows, cross walks and lettering, and handicap striping and symbols as indicated on the Drawings and in accordance with local governing agency's standards. Use stencils for arrows, lettering, and symbols.
- F. Apply 700 square inch international handicap symbol on pavement surface where indicated on the Drawings:
  - 1. On asphalt surfaces, paint blue symbol on white square.
  - 2. On concrete surfaces, paint white symbol on blue square.
- G. Install traffic signs where indicated on the Drawings. Set post in concrete to depth to resist sign damage from wind speed of 100 miles per hour.

END OF SECTION

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## SECTION 02952

### PAVEMENT RESTORATION AND REHABILITATION

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Resurfacing roads and paved surfaces in which surface is removed or damaged by installation of new work.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 02050 - Soils and Aggregates for Earthwork.
    - b. Section 02742 - Asphaltic Concrete Paving.
    - c. Section 03300 - Cast-in-Place Concrete.

##### 1.02 SYSTEM DESCRIPTION

- A. Performance requirements:
  - 1. Limiting dimensions:
    - a. Determine the exact lengths and dimensions of such roads, pavements, parking areas, and walks that will require removal and replacement for new work.
    - b. Join existing surfaces to terminals of new surfacing in smooth juncture.

##### 1.03 SUBMITTALS

- A. Mix designs:
  - 1. Prior to placement of asphalt concrete, submit full details, including design and calculations for the asphalt concrete mix proposed.
  - 2. Submit gradation of aggregate base.
  - 3. Submit proposed mix design of portland cement concrete.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Aggregate base course: As specified in Section 02050.
- B. Asphalt pavement: As specified in Section 02742.
- C. Portland cement concrete replacement material: Class A concrete as specified in Section 03300.

### **2.02 EQUIPMENT**

- A. Roads, pavements, parking areas, and walks:
  - 1. Equipment requirements: Good condition, capable of performing work intended in satisfactory manner.

### **2.03 ACCESSORIES**

- A. Material for painting asphalt concrete pavement: Tack coat as specified in Section 02742.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Aggregate surface removal replacement:
  - 1. When trench cut is in aggregate surfaced areas, replace aggregate base course material with material matching existing material compacted to 95 percent of its maximum density.
- B. Pavement removal and temporary asphalt replacement:
  - 1. Install temporary asphalt pavement or first course of permanent pavement replacement immediately following backfilling and compaction of trenches that have been cut through existing pavement.
  - 2. Except as otherwise provided, maintain this temporary pavement in safe and reasonably smooth condition until required permanent pavement is installed.
  - 3. Remove and dispose of temporary paving from project site.
  - 4. Where longitudinal trench is partly in pavement, replace pavement to original pavement edge, on a straight line, parallel to centerline of roadway.
  - 5. Where no part of longitudinal trench is in pavement, surfacing replacement shall only be required where existing surfacing materials have been removed.
- C. Asphalt pavement replacement:
  - 1. Replace asphalt pavement to same thickness as adjacent pavement and match as nearly as possible adjacent pavement in texture, unless otherwise indicated on the Drawings.
  - 2. Cut existing asphalt pavements to be removed for trenches or other underground construction by wheel cutter, clay spade, or other device capable of making neat, reasonably straight and smooth cut without damaging adjacent pavement. Cutting device operation shall be subject to acceptance of Engineer.

3. Cut and trim existing pavement after placement of required aggregate base course and just prior to placement of asphalt concrete for pavement replacement, and paint trimmed edges with material for painting asphalt concrete pavement immediately prior to constructing new abutting asphalt pavements. No extra payment will be made for these items, and all costs incurred in performing this work shall be incidental to pipe laying or pavement replacement.
  4. Conform replacement of asphalt pavement to contour of original pavement.
- D. Portland cement concrete pavement replacement:
1. Where trenches lie within portland cement concrete section of streets, alleys, sidewalks, and similar concrete construction, saw cut such concrete (to a depth of not less than 1-1/2 inches) to neat, vertical, true lines in such manner adjoining surfaces are not damaged.
  2. Place portland cement concrete replacement material to dimension as indicated on the Drawings.
  3. Dowel as indicated on drawings and per Section 03200.
  4. Provide expansion joints that match existing.
  5. Before placing replacement concrete, thoroughly clean edges of existing pavement and wash with neat cement and water.
  6. Surface finish: Wood float finish.
- E. Curb, gutter, and sidewalk replacement:
1. Where any concrete curb, gutter, or sidewalk has been removed or displaced, replace to nearest construction joints with new Class A curb, gutter, or sidewalk to same dimensions and finish as original construction that was removed:
    - a. Provide expansion joints of same spacing and thickness as original construction.
- F. Asphalt pavements:
1. Trim existing asphalt pavements which are to be matched by pavement widening or pavement extension to neat true line with straight vertical edges free from irregularities with saw specifically designed for this purpose. Minimum allowable depth of cut shall be 1-1/2 inches.
  2. Cut and trim existing pavement after placement of required aggregate base course and just prior to placement of asphalt concrete for pavement widening or extension, and paint trimmed edges with material for painting asphalt concrete pavement immediately prior to constructing new abutting asphalt concrete pavements.
  3. No extra payment will be made for these items and all costs incurred in performing this work shall be incidental to widening or pavement extension.

### 3.02 FIELD QUALITY CONTROL

- A. Tests:
  - 1. Asphalt concrete as specified in Section 02742.
  - 2. Concrete as specified in Section 03300.
  
- B. Inspection:
  - 1. Asphalt concrete:
    - a. Lay 10-foot straightedge parallel to centerline of trench when the trenches run parallel to street, and across pavement replacement when trench crosses street at angle.
    - b. Remove and correct any deviation in cut pavement replacement greater than 1/4 inch in 10 feet.
  - 2. Portland cement concrete replacement pavement:
    - a. Lay 10-foot straightedge either across pavement replacement or longitudinal with centerline of gutter or ditch.
    - b. Remove and correct any deviation in cut pavement replacement greater than 1/4 inch in 10 feet.

END OF SECTION

## SECTION 03071

### EPOXIES

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Epoxy bonding agent.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. C 881 – Standard Specification for Epoxy-Resin-Base Systems for Concrete.
  - 2. C 882 – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
  - 3. D 638 - Standard Test Method for Tensile Properties of Plastics.
  - 4. D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.

##### 1.03 SYSTEM DESCRIPTION

- A. Performance requirements:
  - 1. Provide epoxy materials that are new.
  - 2. Store and use products within shelf life limitations set forth by manufacturer.
  - 3. 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:
  - 1. Submit evidence of conformance to ASTM C 881. Include manufacturer's designations of Type Grade, Class, and Color.
  - 2. Submit evidence that materials meet or exceed the specified physical characteristics.
- B. Quality control submittals:
  - 1. Manufacturer's installation instructions.

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

- A. General: Moisture tolerant, water-insensitive, two-component epoxy resin adhesive material containing 100 percent solids, and meeting or exceeding the performance properties specified when tested in accordance with the standards specified.

- B. Epoxy bonding agent: Non-sagging product in accordance with ASTM C 881, Type II, Grade 1, Class C:
1. Manufacturers: One of the following or equal:
    - a. BASF, Concrecive Liquid LPL.
    - b. Sika Chemical Corp., Sikadur 32 Hi-Mod LPL.
  2. Required properties:

<b>Table 3 – Material Properties – Epoxy Bonding Agent</b>		
<b>Property</b>	<b>Test Method</b>	<b>Required Results</b>
Tensile Strength (7-day)	ASTM D 638	4,400 pounds per square inch, minimum.
Compressive Yield Strength (7-day)	ASTM D 695	8,300 pounds per square inch, minimum.
Bond Strength (14-days)	ASTM C 882	1,800 pounds per square inch, minimum. Concrete shall fail before failure of epoxy bonding agent.
Pot Life	-	Minimum 70 minutes at 77 degrees Fahrenheit or Minimum 90 minutes at 73 degrees Fahrenheit
Notes: Testing results are for materials installed and cured at a temperature between 72 and 78 degrees Fahrenheit for 7 days, unless otherwise noted.		

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install and cure epoxy materials in accordance with manufacturer's installation instructions.
- B. 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 03150**  
**CONCRETE ACCESSORIES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes:
  - 1. Waterstops.
  - 2. Joint fillers.
  
- B. Related sections:
  - 1. The Contract Drawings are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of the Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 03154 - Hydrophilic Rubber Waterstop.

**1.02 REFERENCES**

- A. ASTM International (ASTM):
  - 1. D 570 - Standard Test Method for Water Absorption of Plastics.
  - 2. D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
  - 3. D 638 - Standard Test Method for Tensile Properties of Plastics.
  - 4. D 746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
  - 5. D 747 - Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam.
  - 6. D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
  - 7. D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - 8. D 1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
  - 9. D 2240 - Standard Test Method for Rubber Property – Durometer Hardness.
  
- B. American National Standards Institute (ANSI):
  - 1. A135.4 - Basic Hardboard.
  
- C. U. S. Army Corps of Engineers (USACE):
  - 1. CRD-C-572, Specification for Polyvinyl Chloride Waterstop.

### 1.03 SUBMITTALS

- A. Product data:
  - 1. Polyvinyl chloride waterstops: Complete physical characteristics.
  - 2. Preformed expansion joint material: Sufficient information on each type of material for review to determine conformance of material to requirements specified.
- B. Samples:
  - 1. Polyvinyl chloride waterstop.
- C. Laboratory test reports: Indicating that average properties of polyvinyl chloride waterstops material and finish conform to requirements specified in this Section.
- D. Quality control submittals:
  - 1. Certificates of Compliance:
    - a. Written certificates that polyvinyl chloride waterstops supplied on this Project meet or exceed physical property in accordance with USACE CRD-C-572 and the requirements of this Section.
  - 2. Manufacturer's instructions: For materials specified in this Section that are specified to be installed with such instructions.

### 1.04 QUALITY ASSURANCE

- A. Mock-ups:
  - 1. Welding demonstration:
    - a. Demonstrate ability to weld acceptable joints in polyvinyl chloride waterstops before installing waterstop in forms.
- B. Field joints:
  - 1. Polyvinyl chloride waterstops field joints: Free of misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects which would reduce the potential resistance of material to water pressure at any point. Replace defective joints. Remove faulty material from site and disposed of by Contractor at its own expense.
- C. Inspections:
  - 1. Quality of welded joints will be subject to acceptance of Engineer.
  - 2. Polyvinyl chloride waterstop: Following defects represent partial list that will be grounds for rejection:
    - a. Offsets at joints greater than 1/16 inch or 15 percent of the material thickness, at any point, whichever is less.
    - b. Exterior crack at joint due to incomplete bond, which is deeper than 1/16 inch or 15 percent of material thickness, at any point, whichever is less.
    - c. Any combination of offset or crack that will result in net reduction in cross section of waterstop in excess of 1/16 inch or 15 percent of material thickness, at any point, whichever is less.
    - d. Misalignment of joint that will result in misalignment of waterstop in excess of 1/2 inch in 10 feet.
    - e. Porosity in welded joint as evidenced by visual inspection.
    - f. Bubbles or inadequate bonding.



## PART 2 PRODUCTS

### 2.01 JOINT FILLERS

- A. General:
  - 1. Use specific type in applications as indicated on the Drawings.
  - 2. Do not use scrap or recycled materials to manufacture joint fillers.
- B. Preformed expansion joint materials:
  - 1. Bituminous fiber expansion joint material:
    - a. Properties:
      - 1) Thickness: To match joint width indicated on the Drawings.
      - 2) Asphalt-impregnated fiber in accordance with ASTM D 1751.
    - b. Manufacturers: One of the following or equal:
      - 1) Durajoint.
      - 2) W.R. Meadows, SealTight Fibre Expansion Joint.

### 2.02 WATERSTOPS

- A. Waterstops - polyvinyl chloride (PVC):
  - 1. Manufactured from prime virgin polyvinyl chloride plastic compound containing the plasticizers, resins, stabilizers, and other materials necessary to meet the requirements as specified in this Section.
  - 2. Manufacturers: One of the following or equal:
    - a. Vinylex Corporation.
    - b. Greenstreak Plastic Products Company, Inc.
  - 3. Type: Ribbed waterstop:
    - a. Construction joints: 6-inch wide ribbed type.
    - b. Expansion joint for wall penetrations for concrete encased electrical duct banks: 6-inch ribbed type with hollow center bulb.
    - c. Expansion joints: 9-inch wide ribbed type with hollow center bulb.
    - d. Dumbbell-type waterstop will not be allowed unless otherwise specified or indicated on the Drawings.
    - e. No scrap or reclaimed material shall be used.
  - 4. Properties as indicated in the following table:

Physical Characteristics	Test Method	Required Results
Specific Gravity	ASTM D 792	Not less than 1.3.
Hardness	ASTM D 2240	70 to 90 Type A15 Shore durometer.
Tensile Strength	ASTM D 638	Not less than 2,000 pounds per square inch.
Ultimate Elongation	ASTM D 638	Not less than 300 percent.
Alkali Extraction	CRD-C-572	Change in weight after 7 days: Between minus 0.1 percent and plus 0.25 percent. Change in hardness after 7 days: Not more than plus 5 points.
Low Temperature Brittle Point	ASTM D 746	No sign of cracking or chipping at -35 degrees Fahrenheit.
Water Absorption	ASTM D 570	Not more than 0.15 percent after 24 hours.

Physical Characteristics	Test Method	Required Results
Accelerated Extraction Test	CRD-C-572	Tensile strength: Not less than 1,600 pounds per square inch. Elongation: Not less than 280 percent.
Stiffness in Flexure	ASTM D 747	Not less than 600 pounds per square inch.
Tear Resistance	ASTM D 624	Not less than 225 pounds per inch.
Thickness	–	3/8 inch.
Center Bulb		
6-inch Waterstops	–	7/8 inch or 1-inch nominal outside diameter.
9-inch Waterstops	–	For expansion joints 1 inch and narrower: 1-inch nominal outside diameter. For expansion joints wider than 1 inch: 2-inch nominal outside diameter.
Allowable Tolerances		
Width	–	Plus or minus 3/16 inch.
Thickness	–	Plus or minus 1/32 inch.

- B. Waterstops – hydrophilic rubber:
1. As specified in Section 03154.

## 2.03 JOINT DOWELS

- A. Expansion joint dowels:
1. Smooth, undeformed steel bars conforming to ASTM A615, Grade 60.
  2. Provide dowels straight and clean, free of loose flaky rust and loose scale.
  3. Dowels may be sheared to length provided deformation from true shape caused by shearing does not exceed 0.04 inches on the diameter of the dowel and extends no more than 0.04 from the end.
  4. Expansion end of the dowel:
    - a. Coat bars with a bond breaker.
    - b. Provide expansion dowel caps.
- B. Slip dowel plastic sleeves:
1. Manufactured using polypropylene.
  2. Manufacturers: One of the following or equal:
    - a. Greenstreak, speed dowel system.
- C. Slip dowel end caps:
1. Manufacturers: One of the following or equal:
    - a. Heckmann Building Products, Inc.: No. 87 Dowel Caps.
    - b. Dayton Superior Corporation: Style K-11 Dowel Caps.
    - c. Meadow Steel Products, Inc.:
      - 1) Style 3070 , DT-8, Metal Dowel Tube.
      - 2) Style 3075, PD-13, Plastic Dowel Tube.

## PART 3 EXECUTION

### 3.01 INSTALLATION

#### A. Waterstops:

##### 1. General:

- a. Store waterstops so as to permit free circulation of air around waterstop material and prevent direct exposure to sunlight.
- b. Install waterstops in concrete joints where indicated on the Drawings.
- c. Carry waterstops in walls into lower slabs and join to waterstops in slabs with appropriate types of fittings.
- d. In waterbearing structures: Provide all joints with waterstops, whether indicated on the Drawings or not.
- e. Provide waterstops that are continuous.
- f. Set waterstops accurately to position and line as indicated on the Drawings.
- g. Hold and securely fix edges in position at intervals of not more than 24 inches so that they do not move during placing of concrete.
- h. Position the waterstop so that symmetrical halves of waterstop are equally divided between concrete pours. Center axis of waterstop shall be coincident with centerline of the joint.
- i. Do not drive nails, screws, or other fasteners through waterstops in vicinity of construction joints.
- j. Use wires at not more than 24 inches on centers near outer edge of waterstop to tie waterstops into position.
- k. Special clips may be used in lieu of wires, at Contractor's option.
- l. Terminate waterstops 3 inches from top of finish surfaces of walls and slabs unless otherwise specified or indicated on the Drawings.
- m. When any waterstop is installed in concrete on one side of joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than 2 days, take suitable precautions to shade and protect exposed waterstop from direct rays of sunlight during entire exposure and until exposed portion is embedded in concrete.
- n. When placing concrete at waterstops in slabs, lift edge of waterstop while placing concrete below the waterstop. Manually force waterstop against and into concrete, and then cover waterstop with fresh concrete.

##### 2. Polyvinyl chloride waterstop:

- a. Install waterstops so that joints are watertight.
- b. Weld joints such as unions, crosses, ells, and tees, with thermostatically controlled equipment recommended by waterstop manufacturer:
  - 1) Do not damage material by heat sealing.
  - 2) Make joints by overlapping, then simultaneously cut ends of sections to be spliced so they will form smooth even joint. Heat cut ends with splicing tool until the plastic melts. Press 2 ends together until plastic cools.
  - 3) Maintain continuity of waterstop ribs and tubular center axis.
  - 4) The splices shall have tensile strength of not less than 60 percent of unspliced materials tensile strength.
- c. Butt joints of ends of 2 identical waterstop sections may be made while material is in forms.
- d. Split-type waterstops will not be permitted except where specifically indicated on the Drawings.

- B. Joints:
  - 1. Construct construction and expansion joints as indicated on the Drawings.
  - 2. Prefomed expansion joint material: Fasten expansion joint strips to concrete, masonry, or forms with adhesive. No nailing will be permitted, nor shall expansion joint strips be placed without fastening.
  
- C. Slip dowels at expansion joints:
  - 1. Where indicated on the Drawings, install smooth dowels at right angles to expansion joints:
    - a. Align dowels with finished surface.
    - b. Rigidly hold in place and support during concrete placement.
  - 2. Slip dowel sleeves:
    - a. Locate slip dowel sleeves on expansion joints as indicated on the Drawings.
  - 3. Slip dowel end caps:
    - a. Unless otherwise indicated on the Drawings, apply a bond breaker at one end of dowels through expansion joints.
    - b. Provide slip dowel end caps on the lubricated end of expansion dowels.

END OF SECTION

## SECTION 03154

### HYDROPHILIC RUBBER WATERSTOP

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Hydrophilic rubber waterstop.

##### 1.02 SUBMITTALS

- A. General:
  - 1. Submit the following items for each type, style and size of hydrophilic waterstop to be installed.
  - 2. Product data:
    - a. Manufacturer's product data sheets:
      - 1) Include complete physical dimensions, expansion characteristics, and laboratory test reports indicating that average material properties conform to the requirements specified.
      - 2) Provide data sheets for all materials to be included in the waterstop system.
  - 3. Samples:
    - a. Minimum 6-inch long samples of each type of waterstop to be used if requested by the Engineer.
  - 4. Manufacturer's installation instructions:
    - a. Installation instructions and recommended installation details for the complete waterstop system, and for each component used in that system.

#### PART 2 PRODUCTS

##### 2.01 HYDROPHILIC RUBBER WATERSTOP

- A. General:
  - 1. System composed of flexible hydrophilic urethane polymer with preformed strips, adhesives, paste, fasteners, and other accessories required for a complete and watertight installation:
    - a. To ensure compatibility of materials, a single manufacturer shall provide all products and accessories for the hydrophilic waterstop system.
    - b. Products incorporating bentonite are not acceptable under this Section.
    - c. Provide waterstop and accessories resistant to degradation under cyclic wetting and drying.
- B. Hydrophilic strip waterstop:
  - 1. Pre-formed strips of flexible hydrophilic rubber designed to undergo controlled expansion when exposed to moisture:
    - a. Strips manufactured to limit expansion in directions parallel to the plane of the joint, and to direct expansion against confining material perpendicular to that plane.

2. Provide low-expansion pressure as scheduled.
  3. Manufacturers. One of the following, or equal:
    - a. Low expansion hydrophilic strip:
      - 1) Adeka Ultra Seal USA: KBA-1510FP.
      - 2) Greenstreak: Hydrotite CJ0725-3K.
- C. Hydrophilic paste waterstop:
1. Single-component gun grade paste of hydrophilic rubber designed to undergo controlled expansion when exposed to moisture after initial curing.
  2. Manufacturers: One of the following, or equal:
    - a. Adeka Ultra Seal USA: P-201.
    - b. Greenstreak: Leakmaster LV-1

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions and recommended details.
- B. Prepare concrete joint surfaces:
1. Use wire brushing or scraping to expose an uncontaminated, solid surface.
  2. Clean prepared surface with high-pressure air or water to remove residue and debris.
  3. Confirm that prepared surfaces conform to manufacturer's recommendations for surface profile and moisture conditions before installing materials.
- C. Provide manufacturer's recommended lap, splice, and corner details for hydrophilic waterstops:
1. Use hydrophilic paste at all corner joints and overlap splices of hydrophilic strips.
- D. Hydrophilic strip waterstop:
1. Install primers and adhesives when recommended by the manufacturer before setting hydrophilic strips.
  2. Keep hydrophilic strip taut during the fastening process.
  3. Secure hydrophilic strip in place with concrete nails, screws, or adhesive.
  4. Provide installation with no gap between the hydrophilic strip and the concrete to which it is attached. At rough or irregular surfaces, set hydrophilic strip waterstop strip in a bead of hydrophilic paste:
    - a. Fill all voids and rough areas under the hydrophilic strip with hydrophilic paste.
    - b. Allow hydrophilic paste to cure in accordance with manufacturer's recommendations before encapsulating paste in fresh concrete.

### 3.02 SCHEDULE

- A. At the following joint locations/conditions, use the hydrophilic strip waterstop configuration noted.
- B. Pipe penetrations through concrete:
  - 1. Pipe diameter less than 4 inches: Not allowed.
  - 2. Pipe diameter of 4 to 24 inches: Continuous bead of hydrophilic paste waterstop, minimum 1/4 inch high by 1/2 inch wide, encircling pipe.
  - 3. Pipe diameter greater than 24 inches: Continuous hydrophilic strip waterstop around perimeter of pipe, with hydrophilic paste seal at lapped ends of strip.

END OF SECTION

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**SECTION 03200**  
**CONCRETE REINFORCING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes:
  - 1. Bar supports.
  - 2. Reinforcing bars.
  - 3. Thread bars.
  - 4. Tie wires.

**1.02 REFERENCES**

- A. American Concrete Institute (ACI):
  - 1. 318 - Building Code Requirements for Structural Concrete and Commentary.
  - 2. 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary.
  - 3. SP-66 - ACI Detailing Manual.
- B. American Welding Society (AWS):
  - 1. D1.4 - Structural Welding Code - Reinforcing Steel.
- C. ASTM International (ASTM):
  - 1. A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - 2. A 615 - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
  - 3. A 706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

**1.03 DEFINITIONS**

- A. Give away bars:
  - 1. Reinforcing bars that are not required by Contract Documents, but are installed by Contractor to support required reinforcing bars.

**1.04 SYSTEM DESCRIPTION**

- A. Drawings contain general notes concerning amount of reinforcement and placing, details of reinforcing bars at wall corners and intersections, and details of extra reinforcing bars around openings in concrete.

## 1.05 SUBMITTALS

- A. Shop drawings:
  - 1. Changes to reinforcement in contract drawing:
    - a. Indicate in separate letter submitted with shop drawings any changes to requirements in Contract Document for reinforcement.
    - b. Such changes will not be acceptable unless Engineer has accepted such changes in writing.
  - 2. Reinforcement shop drawings:
    - a. Review of reinforcement shop drawings by Engineer will be limited to general compliance with Contract Documents.
    - b. Reinforcement mill certificates.
- B. Samples:
  - 1. Submit samples of bar support chairs proposed for use along with letter stating where each type of chair will be used.
- C. Welding of reinforcing bars:
  - 1. Welding procedures specification.
  - 2. Procedures qualification record.
  - 3. Welder qualification test record.

## 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Packing and shipping:
  - 1. Deliver bars bundled and tagged with identifying tags.
- B. Acceptance at site:
  - 1. Reinforcing bars:
    - a. Deliver reinforcing bars lacking grade identification marks accompanied by manufacturer's guarantee of grade.

## 1.07 SEQUENCING AND SCHEDULING

- A. Bar supports:
  - 1. Do not place concrete until samples and product data for bar supports have been accepted by Engineer.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Bar supports:
  - 1. Wire bar supports located between reinforcing bars and face of concrete:
    - a. Stainless steel. Type 304 stainless steel bar supports:
      - 1) Support reinforcing bars for concrete placed on ground using wire bar support chairs with Type 304 stainless steel plates for resting on ground that are welded to chairs.
  - 2. Wire bar supports located between mats of reinforcing bars:
    - a. Steel bar supports.

- B. Reinforcing bars:
  - 1. Reinforcing bars embedded in concrete:
    - a. ASTM A 615 or A 706 Grade 60, deformed reinforcing bars in accordance with.
  - 2. Reinforcing bars that are required to be welded shall meet the following requirements:
    - a. Low-alloy, Grade 60, deformed reinforcing bars in accordance with ASTM A 706.
  - 3. Reinforcing bars that are required to resist earthquake-induced flexural and axial forces in concrete frame members and in concrete shear wall boundary members that meet following requirements:
    - a. Low-alloy, Grade 60, deformed reinforcing bars in accordance with ASTM A 706.
- C. Tie wires:
  - 1. Annealed steel.
- D. Welded wire reinforcement:
  - 1. In accordance with ASTM A 185.
  - 2. Provide welded wire reinforcement in flat sheet form.
  - 3. Welded wire reinforcement oil may be used in place of reinforcing bars if accepted by Engineer:
    - a. Provide welded wire reinforcement having cross-sectional area per linear foot of not less than cross-sectional area per linear foot of reinforcing bars.

## **2.02 FABRICATION**

- A. Shop assembly:
  - 1. Cut and bend reinforcing bars in accordance with ACI 318, ACI 350, and ACI SP-66.
  - 2. Bend reinforcing bars cold.
  - 3. Provide reinforcing bars free from defects and kinks.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of conditions:
  - 1. Reinforcing bars and welded wire reinforcement: Verify that reinforcement is new stock free from rust scale, loose mill scale, excessive rust, dirt, oil, and other coatings that will adversely affect bonding capacity when placed in work.

### 3.02 PREPARATION

- A. Surface preparation:
  - 1. Reinforcing bars:
    - a. Thin coating of red rust resulting from short exposure will not be considered objectionable.
    - b. Thoroughly clean any reinforcing bars having rust scale, loose mill scale, or thick rust coat.
  - 2. Cleaning of reinforcement materials:
    - a. Remove concrete or other deleterious coatings from dowels and other projecting reinforcing bars by wire brushing or sandblasting before reinforcing bars are embedded in subsequent concrete placement.

### 3.03 INSTALLATION

- A. Reinforcing bars: General:
  - 1. Do not field blend reinforcing bars.
  - 2. Roll hoop bars to radius of structure.
- B. Placing reinforcing bars:
  - 1. Accurately place reinforcing bars in accordance with tolerances in ACI 318 and ACI 350 adequately secure them in position.
  - 2. Lap length bars at lap splices as specified:
    - a. Install bars at lap splices in contact with each other and fasten together with tie wire.
    - b. Where reinforcing bars are to be lap spliced at concrete joints, ensure that bars project from first concrete placement, length equal to or greater than minimum lap splice length indicated on the Drawings.
    - c. Where lap splice lengths are not indicated on the Drawings, provide lap splice lengths in accordance with ACI 318 and ACI 350.
  - 3. Reinforcing bar supports:
    - a. Do not use give away bars that have less cover than required by Contract Documents. Do not adjust location of reinforcement required by Contract Documents to provide cover to give away bars.
    - b. Do not use brick, concrete masonry units, spalls, rocks, wood, or similar materials for supporting reinforcing bars.
    - c. Provide sufficient number of bar supports to prevent sagging, and shifting, and to support loads during construction. In no case less bar support than quantities and at locations as indicated in ACI SP-66.
  - 4. If not indicated on the Drawings, provide protective concrete cover in accordance with ACI 350 and ACI SP-66.
- C. Tying of reinforcing bars:
  - 1. Fasten reinforcing bars securely in place with wire ties.
  - 2. Tie reinforcing bars sufficiently often to prevent shifting.
  - 3. Provide at least 3 ties in each reinforcing bar length:
    - a. Does not apply to dowel lap splices or to reinforcing bars shorter than 4 feet, unless necessary for rigidity.
  - 4. Tie slab reinforcing bars at every intersection around periphery of slab.

5. Tie wall reinforcing bars and slab bar intersections other than around periphery at not less than every fourth intersection, but not greater than following maximum spacings:

Bar Size	Slab Bar Spacing Inches	Wall Bar Spacing Inches
Bars Number 5 and Smaller	60	48
Bars Number 6 through Number 9	96	60
Bars Number 10 and Number 11	120	96

6. After tying wire ties, bend ends of wire ties in towards center of concrete section:
  - a. Cover for wire ties shall be same as cover requirements for reinforcing bars.

D. Welded wire fabric:

1. Install necessary tie wires, spacing chairs, or supports to keep welded wire reinforcement in place while concrete is being placed.
2. Bend welded wire reinforcement as indicated on the Drawings or required to fit Work.
3. Unroll or otherwise straighten welded wire reinforcement to make flat sheet before placing in Work.
4. Lap splice welded wire fabric as indicated on the Drawings.
5. If lap splice length is not indicated on the Drawings, splice welded wire fabric in accordance with ACI 318 and ACI 350.

E. Welding reinforcing bars:

1. Weld reinforcing bars where indicated on the Drawings and where acceptable to Engineer.
2. Perform welding in accordance with AWS D1.4 and welding procedures accepted by Engineer:
  - a. Conform to requirements for minimum preheat and interpass temperatures.
3. Submit:
  - a. Welding procedures specification.
  - b. Procedures qualification record.
  - c. Welder qualification test record.
4. Do not tack weld reinforcing bars except where indicated on the Drawings.

### 3.04 FIELD QUALITY CONTROL

A. Inspection of welding of reinforcing bars:

1. Reinforcing bar welding will be continuously inspected by inspection laboratory hired by Owner.
2. In addition to visual inspection, Owner may inspect reinforcing bar welds by other methods including radiographic inspection.

END OF SECTION

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## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Cast-in-place concrete.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 03071 - Epoxies.
    - b. Section 03600 - Grouting.
    - c. Section 03931 - Epoxy Injection System.
    - d. Section 07900 - Joint Sealants.

##### 1.02 REFERENCES

- A. American Concrete Institute (ACI):
  - 1. 305 - Hot Weather Concreting Standard.
  - 2. 306 - Cold Weather Concreting Standard.
  - 3. 318 - Building Code Requirements for Structural Concrete and Commentary.
  - 4. 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary.
  - 5. Manual of Concrete Practice.
- B. ASTM International (ASTM):
  - 1. C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  - 2. C 33 - Standard Specification for Concrete Aggregates.
  - 3. C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  - 4. C 40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
  - 5. C 42 - Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
  - 6. C 88 - Standard Test Method of Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  - 7. C 94 - Standard Specification for Ready-Mixed Concrete.
  - 8. C 131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

9. C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
10. C 143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.
11. C 150 - Standard Specification for Portland Cement.
12. C 172 - Standard Practice for Sampling Freshly Mixed Concrete.
13. C 289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
14. C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
15. C 311 - Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete.
16. C 494 - Standard Specification for Chemical Admixtures for Concrete.
17. C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
18. D 75 - Standard Practice for Sampling Aggregates.

### 1.03 DEFINITIONS

- A. Alkali: Sum of sodium oxide and potassium oxide calculated as sodium oxide.
- B. Cementitious materials: Portland cement.
- C. Cold weather: A period when for more than 3 consecutive days, the average daily outdoor temperature drops below 40 degrees Fahrenheit. The average daily temperature is the average of the highest and lowest temperatures during the period from midnight to midnight. When temperatures above 50 degrees Fahrenheit occur during more than half of any 24-hour duration, the period shall no longer be regarded as cold weather.
- D. Cold weather concreting: Operations for placing, finishing, curing, and protection of concrete during cold weather.
- E. Green concrete: Concrete with less than 100 percent of the specified strength.
- F. Hairline crack: Crack with a crack width of less than 4 thousandths of an inch.
- G. Hot weather: A period when project conditions such as low humidity, high temperature, solar radiation, and high winds, promote rapid drying of freshly placed concrete.
- H. Hot weather concreting: Operations for placing, finishing, curing, and protection of concrete during hot weather.

### 1.04 SYSTEM DESCRIPTION

- A. Performance requirements:
  1. General:
    - a. Except as otherwise specified, provide concrete composed of portland cement, fine aggregate, coarse aggregate, admixtures and water so proportioned and mixed as to produce plastic, workable mixture in accordance with requirements as specified in this Section and suitable to specific conditions of placement.



- b. Proportion materials in a manner that will secure lowest water-cementitious materials ratio that is consistent with good workability, plastic and cohesive mixture, and a mixture that is within specified slump range.
  - c. Proportion fine and coarse aggregates in manner such as not to produce harshness in placing or honeycombing.
2. It is the intent of this Section to secure for every part of the Work concrete with homogeneous mixture, which when hardened will have required strength, watertightness, and durability:
- a. It is recognized that some surface hairline cracks and crazing will develop in the concrete surfaces.
  - b. Repair cracks which develop in walls or slabs and repair cracks which show any signs of leakage until all leakage is stopped.
  - c. Pressure inject visible cracks, other than hairline cracks and crazing, in following areas with epoxy as specified in Section 03931:
    - 1) Floors and walls of water bearing structures.
    - 2) Walls and overhead slabs of passageways or occupied spaces, outsides of which are exposed to weather or may be washed down and are not specified to receive separate waterproof membrane.
    - 3) Other items not specified to receive separate waterproof membrane: Slabs over water channels, wet wells, reservoirs, and other similar surfaces.
  - d. Walls or slabs, as specified above, that leak or sweat because of porosity or cracks too small for successful pressure injection with epoxy: Seal on water or weather side by coatings of surface sealant system, as specified in this Section.
  - e. Pressure injection and sealing: Continue as specified above until structure is watertight and remains watertight for not less than 1 year after final acceptance or date of final repair, whichever occurs later in time.
3. Workmanship and methods: Provide concrete work, including detailing of reinforcing, conforming with best standard practices and as set forth in ACI 318, ACI 350, Manual of Concrete Practices, and recommended practices.

### 1.05 SUBMITTALS

- A. Cement mill tests: Include alkali content, representative of each shipment of cement for verification of compliance with specified requirements.
- B. Concrete mixes: Full details, including mix design calculations for concrete mixes proposed for use for each class of concrete:
  - 1. Include information on correction of batching for varying moisture contents of fine aggregate.
  - 2. Source quality test records with mix design submittal:
    - a. Include calculations for required compressive strength ( $f'_{cr}$ ) based on source quality test records.
- C. Concrete aggregate tests: Certified copies in triplicate of commercial laboratory tests not more than 90 days old of all samples of concrete aggregates:
  - 1. Coarse aggregate:
    - a. Abrasion loss.
    - b. Clay lumps and friable particles.
    - c. Coal and lignite.

- d. Materials finer than 200 sieve.
- e. Reactivity.
- f. Shale and chert.
- g. Soundness.
- 2. Fine aggregate:
  - a. Clay lumps.
  - b. Color.
  - c. Decantation.
  - d. Reactivity.
  - e. Shale and chert.
  - f. Soundness.

- D. Drying shrinkage test data.
- E. Fine or coarse aggregate batched from more than 1 bin: Analyses for each bin, and composite analysis made up from these, using proportions of materials to be used in mix.
- F. For conditions that promote rapid drying of freshly placed concrete such as low humidity, high temperature, and wind: Corrective measures for use prior to placing concrete.
- G. Hot weather concreting: Procedures for production, placement, finishing, curing, protection, and temperature monitoring for concrete during hot weather and appropriate corrective measures.
- H. Product data: Submit data completely describing products.
- I. Temperature of freshly placed concrete.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Packing and shipping:
  - 1. Deliver, store, and handle concrete materials in manner that prevents damage and inclusion of foreign substances.
  - 2. Deliver and store packaged materials in original containers until ready for use.
  - 3. Deliver aggregate to mixing site and handle in such manner that variations in moisture content will not interfere with steady production of concrete of specified degree of uniformity and slump.
- B. Acceptance at site: Reject material containers or materials showing evidence of water or other damage.

#### **1.07 PROJECT CONDITIONS**

- A. Environmental requirements:
  - 1. Hot weather concreting:
    - a. Initiate evaporation control measures when concrete and air temperatures, relative humidity of the air, and the wind velocity have the capacity to evaporate water from a free surface at a rate that is equal to or greater than 0.2 pounds per square feet per hour. Determine evaporation rate using the Menzel Formula and monograph in ACI 305 3.1.3.

- b. When ambient air temperature is above 85 degrees Fahrenheit: Prior to placing concrete, cool forms and reinforcing steel by water cooling to below 90 degrees Fahrenheit.
  - c. Monitor weather conditions at the site including air temperature, humidity, and wind speed, to assess the need for evaporation control measures begin monitoring site conditions no later than 1 hour before the start of concrete placement. Continue to monitor site conditions at intervals of 30 minutes until concrete curing has begun.
  - d. Temperature of concrete mix at time of placement: Keep temperature below 90 degrees Fahrenheit by methods which do not impair quality of concrete.
  - e. For conditions that promote rapid drying of freshly placed concrete such as low humidity, high temperature, and wind: Take corrective measures to minimize rapid water loss from concrete.
  - f. Furnish and use sufficient number of maximum and minimum self-recording thermometers to adequately measure temperature around concrete.
2. Cold weather concreting:
- a. Concrete placed below ambient air temperature of 45 degrees Fahrenheit and falling or below 40 degrees Fahrenheit:
    - 1) Make provision for heating water.
  - b. Follow recommendations of ACI 306 for preparation, placement, and protection of concrete during cold weather.
  - c. If materials have been exposed to freezing temperatures to degree that any material is below 35 degrees Fahrenheit: Heat such materials.
  - d. Heating water, cement, or aggregate materials:
    - 1) Do not heat in excess of 160 degrees Fahrenheit.
  - e. Protection of concrete in forms:
    - 1) Do not remove forms from concrete when outside ambient air temperature is below 50 degrees Fahrenheit until concrete has attained its minimum specified compressive strength. Evidence of strength shall be based on by testing of cylinders stored in the field under equivalent conditions to those at the concrete structure.
    - 2) Protect by means of covering with tarpaulins, or other acceptable covering acceptable to Engineer.
    - 3) Provide means for circulating warm moist air around forms in manner to maintain temperature of 50 degrees Fahrenheit for at least 5 days.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Admixtures:
- 1. General:
    - a. Do not use admixtures of any type, except as specified, unless written acceptance has been obtained from the Engineer.
    - b. Admixtures shall be compatible with concrete and other admixtures. Admixtures other than pozzolans shall be the products of a single manufacture to ensure compatibility.

- c. Do not use admixtures containing chlorides calculated as chloride ion in excess of 0.5 percent by weight of cement.
      - d. Use in accordance with manufacturer's recommendations. Add each admixture to concrete mix separately.
    - 2. Air entraining admixture:
      - a. Provide concrete with 5 percent, within 1 percent, entrained air of evenly dispersed air bubbles at time of placement.
      - b. In accordance with ASTM C 260.
    - 3. Water reducing admixture:
      - a. May be used at the Contractor's option.
      - b. In accordance with ASTM C 494, Type A or Type D.
      - c. Not contain air-entraining agents.
      - d. Liquid form before adding to the concrete mix.
      - e. No decrease in cement is permitted as result of use of water reducing admixture.
    - 4. Super-plasticizers: Are not to be used.
- B. Aggregate:
  - 1. General:
    - a. Provide concrete aggregates that are sound, uniformly graded, and free of deleterious material in excess of allowable amounts specified.
    - b. Grade aggregate in accordance with ASTM C 136 and D 75.
    - c. Provide unit weight of fine and coarse aggregate that produces in place concrete with weight of not less than 140 pounds per cubic foot.
    - d. Do not use aggregate made from recycled materials such as crushed and screened hydraulic-cement concrete, brick, and other construction materials.
  - 2. Fine aggregate:
    - a. Provide fine aggregate for concrete or mortar consisting of clean, natural sand or of sand prepared from crushed stone or crushed gravel.
    - b. Except as otherwise specified, grade fine aggregate from coarse to fine in accordance with ASTM C 33.
  - 3. Coarse aggregate:
    - a. Provide coarse aggregate consisting of gravel or crushed stone made up of clean, hard, durable particles free from calcareous coatings, organic matter, or other foreign substances.
    - b. Aggregate for Class A, B, C, and D concrete: In accordance with ASTM C 33, Size Number 57, except as otherwise specified or authorized in writing by the Engineer.
- C. Evaporation retardant:
  - 1. Manufacturers: One of the following or equal:
    - a. BASF, Cleveland, Ohio, Confilm.
    - b. Euclid Chemical Company, Cleveland, Ohio, Eucobar.
- D. Portland cement:
  - 1. Conform to specifications and tests in accordance with ASTM C 150, Types II or III, low alkali, except as specified otherwise.
  - 2. Have total alkali containing not more than 0.60 percent.

- E. Sprayed membrane curing compound: Clear type with fugitive dye in accordance with ASTM C 309, Type 1D.
- F. Water:
  - 1. Water for concrete, washing aggregate, and curing concrete: Clean and free from oil and deleterious amounts of alkali, acid, organic matter, or other substances.
  - 2. Chlorides and sulfate ions:
    - a. Water for conventional reinforced concrete: Use water containing not more than 1,000 milligrams per liter of chlorides calculated as chloride ion, nor more than 1,000 milligrams per liter of sulfates calculated as sulfate ion.
    - b. Water for prestressed or post-tensioned concrete: Use water containing not more than 650 milligrams per liter of chlorides calculated as chloride ion, or more than 800 milligrams per liter of sulfates calculated as sulfate ion.

## 2.02 EQUIPMENT

- A. Mixing concrete:
  - 1. Mixers may be of stationary plant, paver, or truck mixer type.
  - 2. Provide adequate equipment and facilities for accurate measurement and control of materials and for readily changing proportions of material.
  - 3. Mixing equipment:
    - a. Capable of combining aggregates, cementitious materials, and water within specified time into thoroughly mixed and uniform mass and discharging mixture without segregation.
    - b. Maintain concrete mixing plant and equipment in good working order and operated at loads, speeds, and timing recommended by manufacturer or as specified.
    - c. Proportion cementitious materials and aggregate by weight.
- B. Machine mixing:
  - 1. Batch plant shall be capable of controlling delivery of all material to mixer within 1 percent by weight of individual material.
  - 2. If bulk cementitious materials are used, weigh them on separate visible scale which will accurately register scale load at any stage of weighing operation from zero to full capacity.
  - 3. Prevent cementitious materials from coming into contact with aggregate or with water until materials are in mixer ready for complete mixing with all mixing water.
  - 4. Procedure of mixing cementitious materials with sand or with sand and coarse aggregate for delivery to project site, for final mixing and addition of mixing water will not be permitted.
  - 5. Retempering of concrete will not be permitted.
  - 6. Discharge entire batch before recharging.
  - 7. Volume of mixed material per batch: Not exceed manufacturer's rated capacity of mixer.
  - 8. Mixers:
    - a. Perform mixing in batch mixers of acceptable type.

- b. Equip each mixer with device for accurately measuring and indicating quantity of water entering concrete, and operating mechanism such that leakage will not occur when valves are closed.
  - c. Equip each mixer with device for automatically measuring, indicating, and controlling time required for mixing:
    - 1) Interlock device to prevent discharge of concrete from mixer before expiration of mixing period.
- C. Transit-mixed concrete:
- 1. Mix and deliver in accordance with ASTM C 94.
  - 2. Total elapsed time between addition of water at batch plant and discharging completed mix:
    - a. Not to exceed 90 minutes.
    - b. Elapsed time at project site shall not exceed 30 minutes.
  - 3. Under conditions contributing to quick setting, total elapsed time permitted may be reduced by the Engineer.
  - 4. Equip each truck mixer with device interlocked to prevent discharge of concrete from drum before required number of turns and furnish device that is capable of counting number of revolutions of drum.
  - 5. Continuously revolve drum after it is once started until it has completely discharged its batch:
    - a. Do not add water until drum has started revolving.
    - b. Right is reserved to increase required minimum number of revolutions or to decrease designated maximum number of revolutions allowed, if necessary, to obtain satisfactory mixing. The Contractor will not be entitled to additional compensation because of such increase or decrease.

## 2.03 MIXES

- A. Measurements of materials:
- 1. Measure materials by weighing, except as otherwise specified or where other methods are specifically authorized in writing by the Engineer.
  - 2. Furnish apparatus for weighing aggregates and cementitious materials that is suitably designed and constructed for this purpose.
  - 3. Accuracy of weighing devices: Furnish devices that have capability of providing successive quantities of individual material that can be measured to within 1 percent of desired amount of that material.
  - 4. Measuring or weighing devices: Subject to review by the Engineer. Shall bear valid seal of the Sealer of Weights and Measures having jurisdiction.
  - 5. Weighing cementitious materials:
    - a. Weigh cementitious materials separately.
    - b. Cement in unbroken standard packages (sacks): Need not be weighed.
    - c. Weigh bulk cementitious materials and fractional packages.
  - 6. Measure mixing water by volume or by weight.
- B. Concrete proportions and consistency:
- 1. Provide concrete that can be worked readily into corners and angles of forms and around reinforcement without excessive vibration and without permitting materials to segregate or free water to collect on surface.
  - 2. Prevent unnecessary or haphazard changes in consistency of concrete.
  - 3. Ratio of coarse aggregate to fine aggregate: Not less than 1.0 or more than 2.0 for all concrete Classes.

4. Aggregate:
  - a. Obtain aggregate from source that is capable of providing uniform quality, moisture content, and grading during any single day's operation.
5. Maximum concrete mix water to cementitious materials ratio, minimum cementitious materials content, and slump range: Conform to values specified in Table A in this Section.
6. Concrete batch weights: Control and adjust to secure maximum yield. At all times, maintain proportions of concrete mix within specified limits.
7. Mix modification: If required, by the Engineer, modify mixture within limits set forth in this Section.

C. Concrete mixes:

1. Proportioning of concrete mix: Proportion mixes based on required compressive strength  $f'_{cr}$ .
2. Mixes:
  - a. Adjusting of water: After acceptance, do not change mixes without acceptance by Engineer, except that at all times adjust batching of water to compensate for free moisture content of fine aggregate.
  - b. Total water content of each concrete class: Not exceed those specified in Table A in this Section.
  - c. Checking moisture content of fine aggregate: Furnish satisfactory means at batching plant for checking moisture content of fine aggregate.
3. Change in mixes: Submit new mix design and perform new trial batch and test program as specified in this Section.

D. Classes of concrete:

1. Provide concrete consisting of 2 classes: Classes A, C, and D. Use where specified.
2. Weight of concrete classes: Provide classes of concrete having minimum weight of 140 pounds per cubic foot.
3. Class C concrete: Class C concrete may be used for fill for unauthorized excavation, for thrust blocks and ground anchors for piping, for bedding of pipe.
4. Class D concrete: Use Class D for precast concrete items.
5. All other concrete, unless specified or otherwise indicated on the Drawings: Use Class A concrete:

<b>TABLE A CONCRETE WITH AIR ENTRAINMENT</b>				
<b>Class</b>	<b>Specified Compressive Strength <math>f'_c</math> at 28 Days (Pounds per Square Inch)</b>	<b>Water-to- Cementitious Materials Ratio</b>	<b>Cementitious Materials per Cubic Yard of Concrete by Weight (Pounds)</b>	<b>Slump Range (Inches)</b>
A	4,000	0.40 to 0.45	564 to 658	2 to 4
C	2,500	Maximum 0.62	Minimum 423	3 to 6
D	4,500	0.40 to 0.45	564 to 658	2 to 4

6. Pumped concrete: Provide pumped concrete that complies with all requirements of this Section.
  7. Do not place concrete with slump outside limits indicated in Table A.
  8. Classes:
    - a. Classes A, C, and D concrete: Make with Type II low alkali portland cement.
    - b. Admixtures: Provide admixtures as specified in this Section.
- E. Air entraining admixture:
1. Add agent to batch in portion of mixing water.
  2. Batch solution by means of mechanical batcher capable of accurate measurement.

## 2.04 SOURCE QUALITY CONTROL

- A. Tests:
1. Required average compressive strength:
    - a. Determine required average compressive strength ( $f'_{cr}$ ) for selection of concrete proportions for mix design, for each class of concrete, using calculated standard deviation for its corresponding specified compressive strength ( $f'_c$ ) in accordance with ACI 318 and ACI 350.
    - b. When test records of at least 30 consecutive tests that span period of not less than 45 calendar days are available, establish standard deviation as in accordance with ACI 318 and ACI 350 and as modified in this Section.
    - c. Provide test records from which to calculate standard deviation that represent materials, quality control procedures, and conditions similar to materials, quality control procedures, and conditions expected to apply in preparation of concrete for the Work.
    - d. Provide test records with materials and proportions that are more restricted than those for the Work.
    - e. Specified compressive strength ( $f'_c$ ) of concrete used in test records: Within 1,000 pounds per square inch of that specified for the Work.
    - f. When lacking adequate test records for calculation of standard deviation meeting requirements, determine required average compressive strength  $f'_{cr}$  from following Table B:

<b>TABLE B</b>	
<b>REQUIRED AVERAGE COMPRESSION STRENGTH</b>	
<b>Specified Compressive Strength <math>f'_c</math> (pounds per square inch)</b>	<b>Required Average Compressive Strength <math>f'_{cr}</math> (pounds per square inch)</b>
Less than 3,000	$f'_c + 1,000$
3,000 to 5,000	$f'_c + 1,200$
Over 5,000	$1.10f'_c + 700$

2. Aggregate:
  - a. Testing of concrete aggregate is at Contractor's expense.
  - b. If there is change in aggregate source or if there is a significant change in aggregate quality or sieve analysis from same source, submit new set of design mixes covering each class of concrete and prepare new trial batches before further placing of concrete.
  - c. Sieves: Use sieves with square openings for testing grading of aggregates.



- d. Sample aggregate in accordance with ASTM C 136 and D 75.
- e. Fine aggregate:
  - 1) Provide fine aggregate that does not contain strong alkali nor organic matter which gives color darker than standard color when tested in accordance with ASTM C 40.
  - 2) Provide aggregate having soundness in accordance with ASTM C 33 when tested in accordance with ASTM C 88.
  - 3) Provide aggregate complying with reactivity requirements in accordance with ASTM C 33 when tested in accordance with ASTM C 289.
- f. Coarse aggregate:
  - 1) Soundness when tested in accordance with ASTM C 88: Have loss not greater than 10 percent when tested with sodium sulfate.
  - 2) Abrasion Loss: Not exceed 45 percent after 500 revolutions when tested in accordance with ASTM C 131.
  - 3) Reactivity: Not exceed limits specified in Appendix of ASTM C 33 when tested in accordance with ASTM C 289.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Liquid evaporation retardant:
  - 1. Under conditions that result in rapid evaporation of moisture from the surface of the concrete, immediately after the concrete has been screeded, coat the surface of the concrete with a liquid evaporation retardant.
  - 2. Apply the evaporation retardant again after each work operation as necessary to prevent drying shrinkage cracks.
  - 3. Conditions which result in rapid evaporation of moisture may include one or more of the following:
    - a. Low humidity.
    - b. Windy conditions.
    - c. High temperature.
- B. Conveying and placing concrete:
  - 1. Convey concrete from mixer to place of final deposit by methods that prevent separation or loss of materials.
  - 2. Use equipment for chuting, pumping, and conveying concrete of such size and design as to ensure practically continuous flow of concrete at delivery end without segregation of materials.
  - 3. Design and use chutes and devices for conveying and depositing concrete that direct concrete vertically downward when discharged from chute or conveying device.
  - 4. Keep equipment for conveying concrete thoroughly clean by washing and scraping upon completion of day's placement.
- C. Placing concrete:
  - 1. Place no concrete without prior authorization of the Engineer.
  - 2. Do not place concrete until:
    - a. Reinforcement is secure and properly fastened in its correct position and loose form ties at construction joints have been retightened.

- b. Dowels, bucks, sleeves, hangers, pipes, conduits, anchor bolts, and any other fixtures required to be embedded in concrete have been placed and adequately anchored.
    - c. Forms have been cleaned and oiled as specified.
  3. Do not place concrete in which initial set has occurred, or that has been retempered.
  4. Do not place concrete during rainstorms or high velocity winds.
  5. Protect concrete placed immediately before rain to prevent water from coming in contact with such concrete or winds causing excessive drying.
  6. Keep sufficient protective covering on hand at all times for protection of concrete.
  7. After acceptance, adhere to proposed sequence of placing concrete, except when specific changes are requested and accepted by the Engineer.
  8. Notify the Engineer in writing of readiness, not just intention, to place concrete in any portion of the work:
    - a. Provide this notification in such time in advance of operations, as the Engineer deems necessary to make final inspection of preparations at location of proposed concrete placing.
    - b. Place forms, reinforcement, screeds, anchors, ties, and inserts in place before notification of readiness is given to the Engineer.
    - c. Depositing concrete:
      - 1) Deposit concrete at or near its final position to avoid segregation caused by rehandling or flowing.
      - 2) Do not deposit concrete in large quantities in one place and work along forms with vibrator or by other methods.
      - 3) Do not drop concrete freely into place from height greater than 5 feet.
      - 4) Use tremies for placing concrete where drop is over 5 feet.
  9. Place concrete in approximately horizontal layers not to exceed 24 inches in depth and bring up evenly in all parts of forms.
  10. Continue concrete placement without avoidable interruption, in continuous operation, until end of placement is reached.
  11. After concrete placement begins, continue concrete placement without significant interruption. Plan and implement precautions to prevent any delay, between layers being placed, from exceeding 20 minutes.
- D. Consolidating concrete:
  1. Place concrete with aid of acceptable mechanical vibrators.
  2. Thoroughly consolidate concrete around reinforcement, pipes, or other shapes built into the work.
  3. Provide sufficiently intense vibration to cause concrete to flow and settle readily into place and to visibly affect concrete over radius of at least 18 inches.
  4. Vibrators:
    - a. Keep sufficient vibrators on hand at all times to vibrate concrete as placed.
    - b. In addition to vibrators in actual use while concrete is being placed, have on hand minimum 1 spare vibrator in serviceable condition.
    - c. Do not place concrete until it has been ascertained that all vibrating equipment, including spares, are in serviceable condition.

5. Take special care to place concrete solidly against forms to leave no voids.
  6. Take every precaution to make concrete solid, compact, and smooth. If for any reason surfaces or interiors have voids or are in any way defective, repair such concrete in manner acceptable to the Engineer.
- E. Footings and slabs on grade:
1. Do not place concrete on ground or compacted fill until subgrade is in moist condition acceptable to the Engineer.
  2. If necessary, sprinkle subgrade with water not less than 6 or more than 20 hours in advance of placing concrete.
  3. If subgrade becomes dry prior to concrete placement, sprinkle again, without forming pools of water.
  4. Do not place concrete if subgrade is muddy or soft.
- F. Loading concrete:
1. Green concrete:
    - a. No heavy loading of green concrete will be permitted.
  2. Use construction methods, sequencing, and allow time for concrete to reach adequate strength to prevent overstress of the concrete structure during construction.
- G. Curing concrete:
1. General:
    - a. Cure concrete by methods specified in this Section.
  2. Water curing:
    - a. Keep surfaces of concrete being water cured constantly and visibly moist day and night for period of not less than 7 days.
    - b. Each day forms remain in place count as 1 day of water curing.
    - c. No further curing credit will be allowed for forms in place after contact has once been broken between concrete surface and forms.
    - d. Do not loosen form ties during period when concrete is being cured by leaving forms in place.
    - e. Flood top of walls with water at least 3 times per day, and keep concrete surfaces moist at all times during 7 day curing period.
  3. Sprayed membrane curing compound:
    - a. Apply curing compound to concrete surface after repairing and patching, and within 1 hour after forms are removed.
    - b. If more than 1 hour elapses after removal of forms, do not use curing compound, but use water curing for full curing period.
    - c. If surface requires repairing or painting, water cure such concrete surfaces.
    - d. Do not remove curing compound from concrete in less than 7 days.
    - e. Curing compound may be removed only upon written request by Contractor and acceptance by Engineer, stating what measures are to be performed to adequately cure concrete.
    - f. Apply curing compound by mechanical, power operated sprayer and mechanical agitator that will uniformly mix all pigment and compound.
    - g. Apply curing compound in at least 2 coats.
    - h. Apply each coat in direction 90 degrees to preceding coat.
    - i. Apply curing compound in sufficient quantity so that concrete has uniform appearance and that natural color is effectively and completely concealed at time of spraying.

- j. Continue to coat and recoat surfaces until specified coverage is achieved and until coating film remains on concrete surfaces.
- k. Thickness and coverage of curing compound: Provide curing compound having film thickness that can be scraped from surfaces at any and all points after drying for at least 24 hours.
- l. The Contractor is cautioned that method of applying curing compound specified in this Section may require more curing compound than normally suggested by manufacturer of curing compound and also more than is customary in the trade.
- m. Apply amounts specified in this Section, regardless of manufacturer's recommendations or customary practice.

### 3.02 FIELD QUALITY CONTROL

- A. Testing of concrete:
  - 1. During progress of construction, the Owner will have tests made to determine whether the concrete, as being produced, complies with requirements specified.
  - 2. Tests will be performed in accordance with ASTM C 31, ASTM C 39, and ASTM C 172.
  - 3. The Contractor will make and deliver test cylinders to the laboratory and testing expense will be borne by the Contractor.
  - 4. Furnish test equipment.
  - 5. Make provisions for and furnish concrete for test specimens, and provide manual assistance to the Engineer in preparing said specimens.
  - 6. Assume responsibility for care of and providing of curing conditions for test specimens in accordance with ASTM C 31.
- B. Compressive strength tests:
  - 1. Set of 3 cylinder specimens, 6-inch diameter by 12 inch long.
  - 2. Information: Test 1 cylinder at 7 days.
  - 3. Acceptance: Test 2 cylinders at 28 days.
- C. Slump tests:
  - 1. Test slump of concrete using slump cone in accordance with ASTM C 143.
  - 2. Do not use concrete that does not meet specification requirements in regards to slump:
    - a. Remove such concrete from project site.
    - b. Test slump at the beginning of each placement, as often as necessary to keep slump within the specified range, and when requested to do so by the Engineer.
- D. Air entrainment tests:
  - 1. Test percent of entrained air in concrete at beginning of each placement, as often as necessary to keep entrained air within specified range, and when requested to do so by the Engineer.
  - 2. Do not use concrete that does not meet Specification requirements for air entrainment:
    - a. Remove such concrete from project site.
  - 3. Test air entrainment in concrete in accordance with ASTM C 173.
  - 4. The Engineer may at any time test percent of entrained air in concrete received on project site.

- E. Enforcement of strength requirement:
1. Concrete is expected to reach a compressive strength ( $f'_c$ ) than that specified in Table A.
  2. Strength level of concrete will be considered acceptable if following conditions are satisfied:
    - a. Averages of all sets of 3 consecutive strength test results is greater or equal to specified compressive strength( $f'_c$ ).
    - b. No individual strength test (average of 2 cylinders) falls below specified compressive strength ( $f'_c$ ) by more than 500 pounds per square inch.
  3. Non-compliant strength tests:
    - a. Mark non-compliant strength test reports to highlight that they contain non-complying results and immediately forward copies of test reports to all parties on the test report distribution list.
    - b. Provide treatment of non-compliant concrete at no additional cost to Owner and with no additional time added to project schedule.
    - c. Initial treatment may consist of additional curing and testing of the affected concrete:
      - 1) Provide additional curing of concrete using means and duration acceptable to the Engineer.
      - 2) Upon completion of the additional curing, provide additional testing designated by the Engineer:
        - a) Obtain and test core samples for compression strength in accordance with ASTM C 42, ACI 318, and ACI 350.
        - b) Provide not less than 3 cores for each affected area. Obtain Engineer's acceptance of proposed coring locations before proceeding with that work.
        - c) Submit report of compression strength testing for Engineer's review.
      - 3) If additional curing does not bring average of 3 cores taken in affected area to at least the minimum specified compressive strength ( $f'_c$ ), designate such concrete in affected area as defective.

### 3.03 ADJUSTING

- A. Provide repair of defective concrete at no additional cost to Owner and with no additional time added to the project schedule.
- B. Make repairs using approach and means acceptable to the Engineer:
1. Provide repairs having strength equal to or greater than specified concrete for areas involved.
  2. Do not patch, repair, or cover defective work without inspection by the Engineer.
  3. Acceptable means may include, but are not limited to strengthening, repair, or removal and replacement.
- C. Strengthening of defective concrete:
1. By addition of concrete.
  2. By addition of reinforcing.
  3. By addition of both concrete and reinforcing.

- D. Repairs:
1. Methods of repair:
    - a. Dry pack method:
      - 1) Use for holes having depth nearly equal to or greater than least surface dimension of hole, for cone-bolt holes, and for narrow slots cut for repair.
      - 2) Smooth holes: Clean and roughen by heavy sandblasting before repair.
    - b. Mortar replacement method:
      - 1) Use for holes too wide to dry pack and too shallow for concrete replacement.
      - 2) Comparatively shallow depressions, large or small, which extend no deeper than nearest surface reinforcement.
    - c. Concrete replacement method:
      - 1) Use when holes extend entirely through concrete section or when holes are more than 1 square foot in area and extend halfway or more through the section.
  2. Preparation of concrete for repair:
    - a. Chip out and key imperfections in the work and make them ready for repair.
    - b. Obtain Engineer's acceptance of surface preparation methods and of prepared surfaces prior to repair.
    - c. Surfaces of set concrete to be repaired: First coat with epoxy bonding agent as specified in Section 03071.
- E. Remove and replace defective concrete.

END OF SECTION

## SECTION 03600

### GROUTING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Cement mortar.
  - 2. Dry-pack mortar.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 03071 - Epoxies.
    - b. Section 03300 - Cast-in-Place Concrete.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-inch or [50-millimeter] cube specimens).
  - 2. C 230 - Standard Specification for Flow Table for Use In Tests of Hydraulic Cement.
  - 3. C 531 - Standard Test Method for Liner Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
  - 4. C 579 - Standard Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes.
  - 5. C 939 - Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
  - 6. C 942 - Standard Test Method for Compressive Strength of Grouts for Preplaced-Aggregate Concrete in the Laboratory.
  - 7. C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
  - 8. C 1181 - Standard Test Methods for Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.
  
- B. International Concrete Repair Institute (ICRI):
  - 1. 310.2R – Selecting and specifying Concrete Surface Preparations for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

### **1.03 SUBMITTALS**

- A. Cement mortar:
  - 1. Mix design.
  - 2. Material submittals.

### **1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to jobsite in their original, unopened packages or containers, clearly labeled with manufacturer's product identification and printed instructions.
- B. Store materials in cool dry place and in accordance with manufacturer's recommendations.
- C. Handle materials in accordance with the manufacturer's instructions.

## **PART 2 PRODUCTS**

### **2.01 MIXES**

- A. Cement mortar:
  - 1. Use same sand-to-cementitious materials ratio for cement mortar mix that is used for concrete mix.
  - 2. Use same materials for cement mortar that are used for concrete.
  - 3. Use water-to-cementitious materials ratio that is no more than that specified for concrete being repaired.
  - 4. 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. Dry-pack mortar:
  - 1. Proportions by weight: 1 part portland cement to 2 parts concrete sand:
    - a. Portland cement: As specified in Section 03300.
    - b. Concrete sand: As specified in Section 03300.
  - 2. Proportioning:
    - a. For horizontal work: Consist of mixture of 1 part epoxy with not more than 2 parts sand.

## **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 loose material or foreign matter likely to reduce bond or performance of grout or mortar.



### 3.02 INSTALLATION

- A. Mixing:
  - 1. Cement mortar:
    - a. Use mortar mixer with moving paddles.
    - b. Pre-wet mixer and empty out excess water before beginning mixing.
  - 2. Dry-patch mortar:
    - a. Use only enough water so that resulting mortar will crumble to touch after being formed into ball by hand.
  
- B. Placement:
  - 1. Cement mortar:
    - a. Use mortar mixer with moving paddles.
    - b. Pre-wet mixer and empty out excess water before beginning mixing.
  
- C. Curing:
  - 1. Cement based grouts and mortars:
    - a. Keep continuously wet for minimum of 7 days. Use wet burlap, soaker hose, sun shading, ponding, and in extreme conditions, combination of methods.
    - b. Maintain above 40 degrees Fahrenheit until it has attained compressive strength of 3,000 pounds per square inch, or above 70 degrees Fahrenheit for minimum of 24 hours to avoid damage from subsequent freezing.

END OF SECTION

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## SECTION 03931

### EPOXY INJECTION SYSTEM

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Epoxy injection system.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
1. D 638 - Standard Test Method for Tensile Properties of Plastics.
  2. D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.
  3. D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

##### 1.03 SUBMITTALS

- A. Product data:
1. Submit manufacturer's data completely describing epoxy injection system materials.
- B. Quality control submittals:
1. Certificates of Compliance.
  2. Manufacturer's Instructions.

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

- A. Manufacturers: One of the following or equal:
1. BASF, Concessive Standard LVI.
  2. Sika Chemical Corp., Sikadur 35 Hi-Mod LV.
- B. Epoxy:
1. Use epoxy materials that are new and use them within shelf-life limitations set forth by manufacturer.
  2. Water-insensitive 2-part type low viscosity epoxy adhesive material containing 100 percent solids and meeting or exceeding following characteristics when tested in accordance with standards specified:

Physical Characteristic	Test Method	Required Results
Tensile Strength	ASTM D 638	8,000 pounds per square inch at 14 days.
Flexure Strength	ASTM D 790	11,000 pounds per square inch at 14 days.
Compressive Strength	ASTM D 695	11,000 pounds per square inch at 24 hours.
Bond Strength	--	Concrete shall fail before failure of epoxy.
Gel Time for 5 Mil Film	--	4 hours maximum.
Elongation	ASTM D 638	1 percent minimum at 14 days.

## **2.02 EQUIPMENT**

- A. Injection pump:
  - 1. Use positive displacement injection pump with interlock to provide in-line mixing and metering system for 2 component epoxy.
  - 2. Use pressure hoses and injection nozzle designed to properly mix of 2 components of epoxy.
  - 3. Standby injection unit may be required.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Surface preparation:
  - 1. Sweep or clean area in vicinity of cracks that will be injected with epoxy. Leave area in generally clean condition after epoxy injection is complete.
  - 2. Clean cracks so they are free from dirt, laitance, and other loose matter.

### **3.02 INSTALLATION**

- A. Install and cure epoxy materials in accordance with manufacturer's installation instructions.
- B. Mix epoxy in accordance with manufacturer's installation instructions.
- C. Do not use solvents to thin epoxy.
- D. Crack injection:
  - 1. Apply adequate surface seal to crack to prevent leakage of epoxy.
  - 2. Establish injection points at distance along crack not less than thickness of cracked member.
  - 3. Crack injection sequence:
    - a. Inject epoxy into crack at first port with sufficient pressure to advance epoxy to adjacent port.
    - b. Seal original port and shift injection to port where epoxy appears.
    - c. Continue port-to-port injection until crack has been injected for its entire length.
    - d. For small amounts of epoxy, or where excessive pressure developed by injection pump might further damage structure, premixed epoxy and use hand caulking gun to inject epoxy if acceptable to the Engineer.
    - e. Seal ports, including adjacent locations where epoxy seepage occurs, as necessary to prevent drips or run out.
    - f. After epoxy injection is complete, remove surface seal material and refinish concrete in area where epoxy was injected to match existing concrete.

END OF SECTION]

## SECTION 05500

### METAL FABRICATIONS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Manhole frames and covers.
  - 2. Miscellaneous metals.
  - 3. Associated accessories to the above items.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 02084 - Precast Concrete Structures.
    - b. Section 09960 - High Performance Coatings.

##### 1.02 REFERENCES

- A. Aluminum Association (AA):
  - 1. DAF-45: Designations from Start to Finish:
    - a. M12-C22-A41.
  
- B. American Association of State Highway and Transportation Officials (AASHTO):
  - 1. Standard Specifications for Highway Bridges.
  
- C. ASTM International (ASTM):
  - 1. A 36 - Standard Specification for Carbon Structural Steel.
  - 2. A 48 - Standard Specification for Gray Iron Castings.
  - 3. A 53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded, and Seamless.
  - 4. A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 5. A 240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels for General Applications.
  - 6. A 276 - Standard Specification for Stainless Steel Bars and Shapes.
  - 7. A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - 8. A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - 9. A 380 - Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.

10. A 489 - Standard Specification for Carbon Steel Lifting Eyes.
11. A 490 - Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated , 150 ksi Minimum Tensile Strength.
12. A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
13. A 501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
14. A 635 - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements for.
15. A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
16. A 992 - Standard Specification for Structural Steel Shapes.
17. B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
18. B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
19. B 308 - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
20. B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
21. F 593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.

D. American Welding Society (AWS):

1. A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

E. Occupational Safety and Health Administration (OSHA).

### 1.03 DEFINITIONS

- A. Passivation: Removal of exogenous iron or iron compounds from the surface of a stainless steel by means of chemical dissolution resulting from treatment with an acid solution that removes the surface contamination but does not significantly affect the stainless steel itself.

### 1.04 SUBMITTALS

- A. Product Data:
1. Manhole frames and covers.
- B. Shop drawings:
1. Miscellaneous metals.
- C. Quality control submittals:
1. Design data.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. General: Unless otherwise specified or indicated on the Drawings, structural and miscellaneous metals in accordance with the standards of the ASTM, including the following:

Item	ASTM Standard No.	Class, Grade Type or Alloy No.
<b>Cast Iron</b>		
Cast Iron	A 48	Class 40B
<b>Steel</b>		
Galvanized sheet iron or steel	A 653	Coating G90
Coil (plate)	A 635	--
Structural plate, bars, rolled shapes, and miscellaneous items (except W shapes).	A 36	--
Rolled W shapes	A 992	Grade 50
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
<b>Stainless Steel</b>		
Plate, sheet, and strip	A 240	Type 304* or 316**
Bars and shapes	A 276	Type 304* or 316**
Bolts (Type 304)	F593	Group 1 Condition CW
Bolts (Type 316)	F593	Group 2 Condition CW
<b>Aluminum</b>		
Flashing sheet aluminum	B 209	Alloy 5005-H14, 0.032 inches minimum thickness
Structural sheet aluminum-	B 209	Alloy 6061-T6
Structural aluminum	B 209 B 308	Alloy 6061-T6
Extruded aluminum	B 221	Alloy 6063-T42
* Use Type 304L if material will be welded.		
** Use 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 MANUFACTURED UNITS

- A. Manhole frames and covers:
  - 1. Material: Gray iron castings, in accordance with ASTM A 48, Class 30-B.
  - 2. Type: Heavy-duty traffic type, with combined minimum set weight of 265 pounds.
  - 3. Machine horizontal and vertical bearing surfaces to fit neatly, with easily removable cover bearing firmly in frame without rocking.
  - 4. Frame:
    - a. Bottom flange type.
    - b. Approximately 4-1/2 inches frame height.
    - c. Dimensions as indicated on the Drawings:
      - 1) Minimum inside clear dimension may not be smaller than nominal diameter minus 2 inches.
  - 5. Cover:
    - a. Skid-resistant grid pattern design stamped with name of utility service provided by manhole: "SEWER".
    - b. Solid type without ventilation holes.
  - 6. Finish: Unpainted.
- B. Miscellaneous aluminum:
  - 1. Fabricate aluminum products, not covered separately in this Section, in accordance with the best practices of the trade and field assemble by riveting or bolting.
  - 2. Do not weld or flame cut.
- C. 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.
- D. Miscellaneous stainless steel:
  - 1. Provide miscellaneous stainless steel items not specified in this Section as indicated on the Drawings or specified elsewhere:
    - a. Fabricate and install in accordance with the best practices of the trade.
  - 2. Cleaning and passivation:
    - a. Following shop fabrication of stainless steel members, clean and passivate fabrications.
    - b. Finish requirements: Remove free iron, heat tint oxides, weld scale and other impurities, and obtain a passive finished surface.
    - c. Provide quality control testing to verify effectiveness of cleaning agents and procedures and to confirm that finished surfaces are clean and passivated:
      - 1) Conduct sample runs using test specimens with proposed cleaning agents and procedures as required to avoid adverse effects on surface finishes and base materials.



- d. Pre-clean, chemically descale (pickle), and final clean fabrications in accordance with the requirements of ASTM A 380 to remove deposited contaminants before shipping:
  - 1) Passivation by citric acid treatment is not allowed:
    - a) If degreasing is required before cleaning to remove scale or iron oxide, cleaning (pickling) treatments with citric acid are permissible; however, these treatments shall be followed by inorganic cleaners such as nitric-hydrofluoric acid.
  - 2) Provide acid descaling (pickling) in accordance with Table A1.1 of Annex A1 of ASTM A 380.
  - 3) After pickling, final cleaning of stainless steel shall conform to Part II of Table A2.1 of Annex A2 of ASTM A 380.
- e. After cleaning, inspect using methods specified for "gross inspection" in ASTM A 380.
- f. Improperly or poorly cleaned and passivated materials shall not be shipped and will not be accepted at the job site.

E. Miscellaneous structural steel:

- 1. Provide miscellaneous steel items not specified in this Section as indicated on the Drawings or specified elsewhere:
  - a. Fabricate and install in accordance with the best practices of the trade.

F. Isolating sleeves and washers:

- 1. Manufacturers: One of the following or equal:
  - a. Central Plastics Company, Shawnee, Oklahoma.
  - b. Corrosion Control Products, PSI Inc., Gardena, CA.
- 2. Sleeves: Mylar, 1/32 inch thick, 4,000 volts per mil dielectric strength, of proper size to fit bolts and extending half way into both steel washers.
- 3. One sleeve required for each bolt.
- 4. Washers: The inside diameter of all washer shall fit over the isolating sleeve and both the steel and isolating washers shall have the same inside diameter and outside diameter:
  - a. Proper size to fit bolts. 2 insulating washers are required for each bolt.
  - b. Two 1/8-inch thick steel washers for each bolt.
  - c. G3 Phenolic:
    - 1) Thickness: 1/8 inch.
    - 2) Base material: Glass.
    - 3) Resin: Phenolic.
    - 4) Water absorption: 2 percent.
    - 5) Hardness (Rockwell): 100.
    - 6) Dielectric strength: 450 volts per mil.
    - 7) Compression strength: 50,000 pounds per square inch.
    - 8) Tensile strength: 20,000 pounds per square inch.
    - 9) Maximum operating temperature: 350 degrees Fahrenheit.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 INSTALLATION**

- A. General:
  - 1. Install products as indicated on the Drawings, and in accordance with shop drawings and manufacturer's printed instructions, as applicable except where specified otherwise.
  - 2. Interface between materials:
    - a. Dissimilar metals: Where steel comes in contact with dissimilar metals (aluminum, stainless steel, etc.), separate or isolate the dissimilar metals:
      - 1) Make application so that the isolating or protective barrier is not visible in the completed construction.
      - 2) Isolating sleeves and washers: Where steel anchors come in contact with dissimilar metals (aluminum, stainless steel, etc.), use stainless steel anchors and separate or isolate dissimilar metals using isolating sleeves and washers.
      - 3) Aluminum in contact with concrete: Coat aluminum surfaces as specified in Section 09960.
- B. Manhole frames and covers:
  - 1. Installation: As specified in Section 02084.

END OF SECTION

## SECTION 07900

### JOINT SEALANTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Precast concrete joint sealant.
  - 2. Synthetic rubber sealing compound.
  - 3. Related materials.

##### 1.02 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
  - 1. M 198 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
- B. ASTM International (ASTM):
  - 1. C 920 - Standard Specification for Elastomeric Joint Sealants.
  - 2. C 990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
  - 3. D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
  - 4. D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

##### 1.03 SUBMITTALS

- A. Product data.
- B. Manufacturer's Installation Instructions.
- C. Warranty.

##### 1.04 QUALITY ASSURANCE

- A. Manufacturer qualifications: Manufacturer of proposed product for minimum 5 years with satisfactory performance record.
- B. Installer qualifications: Manufacturer approved installer of products similar to specified products on minimum 5 projects of similar scope as Project with satisfactory performance record.

##### 1.05 PROJECT/SITE CONDITIONS

- A. Environmental requirements: Do not apply sealant on wet or frosty surfaces or when surface temperature is higher than 100 degrees Fahrenheit or lower than recommended by the manufacturer.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products in accordance with manufacturer's recommendations.
- B. Code date packages. Do not use material older than manufacturer's published shelf life. Store materials at temperatures lower than 80 degrees Fahrenheit. Condition materials in accordance with manufacturer's instructions prior to installation.

## **1.07 WARRANTY**

- A. Warrant to correct defective products for minimum 1 year in accordance with manufacturer's standard warranty.

## **PART 2 PRODUCTS**

### **2.01 PRECAST CONCRETE JOINT SEALANT**

- A. Preformed, cold-applied, ready-to-use, flexible joint sealant in accordance with ASTM C 990 and AASHTO M 198. Manufacturers: One of the following or equal:
  - 1. Henry Corporation, Ram-Nek.
  - 2. Concrete Sealants Division, ConSeal.

### **2.02 SYNTHETIC RUBBER SEALING COMPOUND**

- A. Manufacturer: One of the following or equal:
  - 1. Sika Corporation, Lyndhurst, NJ, Sikaflex 2c NS or SL.
  - 2. Polymeric Systems, Inc., PSI 275.
  - 3. Pacific Polymers, Garden Grove, CA, Elastothane 227R.
- B. Material: In accordance with ASTM C 920 Type M, Grade P (pourable), Class 25 and Type M, Grade NS (non-sag), Class 25; multi-part polyurethane; able to cure at room temperature to firm, highly resilient polymer; able to perform satisfactory when continuously submerged in water or sewage and exposed to direct sunlight in dry condition; with the following properties determined at 75 degrees Fahrenheit and 50 percent relative humidity:
  - 1. Base: Polyurethane rubber.
  - 2. Solids: Minimum 97 percent.
  - 3. Application time: Minimum 2 hours.
  - 4. Cure time: Maximum 3 days.
  - 5. Tack free time: 24 hours.
  - 6. Ultimate hardness: Non-sag 25, Pourable/SL 40, within 5 Shore A.
  - 7. Tensile strength: Non-sag 120 pounds per square inch minimum and self-leveling minimum 170 pounds per square inch when tested in accordance with ASTM D 412.
  - 8. Ultimate elongation: Minimum 490 percent when tested in accordance with ASTM D 412.
  - 9. Tear resistance: Non-sag 45 pounds per inch minimum and self-leveling minimum 85 pounds per inch when tested in accordance with ASTM D 624, Die C.
  - 10. Service temperature range: Minus 25 degrees to 158 degrees Fahrenheit.
  - 11. Color: Gray to match concrete.

## **2.03 RELATED MATERIALS**

- A. Primer: Nonstaining type, recommended by sealant manufacturer to suit application.
- B. Joint cleaner: Noncorrosive, nonstaining, compatible with joint forming materials and as recommended by sealant manufacturer.
- C. Bond breaker tape: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify acceptability of joint dimensions, physical, and environmental conditions.
- B. Verify that surfaces are dry, clean, and free of dirt, grease, curing compound, and other residue which might interfere with adhesion of sealants.

### **3.02 PREPARATION**

- A. Allow concrete to cure thoroughly before caulking.
- B. Caulking:
  - 1. Verify that surfaces are dry, clean, and free of dirt, grease, curing compounds, and other residue that might interfere with adhesion of sealant.
  - 2. Concrete, masonry, wood, and steel surfaces: Clean and prime in accordance with manufacturer's instructions prior to caulking.
- C. Synthetic rubber sealing compound:
  - 1. Ensure surfaces to which synthetic rubber must bond are dry and free of dust, dirt, and other foreign residue.
  - 2. Heavy sandblasted caulking groove to sound surface, and prime with manufacturer's recommended primer for particular surface.
- D. For sidewalks, pavements, and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to depth equal to 75 percent of joint width, but neither more than 5/8 inches deep nor less than 3/8 inches deep.
- E. For normal moving building joints sealed with elastomeric sealants not subject to traffic, fill joints to depth equal to 50 percent of joint width, but neither more than 1/2 inch deep nor less than 1/4 inch deep.
- F. For joints sealed with acrylic-latex sealants, fill joints to depth in range of 75 percent to 125 percent of joint width.
- G. Use joint filler to achieve required joint depths, to allow sealants to perform properly.
- H. Prepare surfaces and install synthetic sponge rubber filler in accordance with manufacturer's recommendations.

- I. Do not stretch filler beyond normal length during installation.
- J. Apply bond breaker when recommended by joint sealer manufacturer.

### **3.03 INSTALLATION**

- A. Synthetic sponge rubber filler: Install filler in accordance with manufacturer's installation instructions.
- B. Caulking, joints, and sealing:
  - 1. Construct expansion, contraction, and construction joints as indicated on the Drawings.
  - 2. Install pipe and conduit in structures as indicated on the Drawings.
  - 3. Caulk doors, windows, louvers, and other items installed in or over concrete openings inside and out.
  - 4. Use synthetic rubber sealing compound for caulking where indicated on the Drawings or as specified, except for masonry construction and where specified otherwise.
  - 5. Complete caulking prior to painting.
  - 6. Verify that concrete is thoroughly cured prior to caulking.
  - 7. When filler compressible material is used, use untreated type.
  - 8. Apply caulking with pneumatic caulking gun.
  - 9. Use nozzles of proper shape and size for application intended.
  - 10. Maintain continuous bond between caulking and sides of joint to eliminate gaps, bubbles, or voids and fill joint in continuous operation without layering of compound.
  - 11. Employ experienced applicators to caulk joints and seams in neat workmanlike manner.
  - 12. To hasten curing of compound when used on wide joints subject to movement, apply heat with infrared lamps or other convenient means.
  - 13. Apply synthetic rubber sealing compound with pneumatic caulking tool or other acceptable method.

### **3.04 CLEANING**

- A. Clean surfaces adjacent to sealant as work progresses.
- B. Remove excess uncured sealant by soaking and scrubbing with sealant cleaning solvent.
- C. Remove excess cured sealant by sanding with Number 80 grit sandpaper.
- D. Leave finished work in neat, clean condition.

### 3.05 SCHEDULE

- A. Synthetic rubber sealing compound, self-leveling Type I:
  - 1. Expansion and control joints in masonry, concrete horizontal surfaces, and metal panels in horizontal surfaces.
  - 2. Small voids between materials requiring filling for weathertight performance in horizontal surfaces.
  - 3. Pavement joints.
  - 4. Perimeters of frames of doors, windows, louvers, and other openings in horizontal surfaces where bonding is critical to airtight performance.

END OF SECTION

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## SECTION 09960

### HIGH-PERFORMANCE COATINGS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Field-applied coatings.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 01600 - Product Requirements.
    - c. Section 01770 - Closeout Procedures.

##### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
  - 2. D 4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
- B. International Concrete Repair Institute (ICRI):
  - 1. Guideline 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.
- C. NACE International (NACE):
  - 1. SP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
  - 2. SP0188 - Discontinuity (Holiday) Testing of Protective Coatings.
- D. National Association of Pipe Fabricators (NAPF):
  - 1. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
- E. Society for Protective Coatings (SSPC):
  - 1. SP COM - Surface Preparation Commentary for Steel and Concrete Substrates.
  - 2. SP 1 - Solvent Cleaning.
  - 3. SP 2 - Hand Tool Cleaning.
  - 4. SP 3 - Power Tool Cleaning.
  - 5. SP 5 - White Metal Blast Cleaning.

6. SP 6 - Commercial Blast Cleaning.
7. SP 7 - Brush-Off Blast Cleaning.
8. SP 10 - Near-White Blast Cleaning.
9. SP 13 - Surface Preparation of Concrete.

- F. United States Environmental Protection Agency (EPA):
1. Method 24 - Surface Coatings.

### **1.03 DEFINITIONS**

- A. Submerged metal: Steel or iron surfaces below tops of channel or structure walls that will contain water even when above expected water level.
- B. Submerged concrete and masonry surfaces: Surfaces that are or will be:
1. Underwater.
  2. In structures that normally contain water.
  3. Below tops of walls of water-containing structures.
- C. Exposed surface: Any metal or concrete surface, indoors or outdoors, that is exposed to view.
- D. Dry film thickness (DFT): Thickness of fully cured coating, measured in mils.
- E. Volatile organic compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon, as determined by EPA Method 24.
- F. Ferrous: Cast iron, ductile iron, wrought iron, and all steel alloys except stainless steel.
- G. Where SSPC surface preparation standards are specified or implied for ductile iron pipe or fittings, the equivalent NAPF surface preparation standard shall be substituted for the SSPC standard.

### **1.04 PERFORMANCE REQUIREMENTS**

- A. Coating materials shall be especially adapted for use in sanitary sewer collection systems.

### **1.05 SUBMITTALS**

- A. General: Submit as specified in Section 01300.
- B. Shop drawings:
1. Schedule of proposed coating materials.
  2. Schedule of surfaces to be coated with each coating material.
- C. Product data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips:
1. Regulatory requirements: Submit data concerning the following:
    - a. VOC limitations.

- b. Coatings containing lead compounds and polychlorinated biphenyls.
  - c. Abrasives and abrasive blast cleaning techniques, and disposal.
- D. Samples: Include 8-inch square drawdowns or brush-outs of topcoat finish when requested. Identify each sample as to finish, formula, color name and number, sheen name, and gloss units.
- E. Certificates: Submit in accordance with requirements for Product Data.
- F. Manufacturer's instructions: Include the following:
  - 1. Special requirements for transportation and storage.
  - 2. Mixing instructions.
  - 3. Shelf life.
  - 4. Pot life of material.
  - 5. Precautions for applications free of defects.
  - 6. Surface preparation.
  - 7. Method of application.
  - 8. Recommended number of coats.
  - 9. Recommended DFT of each coat.
  - 10. Recommended total DFT.
  - 11. Drying time of each coat, including prime coat.
  - 12. Required prime coat.
  - 13. Compatible and non-compatible prime coats.
  - 14. Recommended thinners, when recommended.
  - 15. Limits of ambient conditions during and after application.
  - 16. Time allowed between coats (minimum and maximum).
  - 17. Required protection from sun, wind, and other conditions.
  - 18. Touch-up requirements and limitations.
  - 19. Minimum adhesion of each system submitted in accordance with ASTM D 4541.
- G. Manufacturer's Representative's Field Reports.
- H. Operations and Maintenance Data: Submit as specified in Section 01770:
  - 1. Reports on visits to project site to view and approve surface preparation of structures to be coated.
  - 2. Reports on visits to project site to observe and approve coating application procedures.
  - 3. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are "shop coated."
- I. Quality Assurance Submittals:
  - 1. Quality assurance plan.
  - 2. Qualifications of coating applicator including List of Similar Projects.
- J. Certifications:
  - 1. Submit notarized certificate that:
    - a. All paints and coatings to be used on this project comply with current federal, state, and local VOC regulations.
  - 2. California certifications:
    - a. All paints and coatings to be used on this project comply with the current VOC regulations of the State of California Air Management District in which the coatings will be used.

## 1.06 QUALITY ASSURANCE

- A. Applicator qualifications:
  - 1. Minimum of 5 years of experience applying specified type or types of coatings under conditions similar to those of the Work:
    - a. Provide qualifications of applicator and references listing 5 similar projects completed in the past 2 years.
  - 2. Manufacturer-approved applicator when manufacturer has approved applicator program.
- B. Regulatory requirements: Comply with governing agencies regulations by using coatings that do not exceed permissible VOC limits and do not contain lead:
  - 1. Do not use coal-tar epoxy in contact with drinking water or exposed to ultraviolet radiation.
- C. Field samples:
  - 1. Prepare and coat a minimum 100-square-foot area between corners or limits such as control or construction joints of each system.
  - 2. Approved field sample may be part of the Work.
  - 3. Obtain approval before painting other surfaces.
- D. Compatibility of coatings: Use products by same manufacturer for prime coats, intermediate coats, and finish coats on same surface, unless specified otherwise.
- E. Services of coating manufacturer's representative: Arrange for coating manufacturer's representative to attend pre-installation conferences. Make periodic visits to the project site to provide consultation and inspection services during surface preparation and application of coatings, and to make visits to coating plants to observe and approve surface preparation procedures and coating application of items to be "shop-primed and coated."

## 1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as specified in Section 01600.
- B. Remove unspecified and unapproved paints from Project site immediately.
- C. Deliver new unopened containers with labels identifying the manufacturer's name, brand name, product type, batch number, date of manufacturer, expiration date or shelf life, color, and mixing and reducing instructions:
  - 1. Do not deliver materials aged more than 12 months from manufacturing date.
- D. Store coatings in well-ventilated facility that provides protection from the sun weather, and fire hazards. Maintain ambient storage temperature between 45 and 90 degrees Fahrenheit, unless otherwise recommended by the manufacturer.
- E. Take precautions to prevent fire and spontaneous combustion.

## **1.08 PROJECT CONDITIONS**

- A. Surface moisture contents: Do not coat surfaces that exceed manufacturer-specified moisture contents, or when not specified by the manufacturer, with the following moisture contents:
  - 1. Masonry, concrete, and concrete block: 12 percent.
- B. Do not apply coatings:
  - 1. Under dusty conditions or adverse environmental conditions, unless tenting, covers, or other such protection is provided for structures to be coated.
  - 2. When light on surfaces measures less than 15 foot-candles.
  - 3. When ambient or surface temperature is less than 55 degrees Fahrenheit unless manufacturer allows a lower temperature.
  - 4. When relative humidity is higher than 85 percent.
  - 5. When surface temperature is less than 5 degrees Fahrenheit above dew point.
  - 6. When surface temperature exceeds the manufacturer's recommendation.
  - 7. When ambient temperature exceeds 90 degrees Fahrenheit, unless manufacturer allows a higher temperature.
  - 8. Apply clear finishes at minimum 65 degrees Fahrenheit.
- C. Provide fans, heating devices, dehumidifiers, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
- D. Provide adequate continuous ventilation and sufficient heating facilities to maintain minimum 55 degrees Fahrenheit for 24 hours before, during, and 48 hours after application of finishes.

## **1.09 MAINTENANCE**

- A. Extra materials: Deliver as specified in Section 01770. Include minimum 1 gallon of each type and color of coating applied:
  - 1. When manufacturer packages material in gallon cans, deliver unopened labeled cans as comes from factory.
  - 2. When manufacturer does not package material in gallon cans, deliver material in new gallon containers, properly sealed and identified with typed labels indicating brand, type, and color.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Special coatings: One of the following or equal:
  - 1. Carboline: Carboline, St. Louis, MO.
  - 2. Ceilcote: International Protective Coatings, Berea, OH.
  - 3. Devoe: International Protective Coatings, Louisville, KY.
  - 4. PPG Amercoat: PPG Protective & Marine Coatings, Brea, CA.
  - 5. S-W: Sherwin-Williams Co., Cleveland, OH.
  - 6. Tnemec: Tnemec Co., Kansas City, MO.
  - 7. Wasser: Wasser High Tech Coatings, Kent, WA.

## **2.02 PREPARATION AND PRETREATMENT MATERIALS**

- A. Metal pretreatment: As manufactured by one of the following or equal:
  - 1. Henkel: Galvaprep 5.
  - 2. International: AWLGrip Alumiprep 33.
- B. Surface cleaner and degreaser: As manufactured by one of the following or equal:
  - 1. Carboline Surface Cleaner No. 3.
  - 2. Devoe: Devprep 88.
  - 3. S-W: Clean and Etch.

## **2.03 COATING MATERIALS**

- A. High solids epoxy (self priming) not less than 72-percent solids by volume with a mixed applied flash point of 140 degrees Fahrenheit or less: As manufactured by one of the following or equal:
  - 1. Carboline:
    - a. Non-submerged: Carboguard 890 VOC.
    - b. Submerged: Phenoline 341 (100-percent solids, 2-component epoxy).
  - 2. Devoe:
    - a. Bar Rust 233 Low VOC.
    - b. Devran 133 (100-percent solids, 2-component epoxy).
  - 3. Non-submerged: S-W Macropoxy 646-100.
  - 4. PPG Amercoat: Amerlock 2 VOC.
- B. Coal tar: Where coal tar, coal-tar epoxy, or coal-tar mastic are specified or indicated on the Drawings, coal-tar epoxy substitute, as specified, shall be used in their place. Coal tar shall not be allowed.
- C. Coal-tar epoxy substitute: As manufactured by one of the following or equal:
  - 1. Devoe: Devtar 5A HS.
  - 2. S-W: Macropoxy 646 Black.

## **2.04 MIXES**

- A. Mix in accordance with manufacturer's instructions.

## **PART 3 EXECUTION**

### **3.01 GENERAL PROTECTION**

- A. Protect adjacent surfaces from coatings and damage. Repair damage resulting from inadequate or unsuitable protection.
- B. Protect adjacent surfaces not to be coated from spatter and droppings with drop cloths and other coverings:
  - 1. Mask off surfaces of items not to be coated or remove items from area.
- C. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being coated and, in particular, surfaces within storage and preparation areas.

- D. Place cotton waste, cloths, and material that may constitute a fire hazard in closed metal containers and remove daily from site.
- E. Remove electrical plates, surface hardware, fittings, and fastenings prior to application of coating operations. Carefully store, clean, and replace on completion of coating in each area. Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

### **3.02 GENERAL PREPARATION**

- A. Prepare surfaces in accordance with coating manufacturer's instructions, unless more stringent requirements are specified in this Section.
- B. Protect the following surfaces from abrasive blasting by masking or other means:
  - 1. Threaded portions of valve and gate stems, grease fittings, and identification plates.
  - 2. Machined surfaces for sliding contact.
  - 3. Surfaces to be assembled against gaskets.
  - 4. Surfaces of shafting on which sprockets are to fit.
  - 5. Surfaces of shafting on which bearings are to fit.
  - 6. Machined surfaces of bronze trim, including slide gates.
  - 7. Cadmium-plated items except cadmium-plated, zinc-plated, or sherardized fasteners used in assembly of equipment requiring abrasive blasting.
  - 8. Galvanized items, unless scheduled to be coated.
- C. Protect installed equipment, mechanical drives, and adjacent coated equipment from abrasive blasting to prevent damage caused by entering sand or dust.
- D. Concrete:
  - 1. Allow new concrete to cure for minimum of 28 days before coating.
  - 2. Clean concrete surfaces of dust, mortar, fins, loose concrete particles, form release materials, oil, and grease. Fill voids so that surface is smooth. Prepare concrete surface for coating in accordance with SSPC SP 13. Provide ICRI 310.2 CSP-3 surface profile, or as recommended by coating manufacturer. All concrete surfaces shall be vacuumed clean prior to coating application.
- E. Ferrous metal surfaces:
  - 1. Remove grease and oil in accordance with SSPC SP 1.
  - 2. Remove rust, scale, and welding slag and spatter, and prepare surfaces in accordance with appropriate SSPC standard as specified.
  - 3. Abrasive blast surfaces prior to coating:
    - a. When abrasive blasted surfaces rust or discolor before coating, abrasive blast surfaces again to remove rust and discoloration.
    - b. When metal surfaces are exposed because of coating damage, abrasive blast surfaces and feather in to a smooth transition before touching up.
    - c. Ferrous metal surfaces not to be submerged: Abrasive blast in accordance with SSPC SP 10, unless blasting may damage adjacent surfaces, prohibited, or specified otherwise. Where not possible to abrasive blast, power tool clean surfaces in accordance with SSPC SP 3.
    - d. Ferrous metal surfaces to be submerged: Unless specified otherwise, abrasive blast in accordance with SSPC SP 5 to clean and provide roughened surface profile of not less than 2 mils and not more than 4 mils

- in depth when measured with Elcometer 123, or as recommended by the coating manufacturer.
4. All abrasive blast cleaned surfaces shall be blown down with clean dry air and/or vacuumed.
- F. Ductile iron pipe and fittings to be lined or coated: Abrasive blast clean in accordance with NAPF 500-03.
- G. Sherardized, aluminum, copper, and bronze surfaces: Prepare in accordance with coating manufacturer's instructions.
- H. Galvanized surface:
1. Degrease or solvent clean (SSPC SP 1) to remove oily residue.
  2. Power tool or hand tool clean or whip abrasive blast.
  3. Test surface for contaminants using copper sulfate solution.
  4. Apply metal pretreatment within 24 hours before coating galvanized surfaces that cannot be thoroughly abraded physically, such as bolts, nuts, or preformed channels.
- I. Shop-primed metal:
1. Certify that primers applied to metal surfaces in the shop are compatible with coatings to be applied over such primers in the field.
  2. Remove shop primer from metal to be submerged by abrasive blasting in accordance with SSPC SP 10, unless greater degree of surface preparation is required by coating manufacturer's representative.
  3. Correct abraded, scratched, or otherwise damaged areas of prime coat by sanding or abrasive blasting to bare metal in accordance with SSPC SP 2, SP 3, or SP 6, as directed by the Engineer. When entire shop priming fails or has weathered excessively (more than 25 percent of the item), or when recommended by coating manufacturer's representative, abrasive blast shop prime coat to remove entire coat and prepare surface in accordance with SSPC SP 10.
  4. When incorrect prime coat is applied, remove incorrect prime coat by abrasive blasting in accordance with SSPC SP 10.
  5. When prime coat not authorized by Engineer is applied, remove unauthorized prime coat by abrasive blasting in accordance with SSPC SP 10.
  6. Shop applied bituminous paint or asphalt varnish: Abrasive blast clean shop applied bituminous paint or asphalt varnish from surfaces scheduled to receive non-bituminous coatings.
- J. Cadmium-plated, zinc-plated, or sherardized fasteners:
1. Abrasive blast in the same manner as unprotected metal when used in assembly of equipment designated for abrasive blasting.
- K. Abrasive blast components that are to be attached to surfaces that cannot be abrasive blasted before components are attached.
- L. Grind sharp edges to approximately 1/16-inch radius before abrasive blast cleaning.
- M. Remove and grind smooth all excessive weld material and weld spatter before blast cleaning in accordance with NACE SP0178.



- N. Poly vinyl chloride (PVC) surfaces:
  - 1. Prepare surfaces to be coated by light sanding (de-gloss) and wipe-down with clean cloths, or by solvent cleaning in strict accordance with coating manufacturer's instructions.
  
- O. Cleaning of previously coated surfaces:
  - 1. Utilize cleaning agent to remove soluble salts such as chlorides and sulfates from concrete and metal surfaces:
    - a. Cleaning agent: Biodegradable non-flammable and containing no VOC.
    - b. Manufacturer: The following or equal:
      - 1) CHLOR\*RID International, Inc.
  - 2. Cleaning of surfaces utilizing the decontamination cleaning agent may be accomplished in conjunction with abrasive blast cleaning, steam cleaning, high-pressure washing, or hand washing as approved by the coating manufacturer's representative and the Engineer.
  - 3. Test cleaned surfaces in accordance with the cleaning agent manufacturer's instructions to ensure all soluble salts have been removed. Additional cleaning shall be carried out as necessary.
  - 4. Final surface preparation prior to application of new coating system shall be made in strict accordance with coating manufacturer's printed instructions.

### **3.03 GENERAL APPLICATION REQUIREMENTS**

- A. Apply coatings in accordance with manufacturer's instructions.
  
- B. Verify metal surface preparation immediately before applying coating in accordance with SSPC SP COM.
  
- C. Allow surfaces to dry, except where coating manufacturer requires surface wetting before coating.
  
- D. Wash coat and prime sherardized, aluminum, copper, and bronze surfaces, or prime with manufacturer's recommended special primer.
  
- E. Prime shop-primed metal surfaces. Spot prime exposed metal of shop-primed surfaces before applying primer over entire surface.
  
- F. Multiple coats:
  - 1. Apply minimum number of specified coats.
  - 2. Apply additional coats when necessary to achieve specified thicknesses.
  - 3. Apply coats to thicknesses specified, especially at edges and corners.
  - 4. When multiple coats of same material are specified, tint prime coat and intermediate coats with suitable pigment to distinguish each coat.
  - 5. Lightly sand and dust surfaces to receive high-gloss finishes, unless instructed otherwise by coating manufacturer.
  - 6. Dust coatings between coats.
  
- G. Coat surfaces without drops, overspray, dry spray, runs, ridges, waves, holidays, laps, or brush marks.
  
- H. Remove spatter and droppings after completion of coating.

- I. Apply coating by brush, roller, trowel, or spray, unless particular method of application is required by coating manufacturer's instructions or these Specifications.
- J. Plural component application: Drums shall be premixed each day. All gauges shall be in working order prior to the start of application. Ratio checks shall be completed prior to each application. A spray sample shall be sprayed on plastic sheeting to ensure set time is complete prior to each application. Hardness testing shall be performed after each application.
- K. Spray application:
  - 1. Stripe coat edges, welds, nuts, bolts, and difficult-to-reach areas by brush before beginning spray application, as necessary, to ensure specified coating thickness along edges.
  - 2. When using spray application, apply coating to thickness not greater than that recommended in coating manufacturer's instructions for spray application.
  - 3. Use airless spray method, unless air spray method is required by coating manufacturer's instruction or these Specifications.
  - 4. Conduct spray coating under controlled conditions. Protect adjacent construction and property from coating mist, fumes, or overspray.
- L. Drying and recoating:
  - 1. Provide fans, heating devices, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
  - 2. Limit drying time to that required by these Specifications or coating manufacturer's instructions.
  - 3. Do not allow excessive drying time or exposure, which may impair bond between coats.
  - 4. Recoat epoxies within time limits recommended by coating manufacturer.
  - 5. When time limits are exceeded, abrasive blast clean and de-gloss clean prior to applying another coat.
  - 6. When limitation on time between abrasive blasting and coating cannot be met before attachment of components to surfaces that cannot be abrasive blasted, coat components before attachment.
  - 7. Ensure primer and intermediate coats of coating are unscarred and completely integral at time of application of each succeeding coat.
  - 8. Touch-up suction spots between coats and apply additional coats where required to produce finished surface of solid, even color, free of defects.
  - 9. Leave no holidays.
  - 10. Sand and feather in to a smooth transition and recoat scratched, contaminated, or otherwise damaged coating surfaces so damages are invisible to the naked eye.
- M. Concrete:
  - 1. Apply first coat (primer) only when surface temperature of concrete is decreasing in order to eliminate effects of off-gassing on coating.

### **3.04 HIGH SOLIDS EPOXY SYSTEM**

- A. Preparation:
  - 1. Prepare surfaces in accordance with general preparation requirements and as follows:
    - a. Abrasive blast ferrous metal surfaces to be submerged at jobsite in accordance with SSPC SP 5 prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 10.
    - b. Abrasive blast non-submerged ferrous metal surfaces at jobsite in accordance with SSPC SP 10, prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 6.
    - c. Abrasive blast clean ductile iron surfaces at jobsite in accordance with SSPC SP 7.
- B. Application:
  - 1. Apply coatings in accordance with general application requirements and as follows:
    - a. Apply minimum 2-coat system with minimum total DFT of 12 mils.
    - b. Recoat or apply succeeding epoxy coats within time limits recommended by manufacturer. Prepare surfaces for recoating in accordance with manufacturer's instructions.
    - c. Coat metal to be submerged before installation when necessary, to obtain acceptable finish, and to prevent damage to other surfaces.
    - d. Coat entire surface of support brackets, stem guides, pipe clips, fasteners, and other metal devices bolted to concrete.
    - e. Coat surface of items to be exposed and adjacent 1 inch to be concealed when embedded in concrete or masonry.

### **3.05 PROTECTIVE COAL TAR**

- A. Preparation:
  - 1. Prepare surfaces in accordance with general preparation of coal-tar requirements.
- B. Application:
  - 1. Apply coatings in accordance with general application requirements and as follows:
    - a. Apply minimum 20 mils DFT coating.

### **3.06 COAL-TAR EPOXY SUBSTITUTE**

- A. Preparation:
  - 1. Prepare surfaces in accordance with general preparation requirements and in accordance with the coating manufacturer's printed instructions.
- B. Application:
  - 1. Apply 2 coats at 6 mils to 8 mils each, for a minimum total DFT of 12 mils.

### **3.07 FIELD QUALITY CONTROL**

- A. Each coat will be inspected. Strip and remove defective coats, prepare surfaces, and recoat. When approved, apply next coat.

- B. Control and check DFT and integrity of coatings.
- C. Measure DFT with calibrated thickness gauge.
- D. DFT on ferrous-based substrates may be checked with Elcometer Type 1 Magnetic Pull-Off Gauge or PosiTector® 6000.
- E. Verify coat integrity with low-voltage sponge or high-voltage spark holiday detector, in accordance with NACE SP0188. Allow Engineer to use detector for additional checking.
- F. Check wet film thickness before coal-tar epoxy coating cures on concrete or non-ferrous metal substrates.
- G. Arrange for services of coating manufacturer's field representative to provide periodic field consultation and inspection services to ensure proper surface preparation of facilities and items to be coated, and to ensure proper application and curing:
  - 1. Notify Engineer 24 hours in advance of each visit by coating manufacturer's representative.
  - 2. Provide Engineer with a written report by coating manufacturer's representative within 48 hours following each visit.

### **3.08 SCHEDULE OF ITEMS NOT REQUIRING COATING**

- A. General: Unless specified otherwise, the following items do not require coating:
  - 1. Items that have received final coat at factory and are not listed to receive coating in field.
  - 2. Aluminum, brass, bronze, copper, plastic (except PVC pipe), rubber, stainless steel, chrome, Everdur, or lead.
  - 3. Buried or encased piping or conduit.
  - 4. Exterior concrete.
  - 5. Galvanized steel wall framing, galvanized electrical conduits, galvanized pipe trays, galvanized cable trays, and other galvanized items:
    - a. Areas on galvanized items or parts where galvanizing has been damaged during handling or construction shall be repaired as follows:
      - 1) Clean damaged areas by SSPC SP 1, SP 2, SP 3, or SP 7 as required.
      - 2) Apply 2 coats of a galvanizing zinc compound in strict accordance with manufacturer's instructions.
  - 6. Grease fittings.
  - 7. Fiberglass ducting or tanks in concealed locations.
  - 8. Steel to be encased in concrete or masonry.

### **3.09 SCHEDULE OF SURFACES TO BE COATED IN THE FIELD**

- A. In general, apply coatings to steel, iron, galvanized surfaces, and wood surfaces unless specified or otherwise indicated on the Drawings. Coat concrete surfaces and anodized aluminum only when specified or indicated on the Drawings.
- B. The following schedule is incomplete. Coat unlisted surfaces with same coating system as similar listed surfaces. Verify questionable surfaces.

- C. Concrete:
  - 1. Coal-tar epoxy substitute:
    - a. Exterior of manholes.
  
- D. Metals:
  - 1. High solids epoxy system:
    - a. Field priming of ferrous metal surfaces with defective shop-prime coat where no other prime coat is specified; for non-submerged service.
    - b. Bell rings, underside of manhole covers and frames.
    - c. Sump pumps and grit pumps, including underside of base plates and submerged suction and discharge piping.
    - d. Chlorine diffuser supports.
    - e. Exterior of submerged piping and valves other than stainless steel or PVC piping.
    - f. Submerged pipe supports and hangers.
    - g. Stem guides.
    - h. Vertical shaft mixers and aerators below supports.
    - i. Other submerged iron and steel metal unless specified otherwise.
    - j. Interior surface of suction inlet and volute of submersible influent pumps. Apply coating prior to pump testing.
    - k. Submerged piping.
    - l. Exterior of influent pumps and influent pump submerged discharge piping.
  - 2. Protective coal tar:
    - a. Underground pipe flanges, excluding pipe, corrugated metal pipe couplings, flexible pipe couplings and miscellaneous underground metals not otherwise specified to receive another protective coating.

END OF SECTION

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## SECTION 15052

### COMMON WORK RESULTS FOR GENERAL PIPING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Basic piping materials and methods.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 09960 - High-Performance Coatings.
    - b. Section 15211 - Ductile Iron Pipe : AWWA C151.
    - c. Section 15241 - High Density Polyethylene Plastic Pipe (HDPE): AWWA C906.
    - d. Section 15244 - Polyvinyl Chloride (PVC) Pipe: AWWA C900.
    - e. Section 15956 - Piping Systems Testing.

##### 1.02 REFERENCES

- A. American Water Work Association (AWWA):
  - 1. C105 – Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
- B. ASTM International (ASTM):
  - 1. A 193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
  - 2. A 194 - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
  - 3. A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - 4. A 563 – Standard Specification for Carbon and Alloy Steel Nuts.
  - 5. F 37 - Standard Test Methods for Sealability of Gasket Materials.

##### 1.03 DEFINITIONS

- A. Buried pipe: Pipe that is buried in the soil, or cast in a concrete pipe encasement that is buried in the soil.
- B. Exposed pipe: Pipe that is located above ground, or pipe that is located inside a structure, supported by a structure, or cast into a concrete structure.

- C. Underground piping: Piping actually buried in soil or cast in concrete that is buried in soil.
- D. Underwater piping: Piping below tops of walls in basins or tanks containing water.
- E. Wet wall: Wall with water on at least 1 side.

#### **1.04 SUBMITTALS**

- A. Product data:
  - 1. Gaskets.

### **PART 2 PRODUCTS**

#### **2.01 GASKETS**

- A. Gaskets for ductile iron piping:
  - 1. Gasket material:
    - a. Neoprene elastomer with minimum Shore A hardness value of 70.
    - b. Reinforcement: Inserted 13-ounce nylon fabric cloth for pipes 20 inch or larger.
    - c. Thickness: Minimum 3/32-inch thick for less than 10-inch pipe; minimum 1/8 inch thick for 10-inch and larger pipe.
  - 2. Manufacturers: One of the following or equal:
    - a. Pipe less than 20 inches in diameter:
      - 1) Garlock, Style 7797.
      - 2) John Crane, similar product.
    - b. Pipe 20 inches in diameter and larger:
      - 1) Garlock, Style 8798.
      - 2) John Crane, similar product.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verification of existing conditions:
  - 1. Locate and expose existing structures, piping, conduits, and other facilities and obstructions that may affect construction of underground piping before starting excavation for new underground piping and appurtenances.
  - 2. Verify sizes, elevations, locations, and other relevant features of existing facilities and obstructions. Determine conflicts for the construction of the new underground piping and appurtenances.
  - 3. Make piping location and grade adjustments to resolve conflicts between new piping and existing facilities and obstructions.

#### **3.02 INSTALLATION**

- A. General:
  - 1. Piping drawings:
    - a. Except in details, piping is indicated diagrammatically. Not every offset and fitting, or structural difficulty that may be encountered has been



indicated on the Drawings. Sizes and locations are indicated on the Drawings.

- b. Perform minor modifications to piping alignment where necessary to avoid structural, mechanical, or other type of obstructions that cannot be removed or changed:
    - 1) Modifications are intended to be of minor scope, not involving a change to the design concept or a change to the Contract Price or Contract Times.
  2. Piping alternatives:
    - a. Provide piping as specified in this Section, unless indicated on the Drawings or specified otherwise.
    - b. Alternative pipe ratings:
      - 1) Piping with greater pressure rating than specified may be substituted in lieu of specified piping without changes to the Contract Price.
      - 2) Piping of different material may not be substituted in lieu of specified piping.
  3. Unless otherwise indicated on the Drawings, piping at pipe joints, fittings, couplings, and equipment shall be installed without rotation, angular deflection, vertical offset, or horizontal offset.
- B. Wall and slab penetrations:
1. Provide sleeves for piping penetrations through concrete walls, floors, ceilings, roofs, unless specified or otherwise indicated on the Drawings.
  2. For piping 1 inch in nominal diameter and larger, provide sleeves with minimum inside diameters of 1 inch plus outside diameter of piping. For piping smaller than 1 inch in nominal diameter, provide sleeve of minimum twice the outside diameter of piping:
    - a. Arrange sleeves and adjacent joints so piping can be pulled out of sleeves and replaced without disturbing the structure.
    - b. Cut ends of sleeves flush with surfaces of concrete, masonry, or plaster.
    - c. Seal spaces between pipes and sleeves with link-type seals when not otherwise specified or indicated on the Drawings.
  3. Provide flexibility in piping connecting to structures to accommodate movement due to soil settlement and earthquakes. Provide flexibility using details indicated on the Drawings.
  4. Core drilled openings:
    - a. Do not damage or cut existing reinforcing bars, electrical conduits, or other items embedded in the existing concrete without acceptance by Engineer.
    - b. Determine location of reinforcing bars or other obstructions with a non-destructive indicator device.
    - c. Remove dust and debris from hole using compressed air.
- C. Buried piping:
1. Bury piping with minimum 3-foot cover without air traps, unless otherwise indicated on the Drawings.
  2. Where 2 similar services run parallel to each other, piping for such services may be laid in the same trench:
    - a. Lay piping with sufficient room for assembly and disassembly of joints, for thrust blocks, for other structures, and to meet separation requirements of public health authorities having jurisdiction.

3. Laying piping:
  - a. Lay piping in finished trenches free from water or debris. Begin at the lowest point with bell ends up slope.
  - b. Place piping with top or bottom markings with markings in proper position.
  - c. Lay piping on an unyielding foundation with uniform bearing under the full length of barrels.
  - d. Where joints require external grouting, banding, or pointing, provide space under and immediately in front of the bell end of each section laid with sufficient shape and size for grouting, banding, or pointing of joints.
  - e. At the end of each day's construction, plug open ends of piping temporarily to prevent entrance of debris or animals.
  
- D. Connections to existing piping:
  1. Expose existing piping to which connections are to be made with sufficient time to permit, where necessary, field adjustments in line, grade, or fittings:
    - a. Protect domestic water/potable water supplies from contamination:
      - 1) Make connections between domestic water supply and other water systems in accordance with requirements of public health authorities.
      - 2) Provide devices approved by Owner of domestic water supply system to prevent flow from other sources into the domestic supply system.
  2. Make connections to existing piping and valves after sections of new piping to be connected have been tested and found satisfactory.
  3. Provide sleeves, flanges, nipples, couplings, adapters, and other fittings needed to install or attach new fittings to existing piping and to make connections to existing piping.
  
- E. Connections between ferrous and nonferrous metals:
  1. Connect ferrous and nonferrous metal piping, tubing, and fittings with dielectric couplings especially designed for the prevention of chemical reactions between dissimilar metals.
  2. Nonferrous metals include aluminum, copper, and copper alloys.

### **3.03 CLEANING**

- A. Piping cleaning:
  1. Upon completion of installation, clean piping interior of foreign matter and debris.
  2. Perform special cleaning when required by the Contract Documents.

### **3.04 PIPING SCHEDULE**

**PIPING SCHEDULE**

<b>Process Abbrev.</b>	<b>Service</b>	<b>Nominal Diameter (inches)</b>	<b>Material</b>	<b>Pressure Class Special Thickness Class Schedule Wall Thickness</b>	<b>Pipe Spec. Section</b>	<b>Joints/ Fittings</b>	<b>Test Pressure/ Method</b>	<b>Lining</b>	<b>Coating</b>	<b>Service Conditions</b>	<b>Comments</b>
	Underground	4-6	PVC	SDR 18	15244	B&SP	15 feet/GR	None	None	Sewer	
	Underground	4-6	HDPE	SDR 17	15241	Fusion Weld	15 feet/GR	None	None	Sewer	Use for Pipe Bursting
<p>Abbreviations:</p> <p>1. The following abbreviations used in the column of test method refer to the respective methods as specified in Section 15956.</p> <p>GR Gravity method</p> <p>2. Abbreviations to designate piping include the following:</p> <p>B&amp;SP Bell and spigot</p> <p>CL Class</p> <p>CM Cement Mortar</p> <p>DIP Ductile Iron Pipe</p> <p>FPVC Fusible Polyvinyl Chloride</p>						<p>HDPE High Density Polyethylene</p> <p>PEE Polyethylene encasement</p> <p>PVC Polyvinyl Chloride</p> <p>SDR Standard Dimension Ratio</p>					

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## SECTION 15076

### PIPE IDENTIFICATION

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Pipe identification including the following:
  - 1. Underground tracer tape.
  - 2. Tracer wire.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 01600 - Product Requirements.
    - c. Section 01770 - Closeout Procedures.
    - d. Section 09960 - High-Performance Coatings.

##### 1.02 REFERENCES

- A. American Society of Mechanical Engineers (ASME):
  - 1. A13.1 - Scheme for the Identification of Piping Systems.

##### 1.03 SUBMITTALS

- A. Submit as specified in Section 01300.
  
- B. Submit following:
  - 1. Product data.
  - 2. Samples.
  - 3. Manufacturer's installation instructions.
  - 4. Submit following as specified in Section 01770:
    - a. Operation and Maintenance Data.
    - b. Warranty.

## **PART 2 PRODUCTS**

### **2.01 BURIED PIPELINE IDENTIFICATION**

- A. Underground tracer tape:
  - 1. Manufacturer: One of the following or equal:
    - a. Seton Name Plate Company, Branford, CT.
    - b. T. Christy Enterprises, Inc.
  - 2. Material:
    - a. Detectable Polyethylene tape with aluminum foil core for prolonged underground use.
    - b. Minimum tape thickness: 4 mils.
    - c. Overall tape width: 3 inches minimum.
    - d. Message: "CAUTION" with the name of the service followed by "LINE BURIED BELOW." in black lettering on colored background in accordance with approved APWA colors:
      - 1) Water: Blue.
      - 2) Sewer: Green.
      - 3) Telephone: Orange.
      - 4) Gas and other services: Yellow.
  
- B. Tracer wire:
  - 1. Manufacturers: One of the following or equal:
    - a. Kris-Tech Wire.
    - b. Corpro.
  - 2. Materials: One of the following or equal:
    - a. Solid copper conductor with 30 mil HMWPE.
    - b. 10 gauge or thicker wire.
    - c. Match insulation color to the color of the pipe being installed.

## **PART 3 EXECUTION**

### **3.01 BURIED PIPING IDENTIFICATION**

- A. Underground tracer tape:
  - 1. Place continuous run of warning tape in pipe trench, 12 inches above the pipe. Both tracer tape and tracer wire are required for plastic pipe.
  
- B. Tracer wire:
  - 1. Install on all non-metallic pipe.
  - 2. Install an electrically continuous run of tracer wire along the entire length of the pipe with wire terminations in valve boxes, manholes, or structures.
  - 3. Tracer wire shall be accessible at all manhole's interior between the top of the cone section and the grade ring or frame set, cleanouts and valve boxes (where applicable).

4. Install tracer wire on top of the pipe and secure to pipe with tape a minimum of every 5 feet.
5. A tracer wire continuity test shall be performed before project acceptance.
6. Where approved by the Engineer, splice sections of wire together using approved direct bury wire nuts.
  - a. Twisting the wires together is not acceptable.

END OF SECTION

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**SECTION 15120**  
**PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes: Piping specialties including:
  - 1. Pipe saddles.
  - 2. Tapping sleeves.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 15052 - Common Work Results for General Piping.
    - c. Section 15956 - Piping Systems Testing.

**1.02 REFERENCES**

- A. American Society of Mechanical Engineers (ASME):
  - 1. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24.
  
- B. American Water Works Association (AWWA):
  - 1. C110 - Standard for Ductile-Iron and Gray-Iron Fittings.
  - 2. C151 - Standard for Ductile-Iron Pipe, Centrifugally Cast.
  
- C. ASTM International (ASTM):
  - 1. A 148 - Standard Specification for Steel Castings, High-Strength, for Structural Purposes.
  - 2. A 536 - Standard Specification for Ductile Iron Castings.

**1.03 SUBMITTALS**

- A. Submit as specified in Section 01300.
  
- B. Product data:
  - 1. Submit for each piping specialty:
    - a. Shop drawings detailing dimensions and materials.
    - b. Manufacturer's published installation instructions.

- C. Provide vendor operation and maintenance manual.
- D. Provide Manufacturer's Certificate of Source Testing.

## **PART 2 PRODUCTS**

### **2.01 PIPE SADDLES**

- A. Manufacturers: One of the following or equal:
  - 1. BTR Inc./Smith-Blair, Inc., Style 317.
  - 2. Romac Industries, Inc., Style SST-H for HDPE pipe.
- B. Materials:
  - 1. Pipe saddles: Ductile iron.
  - 2. Straps, bolts, and nuts: Type 304 stainless steel with Teflon coating on nuts.
  - 3. Gaskets: EPDM.

### **2.02 TAPPING SLEEVES**

- A. Manufacturers: One of the following or equal:
  - 1. BTR, Inc./Smith-Blair, Inc., Style 622.
  - 2. Romac Industries, Inc., Style FTS 423 for HDPE and Style FTS 419 for PVC.
- B. Materials:
  - 1. Tapping sleeves: Steel construction.
  - 2. Bolts and nuts: Type 304 stainless steel.
  - 3. Nuts: Teflon coated.
  - 4. Gaskets: EPDM.
  - 5. Size of tapped boss: As indicated on the Drawings.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Pipe saddles:
  - 1. Coat threads on bolts with anti-gall coating prior to installation.
- B. Tapping sleeves:
  - 1. Verify existing pipe material and outer diameter prior to ordering materials.
  - 2. Coat threads on bolts with anti-gall coating prior to installation.
- C. Functional Testing:
  - 1. Pressure testing as specified in Sections 15052 and 15956.

END OF SECTION

## SECTION 15121

### PIPE COUPLINGS

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. Pipe couplings for ductile iron piping.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 09960 - High-Performance Coatings.
    - c. Section 15052 - Common Work Results for General Piping.
    - d. Section 15956 - Piping Systems Testing.

##### 1.02 REFERENCES

- A. American National Standards Institute (ANSI).
  
- B. American Society of Mechanical Engineers (ASME):
  - 1. B31.1 - Power Piping.
  - 2. B31.9 - Building Services Piping.
  
- C. American Water Works Association (AWWA):
  - 1. C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - 2. C606 – Standard for Grooved and Shouldered Joints.

##### 1.03 SUBMITTALS

- A. Submit as specified in Section 01300.
  
- B. Product data:
  - 1. Shop drawings, detailing dimensions, and materials.
  - 2. Piping layout drawings: Coordinate preparation of required piping layout drawings to show coupling sizes.

- C. Provide vendor operation and maintenance manual:
  - 1. Furnish bound sets of installation, operation, and maintenance instructions for each type of manual valve 4 inch in nominal size and larger, and all non-manual valves. Include information on valve operators.
- D. Provide Manufacturer's Certificate of Source Testing.

**PART 2 PRODUCTS**

**2.01 GENERAL**

- A. Known acceptable manufacturers are listed by specific products.
- B. Provide references as specified in this Section by specific product.
- C. Gaskets for flexible couplings and flanged coupling adapters:
  - 1. Provide gasket materials for piping applications as follows:
    - a. All other piping applications: EPDM.
- D. Exterior coatings for underground and submerged applications:
  - 1. Manufacturers: One of the following or equal:
    - a. Tapecoat Company, Inc., T.C. Mastic.
    - b. Kop-Coat Company, Inc., Bitumastic Number 50.
  - 2. Thickness: Minimum 0.040 inch.

**2.02 PIPE COUPLINGS FOR DUCTILE IRON PIPING**

- A. Flexible couplings:
  - 1. Manufacturers: One of the following or equal:
    - a. Dresser, Inc., Style 253.
    - b. Romac Industries, Inc., Style 501.
    - c. Smith-Blair, Inc., Series 441.
  - 2. Materials:
    - a. Center rings: Ductile iron in accordance with ASTM A 536.
    - b. Follower rings: Ductile iron in accordance with ASTM A 536.
    - c. Bolts and hex nuts:
      - 1) Aboveground: High strength, low alloy steel in accordance with AWWA C111.
      - 2) Buried and underwater: Type 316 stainless steel in accordance with ASTM F 593.
  - 3. Coating and lining: Manufacturer's standard fusion bonded epoxy.
  - 4. Center sleeve dimensions: Provide center sleeves with lengths in accordance with following table:

Nominal Pipe Size	Sleeve Length
3 inch and smaller	Manufacturer's standard
4 inch through 8 inch	7 inches
10 inch through 14 inch	12 inches
Greater than 16 inch	Use steel flexible coupling per Pipe Couplings for Steel Piping

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. In underground and underwater installations, coat the exterior of coupling with a protective coating in accordance with manufacturer's instructions.
- B. Joints and flexible connections shall be installed centered with no angular deflection unless otherwise indicated on the Drawings.
- C. Flexible couplings: Install with gap between pipe ends in accordance with the following table unless a greater gap is indicated on the Drawings. Maximum gap tolerance shall be within 1/8 inch:
  - 1. Install flexible coupling with pipe gap located in middle of center sleeve.
  - 2. Install flanged coupling adapter with end of plain end pipe in middle of flanged coupling body:

Center Ring Length	Gap Dimension and Tolerance
4 inch through 6 inch	3/8 inch
7 inch	5/8 inch
10 inch and greater	7/8 inch

- D. Pressure testing as specified in Sections 15052 and 15956.

END OF SECTION

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## SECTION 15211

### DUCTILE IRON PIPE: AWWA C151

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Ductile iron pipe, joints, fittings, gaskets, and pipe linings and coatings.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 02318 - Trenching.
    - c. Section 09960 - High-Performance Coatings.
    - d. Section 15052 - Common Work Results for General Process Piping.

##### 1.02 REFERENCES

- A. American Water Works Association (AWWA):
  - 1. C104 - Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
  - 2. C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
  - 3. C110 - Standard for Ductile-Iron and Gray-Iron Fittings.
  - 4. C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - 5. C150 - Standard for Thickness Design of Ductile-Iron Pipe.
  - 6. C151 - Standard for Ductile-Iron Pipe, Centrifugally Cast.
  - 7. C600 - Installation of Ductile Iron Water Mains and Their Appurtenances.

##### 1.03 SUBMITTALS

- A. Submit as specified in Section 01300.
- B. Shop Drawings:
  - 1. Detailed layout drawings showing alignment of pipes, fittings, and appurtenances, and types of joints.

##### 1.04 QUALITY ASSURANCE

- A. Perform testing per section 15956.

## 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Block piping and associated fittings for shipment to prevent damage to coatings and linings.
- B. Carefully handle piping and associated fittings during loading, unloading, and installation:
  - 1. Do not drop piping material from cars or trucks.
  - 2. Lower piping by mechanical means.
  - 3. Do not drop or pound pipe to fit grade.
- C. Store piping, fittings, and other accessories such that they do not accumulate and hold rainwater, dirt, and debris.

## PART 2 PRODUCTS

### 2.01 MANUFACTURED UNITS

- A. Ductile iron piping:
  - 1. Typical type:
    - a. In accordance with AWWA C150 and AWWA C151.
    - b. Pressure class or special thickness class as indicated in the Piping Schedule provided in Section 15052.
- B. Joints:
  - 1. Push-on rubber gasket joints: In accordance with AWWA C111.
- C. Fittings:
  - 1. Ductile iron in accordance with AWWA C110.
  - 2. Joint type: Same as that of the associated piping as specified in Section 15052.
  - 3. Plain end-to-flanged joint connectors using setscrews are not acceptable.
- D. Pipe linings:
  - 1. Cement-mortar lining:
    - a. In accordance with AWWA C104, apply cement-mortar on clean bare metal surfaces. Extend to faces of flanges, ends of spigots, and shoulders of hubs.
    - b. Minimum lining thickness: Standard in accordance with AWWA C104.
    - c. Type of cement: Type II.
  - 2. Asphaltic seal coat:
    - a. Apply over cement mortar linings and to outside surface of pipes that will not receive another coating. Apply in accordance with AWWA C151.
- E. Coatings:
  - 1. Asphalt varnish: Factory applied.
  - 2. Primer:
    - a. Factory applied for field coating.
    - b. Compatible with materials as specified in Section 09960.



## **2.02 POLYETHYLENE ENCASEMENT**

- A. 2 layers of linear low-density polyethylene (LLDPE) film, minimum thickness of 8 mils in accordance with AWWA C105.
- B. Single layer of high-density, cross-laminated polyethylene (HDCLPE) film, minimum thickness of 4 mils in accordance with AWWA C105.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. General:
  - 1. Install ductile iron piping in accordance with AWWA C600, modified as specified in Section 15052.
  - 2. For underground piping, the trenching, backfill, and compaction: As specified in Section 02318.
- B. Polyethylene encasement:
  - 1. Wrap all buried ductile iron pipe and fittings in 2 layers of loose polyethylene wrap in accordance with AWWA C105.
  - 2. Polyethylene encasement shall be continuous and terminated neatly at connections to below grade equipment or structures.
  - 3. At wall penetrations, extend encasement to the wall and neatly terminate.
  - 4. At slab penetrations, extend encasement to 2 inches below the top of slab and neatly terminate.
  - 5. When rising vertically in unimproved areas, extend encasement 6 inches above existing grade and neatly terminate.
  - 6. Repair tears and make joints with 2 layers of plastic tape.
  - 7. All work shall be inspected prior to backfilling of pipe and associated items.
- C. Joints:
  - 1. Install types of joints as specified in the piping schedule provided in Section 15052.
  - 2. Mechanical joints are not acceptable in above ground applications.

### **3.02 FIELD QUALITY CONTROL**

- A. Testing ductile iron piping:
  - 1. Test as specified in Section 15052.
  - 2. Do not test sections longer than 1/2 mile in total pipe length.
- B. Repair damaged cement mortar lining to match quality, thickness, and bonding of original lining in accordance with AWWA C104.
  - 1. When lining cannot be repaired or repairs are defective, replace defective piping with undamaged piping.

END OF SECTION

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## SECTION 15241

### HIGH DENSITY POLYETHYLENE PLASTIC (HDPE) PIPE: AWWA C906

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: High Density Polyethylene Pipe (HDPE) and fittings.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 15052 - Common Work Results for General Piping.

##### 1.02 REFERENCES

- A. American Water Works Association (AWWA):
  - 1. C906- Standard for Polyethylene (PE) Pressure Pipe And Fittings, 4 In. (100 mm) Through 63 In. (1,575 mm), for Water Distribution and Transmission.
- B. ASTM International (ASTM):
  - 1. D 1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
  - 2. D 1248 - Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.
  - 3. D 1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique.
  - 4. D 1599 - Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings.
  - 5. D 1603 - Standard Test Method for Carbon Black Content in Olefin Plastics.
  - 6. D 2122 - Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.
  - 7. D 2290 - Standard Test Method for Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe by Split Disk Method.
  - 8. D 3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
  - 9. D 3350 - Standard Specification for Polyethylene Plastic Pipe and Fittings Material.
  - 10. F 645 - Standard Guide for Selection, Design, and Installation of Thermoplastic Water-Pressure Piping Systems.
  - 11. F 714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

- C. Plastic Pipe Institute (PPI):
  - 1. PE 3408/PE 3608.

### **1.03 ABBREVIATIONS**

- A. HDPE: High-density polyethylene pipe.
- B. ID: Inside diameter of piping or tubing.
- C. OD: Outside diameter.
- D. SDR: Standard dimension ratio.

### **1.04 SUBMITTALS**

- A. Submit as specified in Section 01300.
- B. Product data:
  - 1. Describe materials and installation equipment including fusion machine. Include optimum range of fusion conditions such as fusion temperature, interface pressure, and cooling time. Pipe loads and structural calculations.
- C. Installation instructions.
- D. Provide Manufacturer's Certificate of Source Testing:
  - 1. Include date of manufacture for each lot delivered.
- E. Qualifications of installation crew for high-density polyethylene pipe including qualifications of the fusion machine technician. Furnish proof of training in the use of fusion equipment.

### **1.05 QUALITY ASSURANCE**

- A. Fusion machine technician qualifications: 3 years' experience in the installation of similar PE piping systems from the same manufacturer.
- B. Markings on the pipe shall be in accordance with AWWA C906.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect piping materials from sunlight, scoring, and distortion.
- B. Do not allow surface temperatures on pipe and fittings to exceed 120 degrees Fahrenheit.
- C. Store and handle PE pipe and fittings as recommended by manufacturer in published instructions.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Extruding and molding material: Virgin material containing no scrap, regrind, or rework material except where permitted in the referenced standards.
- B. Fittings: Same material as the pipe and of equal or greater pressure rating.

### **2.02 HDPE PIPING**

- A. General:
  - 1. Pipe and fittings: High-density polyethylene.
  - 2. Dimensions of pipe and fittings: Based on controlled outside diameter in accordance with ASTM F 714:
    - a. SDR: As given in Piping Schedule, Section 15052; or, if not given, minimum SDR = 9.
    - b. Pipe Diameter: IPS dimensions as specified in Section 15052 Pipe Schedule.
- B. Materials:
  - 1. Manufacturers: One of the following or equal:
    - a. Performance Pipe.
    - b. Isco Industries.
    - c. Pipe, fittings, and adapters: Furnished by the same manufacturer, or compatible with components in the same system and with components of other systems to which connected.
  - 2. Polyethylene: In accordance with ASTM D 1248, Type III, Class C, Category 5, Grade P34; listed by the PPI under the designation PE 3408/PE 3608; and have a minimum cell classification, in accordance with ASTM D 3350, of 345464C:
    - a. Pipe and fittings: Manufactured from material with the same cell classification.
    - b. Manufacturer shall certify that pipe and fittings meet the above classifications.
  - 3. Polyethylene fittings and custom fabrications:
    - a. Molded or fabricated.
    - b. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe.
    - c. All fittings and custom fabrications shall be fully rated for the same internal pressure as the mating pipe.
    - d. Pressure de-rated fabricated fittings are prohibited.
  - 4. Molded fittings:
    - a. Manufactured in accordance with ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, and shall be so marked.
    - b. Each production lot of molded fittings shall be subjected to the tests required under ASTM D 3261.
  - 5. X-ray inspection: The manufacturer shall submit samples from each molded fittings production lot to x-ray inspection for voids, and shall certify that voids were not found.

6. Fabricated fittings:
  - a. Made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings.
  - b. Rated for internal pressure service at least equal to the full service pressure rating of the mating pipe.
7. Polyethylene flange adapters:
  - a. Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder.
  - b. The sealing surface of the flange adapter shall be machined with a series of small v-shaped grooves to provide gasketless sealing, or to restrain the gasket against blowout.
8. Back-up rings and flange bolts:
  - a. Flange adapters shall be fitted with Type 304 or 316 stainless steel back-up rings pressure rated equal to or greater than the mating pipe.
  - b. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius.
  - c. Flange bolts and nuts shall be the same material as backing flange and as specified in Section 15052.

## 2.03 SOURCE QUALITY CONTROL

- A. HDPE piping:
  1. Manufacturer's quality control: The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials.
  2. Incoming polyethylene materials:
    - a. Inspected for density, melt flow rate, and contamination.
    - b. The cell classification properties of the material shall be certified by the supplier, and verified by manufacturer's quality control.
    - c. Approved by quality control before processing into finished goods.
  3. Outgoing materials shall be checked for:
    - a. Outside diameter, wall thickness, and eccentricity in accordance with ASTM D 2122 at a frequency of at least once per hour.
    - b. Out of roundness at a frequency of at least once per hour.
    - c. Straightness, inside and outside surface finish, markings and end cuts shall be visually inspected in accordance with ASTM F 714 on every length of pipe:
      - 1) Quality control shall verify production checks and test for:
        - a) Density in accordance with ASTM D 1505 at a frequency of at least once per extrusion lot.
        - b) Melt Index in accordance with ASTM D 1238 at a frequency of at least once per extrusion lot.
        - c) Carbon content in accordance with ASTM D 1603 at a frequency of at least once per day in accordance with extrusion line.
        - d) Quick burst pressure in accordance with ASTM D 1599 at a frequency of at least once per day per line.
        - e) Ring Tensile Strength in accordance with ASTM D 2290 at a frequency of at least once per day per line.
    - d. X-ray inspection shall be used to inspect molded fittings for voids, and knit line strength shall be tested. All fabricated fittings shall be inspected for joint quality and alignment.

4. Permanent records: The manufacturer shall maintain permanent QC and QA records.
5. Compliance tests:
  - a. Manufacturer's inspection and testing of the materials.
    - 1) In case of conflict with manufacturer's certifications, the Contractor, Engineer, or Owner may request retesting by the manufacturer or have retests performed by an outside testing service.
    - 2) All retesting shall be at the requestor's expense, and shall be performed in accordance with this Section.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. General:
  1. Where not otherwise specified, install piping in accordance with ASTM F 645, or manufacturer's published instructions for installation of piping, as applicable to the particular type of piping.
  2. Provide molded transition fittings for transitions from HDPE to metal or IPS pipe. Do not thread or solvent weld HDPE pipe.
- B. Installation of HDPE piping:
  1. Joining:
    - a. Heat fusion joining:
      - 1) Joints between plain end pipes and fittings shall be made by butt fusion, and joints between the main and saddle branch fittings shall be made utilizing saddle fusion employing only procedures that are recommended by the pipe and fitting manufacturer.
      - 2) The Contractor shall certify, in writing, that persons making heat fusion joints have received training in the manufacturer's recommended procedure and have had at least 3 years current experience in the heat fusion butt welding process.
      - 3) The Contractor shall maintain records of trained personnel, and shall certify that training was received not more than 12 months before commencing construction.
      - 4) External and internal beads shall not be removed.
    - b. Heat fusion training services: The manufacturer shall provide training in the manufacturer's recommended butt fusion and saddle fusion procedures to the Contractor's installation personnel, and to the inspector(s) representing the Owner, prior to the start of construction.
    - c. Mechanical joining:
      - 1) Polyethylene pipe and fittings may be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or, where specifically indicated on the Drawings, flexible couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material.
      - 2) Flexible couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins.

2. Installation:
  - a. General:
    - 1) The Manufacturer shall package products for shipment in a manner suitable for safe transport by commercial carrier.
    - 2) When delivered, a receiving inspection shall be performed, and any shipping damage shall be reported to the manufacturer within 7 days.
    - 3) Damaged pipe shall be promptly removed from the job site.
    - 4) Installation shall be in accordance with manufacturer's recommendations, and this specification.
    - 5) Prior to making a terminal connection of each individual run of HDPE pipe, the temperature of the pipe should be allowed to approach the service temperature at which the pipe is intended to operate.
    - 6) All necessary precautions shall be taken to ensure a safe working environment in accordance with applicable codes and standards.
  - b. Large diameter fabricated fittings: Fabricated fittings shall be butt fused to the end of a pipe.
  - c. Mechanical joint and flange installation:
    - 1) Mechanical joints and flange connections shall be installed in accordance with the manufacturer's recommended procedure.
    - 2) Flange faces shall be centered and aligned to each other before assembling and tightening bolts.
    - 3) Every effort shall be made to ensure that the opposing faces of the flange assemblies mate up securely at a temperature approximately the same as the service temperature.
    - 4) In no case shall the flange bolts be used to draw the flanges into alignment.
    - 5) Bolt threads shall be lubricated, and flat washers shall be fitted under the flange nuts.
    - 6) Bolts shall be evenly tightened according to the tightening pattern and torque step recommendations of the manufacturer.
    - 7) At least 1 hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the manufacturer.
    - 8) The final tightening torque shall be 100 ft-lbs or less as recommended by the manufacturer.
  - d. Pipe handling:
    - 1) Lift, move, or lower pipe and fittings only with wide fabric choker slings.
    - 2) Wire rope or chain shall not be used.
    - 3) Slings shall be of sufficient capacity for the load, and shall be inspected before use.
    - 4) Worn or defective equipment shall not be used.
  - e. Excavation, backfill material and backfilling and compacting:
    - 1) Comply with typical details on drawings.

### 3.02 FIELD QUALITY CONTROL

- A. Testing:
  1. Butt fusion testing:
    - a. Pipe size smaller than 14 inch:
      - 1) Test daily using ultrasonic time-of-flight diffraction (TOFD) per ISO/DIS 10863, Welding – Use of time-of-flight diffraction technique.



- B. Data logging and test data:
  - 1. A data logger shall be installed on the fusion heated joining machine. Data on each joint shall be recorded by the data logger. Data to be recorded shall be minimum temperature of joint fusion and interface pressure of the fused joint.
  - 2. Recorded data from the fusion data logger and the TOFD shall be transmitted to the Owner daily.
  
- C. Pressure testing:
  - 1. Conduct in accordance with Section 15956.
  - 2. Test pressures as specified in Section 15052.
  - 3. Temperature of test water shall be no more than 73 degrees Fahrenheit.

END OF SECTION

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## SECTION 15242

### PIPE BURSTING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Requirements for replacement of existing pipe using static pipe bursting. Pneumatic pipe bursting will not be allowed.
- B. Related section:
  - 1. Section 01550 - Traffic Control.
  - 2. Section 02260 - Excavation Support and Protection.
  - 3. Section 02318 - Trenching.
  - 4. Section 02501 - Pipeline Cleaning and CCTV Inspection.
  - 5. Section 15076 - Pipe Identification.
  - 6. Section 15241 - High Density Polyethylene Pipe (HDPE) Pipe: AWWA C906.
  - 7. Section 15244 - Polyvinyl Chloride (PVC) Pipe: AWWA C900.
  - 8. Section 15956 - Piping Systems Testing.

##### 1.02 QUALIFICATIONS

- A. Submit evidence of certification from the pipe bursting system manufacturer stating the Contractor is a fully trained and licensed user of the proposed pipe bursting system:
  - 1. Only those employees trained in the use of the pipe bursting equipment will be allowed to operate it for the Work.
- B. Submit evidence that the pipe bursting equipment operator has successfully completed a minimum of 10,000 feet of pipe bursting for similar pipe materials and diameters.
- C. Submit evidence that the Contractor has a minimum of 3 years' experience and have installed, as a company, a minimum of 50,000 feet pipe replacement by pipe bursting with the proposed pipe bursting system:
  - 1. Submit a list of at least 3 projects completed within the last 5 years.
    - a. For each project provide:
      - 1) Owner's name, address, and phone numbers.
      - 2) Engineer's name and phone numbers.
      - 3) Installation dates.
      - 4) Pipe material.
      - 5) Pipe diameter and names of the pipe bursting equipment operators.
    - b. Provide list and receive approval from the Engineer at least 2 days before mobilizing to the site.

##### 1.03 SYSTEM DESCRIPTION

- A. General:
  - 1. Replace existing pipe using pipe bursting equipment.

- B. Equipment:
1. Bursting unit:
    - a. Pipe bursting equipment shall be limited to static pipe bursting system.
    - b. Designed and manufactured to increase the external dimensions sufficiently for installation of the new pipe by breaking the existing pipe, compressing the fragments into the surrounding soils as the equipment progresses. The bursting unit shall generate sufficient force to burst and compact the existing pipeline. In each case the pipe bursting unit shall pull the pipe with it as it moves forward.
    - c. Includes an expander on the bursting head to prevent collapse of the cavity ahead of the new pipe.
    - d. Includes provisions to directly connect the new pipe to be installed to the rear of the bursting unit in accordance with the pipe bursting system manufacturer's requirements.
  2. Maintain automatic thrust and pull back.
  3. Capable of pipe bursting in 2 directions from the same excavation.
  4. Pull heads:
    - a. Advanced by a hydraulic or winching mechanism, and connected by means of a cable, chain, or rod.
    - b. Use pull heads that employ a positive through-bolt design assuring a smooth wall against the pipe cross-section at all times.
  5. Pipe rollers:
    - a. Sufficiently sized to fully support the weight of the pipe during handling and pullback operations.
    - b. Sufficient quantity and spacing of rollers to meet pipe supplier's guidelines, to assure adequate support, and to resist excessive sagging of the product pipe.
  6. Safety:
    - a. Ensure all pipe bursting equipment is equipped with proper safety devices at all time as required by all current applicable Federal, State, and local agency safety codes and regulations.

#### 1.04 SUBMITTALS

- A. Submit Contractor qualifications statement.
- B. Submit a pipe bursting plan including, but not limited to:
  1. Dimensioned layout drawings including all proposed pit locations.
  2. Installation procedures, sequencing, and schedule.
  3. Staging and laydown areas.
  4. Bursting distances and direction.
  5. Bypass pumping plan.
  6. Traffic control plan, as specified in Section 01550.
  7. Service outage and reinstatement schedule.
- C. Submit data reports, if applicable, of parameters recorded during installation of the pipe.
- D. Submit drawings and calculations for excavation supports as specified in Section 02260.

- E. If proposed for use, provide details of lubricants to be utilized including composition, weights of components, and method of application.
- F. Certifications of personnel involved in fusion welding of pipe.
- G. CCTV:
  - 1. Submit CCTV DVD of the pipeline after the new pipe has been installed to confirm successful installation.
- H. Contingency Plan for all potential problems including the following:
  - 1. Retrieval of bursting head if progress is halted by an obstruction.
  - 2. Repair of excessive settlement or upheaval as a result of pipe bursting operations.
  - 3. Repair of damage to existing structures or utilities.

## **PART 2 PRODUCTS**

### **2.01 PIPING MATERIALS**

- A. HDPE as specified in Section 15241.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Install new pipe using static pipe bursting method:
  - 1. Other methods of pipe bursting are prohibited unless specifically approved by the Engineer and Owner prior to mobilization of equipment.
- B. Existing utilities:
  - 1. At locations where there is less than 3 feet of vertical clearance between the pipe to be replaced and an existing utility, expose the existing utility at the crossing to prevent the transfer of pipe bursting forces on the utility:
    - a. Expose the existing utility for the width of the existing utility trench to a depth 6" below the utility.
  - 2. After pipe bursting operations are complete, backfill the exposed utility using CLSM as specified in Section 02312 and restore surface to preconstruction conditions.
- C. Provide written notification, including a general description of the work and approximate time line of construction events, to property owners 48 to 72 hours advance of pipe bursting operations.
- D. Noise shall be limited to meet City noise ordinance and encroachment permit requirements.

### **3.02 CCTV INSPECTION**

- A. Provide cleaning and CCTV inspection per Section 02501.
- B. Pre-pipe bursting:

1. Prior to pipe bursting operations, clean each segment of the existing pipe to be replaced.
  2. Perform an internal CCTV inspection of the pipeline after it has been cleaned to document the existing condition of the pipeline and verify the location of any existing services.
  3. Immediately notify the Engineer of any discrepancies with the Drawings:
    - a. If the pre-installation CCTV inspection reveals a defect in the existing pipe that will prohibit proper installation of the new pipe (e.g. sags, severely offset joints, etc.) notify the Engineer immediately for direction.
    - b. Eliminate the defect by using open cut construction to remove the portion(s) of pipe containing the defect and to install new pipe at the appropriate grade, or as directed by the Engineer.
    - c. Repair all defects in the existing pipeline prior to starting pipe bursting operations.
- C. Post installation:
1. Immediately after the new pipe has been installed, and all services have been reconnected, but before the pipe is placed back into service, perform an internal CCTV inspection to confirm that the pipe was installed without visual defects and that all services have been reinstated:
    - a. If Post installation CCTV inspection reveals a visual defect in the new pipeline, remove or repair the affected segment at no additional cost to the Owner.

### **3.03 LAUNCHING AND RECEIVING PITS**

- A. Plan the location and number of launching and receiving pits and submit in writing for approval by the Engineer a minimum of 14 days prior to scheduled excavation:
  1. Locate pits over the center of the pipe to be replaced.
  2. Use the minimum number of pits necessary to efficiently accomplish the work.
  3. Plan length of pits to ensure the manufacturer's recommended minimum bending radius for the pipe is maintained.
- B. Before beginning excavation, determine the location of existing utilities in the vicinity of the work area:
  1. Conduct potholing operations a minimum of 2 days prior to planned excavation.
  2. The Contractor is responsible for repairing any damage resulting to existing utilities, at no additional cost to the Owner.
- C. Properly shore all excavations as specified in Section 02260:
  1. The Contractor is responsible for correcting any damage resulting from improperly shored excavations at no additional cost to the Owner.
- D. Backfill pits as indicated on the Drawings and as specified in Section 02318.
- E. Keep all open excavations secure at all times by using barricades, lighting, signage, construction tape, steel plates, etc.

### **3.04 PIPE BURSTING**

- A. Use static pipe bursting methods.

- B. In general:
1. Post notices of service interruptions and outage as indicated in the pipe bursting plan.
  2. Excavate and shore launching and receiving pits.
  3. Isolate existing system, locate services, and excavate to the haunch of the existing pipe to expose each service.
  4. Disconnect services.
  5. Connect services to temporary system so they remain operational.
  6. Set up bursting equipment in the receiving pit and insert the bursting rods or cable through the host pipe.
  7. Connect the bursting head to the replacement pipeline and the bursting rods or cable in the launch pit.
  8. Burst the existing pipeline while pulling new pipe and tracer wire.
    - a. Attach tracer wire to the new pipe as specified in Section 15076.
  9. Reconnect services along the newly replaced pipeline as indicated on the Drawings.
  10. Pull the pipe expander, or bursting head, through the existing pipe, on grade as indicated in the Drawings, widening the existing pipe material to allow insertion of the new pipe.
  11. Attach new pipe to the rear of the bursting head and pull in directly behind bursting operations.
  12. Inspect the first 5-feet of pipe installed by pipe bursting for gouges. If gouging exceeds 10 percent of the pipe wall thickness, weld additional pipe to the end and remove damaged pipe.

### **3.05 LUBRICATION**

- A. Use lubrication if determined by the Contractor that lubrication is needed to ensure the successful completion of the project. Obtain approval for any lubricants prior to use.

### **3.06 PIPE RELAXATION AND COOLING**

- A. Allow the installed pipe to relax and cool to ambient temperature per the manufacturer's recommended amount of time, but not less than 4 hours, prior to reconnection of any service line or lateral, sealing of the annulus, or backfilling of launching and receiving pits.
- B. Allow 4 to 8 inches of new pipe to protrude into structures to allow for relaxation and contraction.

### **3.07 MANHOLE RESTORATION**

- A. Connect the new pipe to the existing or new manhole with a tight fitting seal as indicated on the Drawings:
1. If no details for pipe sealing at manholes are indicated on the Drawings, place an approved grouting ring circumferentially on the new pipe and encase with a cementitious non-shrink grout to prevent infiltration into the manhole after the pipe has relaxed and cooled.

### **3.08 SERVICES**

- A. Locate and expose existing services before beginning pipe bursting operations.

- B. Completely disconnect and isolate all services from the existing pipeline before pipe bursting operations begin.
- C. Keep all services in service during pipe bursting activities by using bypass pumping or other method approved by the Owner.
- D. Re-connect services to the new pipeline only after the pipeline has been installed, and successfully tested.
- E. Keep all bypass pumping systems in service until all services have been restored.

### **3.09 SEWAGE BYPASSING**

- A. The Contractor shall provide for continuous sewage flow around the section(s) of the pipe designated for the installation of the replacement pipe. The pump and bypass lines shall be of adequate size and capacity to handle the flow.

### **3.10 TESTING**

- A. Test all new pipe as specified in Section 15956.

END OF SECTION



## SECTION 15244

### POLYVINYL CHLORIDE (PVC) PIPE: AWWA C900

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes:
  - 1. AWWA C900 PVC pipe and fittings.
  - 2. Fusible PVC C900.
  
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 15052 - Common Work Results for General Piping.
    - c. Section 15076 - Pipe Identification.
    - d. Section 15120 - Piping Specialties.
    - e. Section 15211 - Ductile Iron Pipe: AWWA C151.
    - f. Section 15956 - Piping Systems Testing.

##### 1.02 REFERENCES

- A. American Water Works Association (AWWA):
  - 1. C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - 2. C605 - Standard for Underground Installation of PVC and PVCO Pressure Pipe and Fittings for Water.
  - 3. C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inches to 12 Inches, for Water Transmission Distribution.
  - 4. M23 – PVC Pipe – Design and Installation Manual.
  
- B. ASTM International (ASTM):
  - 1. A 536 - Standard Specification for Ductile Iron Castings.
  - 2. D 1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
  - 3. D 3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
  - 4. F 477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
  - 5. F 645 - Standard Guide for Selection, Design and Installation of Thermoplastic Water-Pressure Piping Systems.

### 1.03 ABBREVIATIONS

- A. DR: Dimension ratio.
- B. NPS: Nominal pipe size followed by the size designation.

### 1.04 SUBMITTALS

- A. Submit as specified in Section 01300.
- B. Shop Drawings:
  - 1. Describe materials, pipe, fittings, and gaskets.
  - 2. Manufacturer's product handling and installation instructions.
  - 3. Fusion technician qualifications.
  - 4. The following AS-RECORDED DATA is required from the Contractor and/or fusion provider.
  - 5. Fusion report for each fusion joint performed on the project, including joints that were rejected. Submittals of the Fusion Technician's joint reports are required as requested by the Owner or Engineer. Specific requirements of the Fusion Technician's joint report shall include:
    - a. Pipe size and dimensions.
    - b. Machine size.
    - c. Fusion technician identification.
    - d. Job identification.
    - e. Fusion joint identification.
    - f. Fusion, heating, and drag pressure settings.
    - g. Heat plate temperature.
    - h. Pipe extrusion time stamp.
    - i. Heating and cool down time of fusion.
    - j. Ambient temperature.
- C. Provide Manufacturer's Certificate of Source Testing:
  - 1. Include date of manufacture for each lot delivered.

### 1.05 QUALITY ASSURANCE

- A. Mark plastic pipe with date of extrusion, nominal size, class, manufacturer and all markings required in accordance with ASTM and AWWA standards.
- B. Fusion Technician Requirements:
  - 1. Qualified by the pipe supplier to fuse FPVCP of the type(s) and size(s) being used.
  - 2. Current qualification as of the actual date of fusion performance on the project.
  - 3. Training records for qualified fusion technicians available to Owner or Engineer upon request.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect from sunlight, scoring, and distortion.
- B. Do not allow surface temperatures to exceed 120 degrees Fahrenheit.

- C. Deliver, offload, handle, and store pipe in accordance with manufacturer's or pipe supplier's recommendations and best practices provided by AWWA M23 and AWWA C605, including compliance with minimum recommended bending radius and maximum safe pulling forces for each specific pipe.

## **PART 2 PRODUCTS**

### **2.01 PIPE**

- A. General:
  - 1. Extruding and molding material: Virgin material containing no scrap, regrind, or rework material except where permitted in the referenced standards.
  - 2. In accordance with AWWA C900.
  - 3. Made from a PVC compound conforming to cell classification 12454 in accordance with ASTM D 1784.
- B. Pipe:
  - 1. Bell and spigot:
    - a. Pipe with integral bell.
    - b. Pressure Class as scheduled in Section 15052 with a minimum DR of 18.
    - c. Manufacturers:
      - 1) Diamond Plastics Corporation.
      - 2) CertainTeed.
      - 3) North American Pipe Corporation.
  - 2. Fusible:
    - a. Extruded with plain ends square to the pipe and free of any bevel or chamfer.
    - b. No bell or gasket of any kind incorporated into the pipe.
    - c. Pressure Class as scheduled in Section 15052.
    - d. Pipe suppliers:
      - 1) Underground Solutions, Inc., Fusible C-900®.
    - e. Extruders:
      - 1) Northern Pipe Products.
      - 2) CertainTeed.
      - 3) North American Pipe Company.

### **2.02 FITTINGS**

- A. Material:
  - 1. Cast or ductile iron fittings as specified in Section 15211, sized for the dimensions of the pipe being used.
  - 2. Same material as the pipe, sized for the dimensions of the pipe being used.
- B. Equal to or greater pressure rating than the pipe.

### **2.03 JOINTS**

- A. Bell and spigot joints:
  - 1. Push-on or mechanical joint type as identified in the Piping Schedule in Section 15052.
  - 2. Gasketed joint assembly: Meet or exceed the requirements in accordance with ASTM D 3139.

3. Factory installed gaskets: EPDM in accordance with ASTM F 477.
- B. Fusion joints:
1. Unless otherwise specified, assemble FPVCP lengths in the field using butt-fusion joining methodology as recommended by the pipe supplier.

## **2.04 SOURCE QUALITY CONTROL**

- A. Bell and spigot piping:
1. Hydrostatic proof testing in accordance with AWWA C900: Test pipe and integral bell to withstand, without failure, 2 times the pressure class of the pipe for a minimum of 5 seconds.
- B. Fusible:
1. Test at the extrusion facility for properties required to meet all applicable parameters as outlined in AWWA C900.
  2. Conduct hydrostatic proof testing on specially belled, 20-foot length of FPVCP on a per shift basis, in accordance with the provisions of AWWA C900.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. General:
1. Install piping in accordance with ASTM F 645, AWWA C605, the Appendix of AWWA C900 and manufacturer's or pipe supplier's published installation instructions.
  2. For open cut installations, install underground detectable tape as specified in Section 15076.
  3. Install pipe with tracer wire as specified in Section 15076.
- B. Fusible PVC:
1. Layout:
    - a. Perform all fusion of the pipe at surface level:
      - 1) No fusion will be completed in the excavated area or trench.
    - b. Fuse pipe lengths in their entirety and stage prior to installation in the trench.
    - c. Handle and install the FPVCP pipe in a manner so as not to exceed the recommended bending radius.
  2. Installation:
    - a. Install fused lengths of pipe by lowering into the trench or excavation using manufacturer approved methods:
      - 1) Once the lowering operation is initiated, proceed until the entire length of the fused section of pipe is installed.
    - b. Coordinate lifting equipment to ensure the fused pipe does not exceed the bending and buckling limitations of the pipe, per the manufacturer's or pipe supplier's recommendations:
      - 1) Do not "drop" or "roll" pipe into the trench or excavation.
      - 2) Support pipe at all times, including placement in final alignment.
    - c. Bed and remove lengths of FPVCP from direct sunlight for a period of at least 2 minutes per inch-diameter before any connections are made.

- d. Where FPVCP is installed by pulling in tension, do not exceed the manufacturer's recommended safe pulling force for the specific pipe size and DR being installed.

C. Fusion process:

1. FPVCP will be fused by qualified fusion technicians certified and experienced in the type and size of pipe being used:
  - a. Qualification shall be documented by the pipe supplier, and shall be current as of the date of welding for the project.
2. Use only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier for the fusion process. Fusion machines must meet the following requirements:
  - a. Heat plates shall be appropriately sized and in good condition with no deep gouges or scratches within the pipe circle being fused.
  - b. Plates shall be clean and free of any contamination.
  - c. Heater controls shall properly function.
  - d. The heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe manufacturer's recommendations.
  - e. Carriage shall travel smoothly with no binding at less than 50 pounds per square inch.
  - f. Jaws shall be in good condition with proper inserts for the pipe size being fused.
  - g. Insert pins shall be installed with no interference to carriage travel.
  - h. Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.
3. Use pipe rollers for support of pipe on either side of the machine.
4. Provide a weather protection canopy that allows full machine motion of the heat plate, fusion assembly, and carriage for fusion in inclement and/or windy weather.
5. Use facing blades specifically designed for cutting FPVCP.
6. Record and log each fusion joint using an electronic monitoring device (data logger) connected to the fusion machine:
  - a. Generate the fusion data logging and joint report using software developed specifically for the fusion of FPVCP.
  - b. Use the current version of the pipe manufacturer's recommended data logger software.
  - c. Manually log data not logged by the data logger and include in the fusion technician's joint report.

A. Tapping:

1. Direct tapping of FPVCP is not allowed.
2. Saddle tapping:
  - a. Saddle taps are allowable on all sizes and classes of AWWA C900 FPCVP.
  - b. As specified in Section 15120 for allowable service saddles.
3. Tapping sleeves:
  - a. Tapping sleeves are allowable on all sizes and classes of AWWA C900 FPVCP.
  - b. As specified in Section 15120 for allowable tapping sleeves.
4. Use only allowable tap sizing and recommended tapping procedures provided by the pipe supplier for all tapping operations on FPVCP.

### **3.02 FIELD QUALITY CONTROL**

#### **A. Leakage test for piping:**

1. Subject to visible leak test and pressure test as specified in Section 15956.
2. No leakage is allowed for FPVCP.

END OF SECTION

## SECTION 15956

### PIPING SYSTEMS TESTING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section includes: Test requirements for piping systems.
- B. Related sections:
  - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
  - 2. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
  - 3. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents:
    - a. Section 01300 - Submittals.
    - b. Section 01060 - Regulatory Requirements and Permits.
    - c. Section 01510 - Temporary Utilities.
    - d. Section 15052 - Common Work Results for General Piping.

##### 1.02 REFERENCES

- A. National Fuel Gas Code (NFGC).
- B. American Society of Mechanical Engineers (ASME):
  - 1. B31.1 - Power Piping.
  - 2. B31.3 - Process Piping.
  - 3. B31.8 - Gas Transmission and Distribution Piping Systems.
- C. Underwriters Laboratories Inc. (UL).

##### 1.03 TESTING REQUIREMENTS

- A. General requirements:
  - 1. Testing requirements are stipulated in Laws and Regulations; are included in the Piping Schedule in Section 15052; are specified in the specifications covering the various types of piping; and are specified in this Section.
  - 2. Requirements in Laws and Regulations supersede other requirements of Contract Documents, except where requirements of Contract Documents are more stringent, including higher test pressures, longer test times, and lower leakage allowances.

3. Test plumbing piping in accordance with Laws and Regulations, the plumbing code, and UL requirements.
  4. When testing with water, the specified test pressure is considered to be the pressure at the lowest point of the piping section under test:
    - a. Lower test pressure as necessary (based on elevation) if testing is performed at higher point of the pipe section.
- B. Furnish necessary personnel, materials, and equipment, including bulkheads, restraints, anchors, temporary connections, pumps, water, pressure gauges, and other means and facilities required to perform tests.
- C. Water for testing, cleaning, and disinfecting:
  1. Water for testing, cleaning, and disinfecting will be provided as specified in Section 01510.
- D. Pipes to be tested: Test only those portions of pipes that have been installed as part of this Contract. Test new pipe sections prior to making final connections to existing piping. Furnish and install test plugs, bulkheads, and restraints required to isolate new pipe sections. Do not use existing valves as test plug or bulkhead.
- E. Unsuccessful tests:
  1. Where tests are not successful, correct defects or remove defective piping and appurtenances and install piping and appurtenances that comply with the specified requirements.
  2. Repeat testing until tests are successful.
- F. Test completion: Drain and leave piping clean after successful testing.
- G. Test water disposal: Dispose of testing water in adjacent manhole in accordance with requirements of federal, state, county, and city regulations governing disposal of wastes in the location of the Project and disposal site.

#### **1.04 SUBMITTALS**

- A. Submit as specified in Section 01300.
- B. Schedule and notification of tests:
  1. Submit a list of scheduled piping tests by noon of the working day preceding the date of the scheduled tests.
  2. Notification of readiness to test: Immediately before testing, notify Engineer in writing of readiness, not just intention, to test piping.
  3. Have personnel, materials, and equipment specified in place before submitting notification of readiness.
- C. CCTV data of new sewer.

#### **1.05 SEQUENCE**

- A. Clean piping before pressure or leak tests. All debris removed from the sewer shall be transferred to and accumulated in an appropriate covered leak proof container to be provided by CITY at its Corporation Yard at 530 Nevada Street for profiling and disposal at CITY expense. Liquid waste from the sewer may be disposed of back into the sanitary sewer system.



- B. Test gravity piping underground, including sanitary sewers, for visible leaks before backfilling and compacting.
- C. Underground pressure piping may be tested before or after backfilling when not indicated or specified otherwise.
- D. Backfill and compact trench, or provide blocking that prevents pipe movement before testing underground piping with a maximum leakage allowance.
- E. Test underground piping before encasing piping in concrete or covering piping with slab, structure, or permanent improvement.

## **PART 2 PRODUCTS**

Not Used.

## **PART 3 EXECUTION**

### **3.01 TESTING ALIGNMENT, GRADE, AND DEFLECTION**

- A. Alignment and grade:
  - 1. Visually inspect the interior of gravity piping with artificial light, reflected light, or laser beam.
  - 2. Consider inspection complete when no broken or collapsed piping, no open or poorly made joints, no grade changes that affect the piping capacity, or no other defects are observed.
  - 3. All gravity piping shall have a constant slope from manhole to manhole. The maximum allowable vertical deviation from grade line indicated on drawings is plus or minus 0.1 feet.
  - 4. The maximum allowable horizontal deviation from line indicated on drawings is plus or minus 0.3 feet.
  - 5. Contractor shall CCTV new sewer using one-tenth target attached to CCTV camera to verify compliance with maximum vertical deviation from grade indicated on drawings.
- B. Deflection test:
  - 1. Pull a mandrel through the clean piping section under test.
  - 2. Perform the test not sooner than 30 days after installation and not later than 60 days after installation.
  - 3. Use a 9-rod mandrel with a contact length of not less than the nominal diameter of the pipe within 1 percent plus or minus.
  - 4. Consider test complete when the mandrel can be pulled through the piping with reasonable effort by 1 person, without the aid of mechanical equipment.

### **3.02 TESTING GRAVITY FLOW PIPING**

- A. Test gravity flow piping indicated with "GR" in the Piping Schedule, as follows:
  - 1. Unless specified otherwise, subject gravity flow piping to the following tests:
    - a. Alignment and grade.
    - b. For plastic piping test for deflection.

- c. Visible leaks and pressure with maximum leakage allowance, except for storm drains and culverts.
2. Inspect piping for visible leaks before backfilling.
3. Provide temporary restraints when needed to prevent movement of piping.
4. Gravity flow piping can be tested by the following method:
  - a. Air Pressure Test:
    - 1) Each section of sewer main and its appurtenant connected laterals shall be tested between successive manholes by plugging and bracing all openings in the sewer lines. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure started over again.
    - 2) All necessary test equipment shall be in proper working order and tests shall be made in the presence of the Inspector. Test plugs shall be carefully placed at each end of the section of line to be tested. When all necessary test equipment is in place, a compressed air supply shall be attached to the air fitting on the test equipment and the air pressure within the line increased to four (4) pounds per square inch (psi). After the air supply is securely turned off or disconnected, there shall be a two (2) minute waiting period to allow stabilization of air within the sewer line before the actual test period begins. In no case shall the air pressure within the line be less than three and one-half (3-1/2) pounds per square inch at the beginning of the test period. The allowable air pressure loss shall not exceed one (1) pound per square inch for a period of 15 minutes. After completion of a test, the air pressure shall be released slowly through the valve, which is incorporated in the test equipment. Air test plugs shall not be removed until the air pressure is no longer measurable.

END OF SECTION

# **APPENDIX A**

## **Standard Conditions for Encroachment Permit**



- City of Belvedere
- City of Larkspur
- City of Mill Valley
- City of Novato
- City of San Rafael \*
- City of Sausalito

- Town of Ross
- Town of Fairfax
- Town of Corte Madera
- Town of San Anselmo
- Town of Tiburon
- County of Marin

EP No: \_\_\_\_\_  
A / B

## UNIFIED APPLICATION FOR ENCROACHMENT PERMIT

APPLICATION DATE: \_\_\_\_\_ APN: \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

LOCATION OF WORK OR ENCROACHMENT: \_\_\_\_\_  
No. Street City/Township

CROSS STREET: \_\_\_\_\_ ESTIMATED COST: \$ \_\_\_\_\_

STARTING DATE: \_\_\_\_\_ COMPLETION DATE: \_\_\_\_\_

PROPERTY OWNER'S NAME AND ADDRESS (If Different from Applicant): \_\_\_\_\_

**THE UNDERSIGNED HEREBY APPLIES FOR PERMISSION TO PERFORM THE FOLLOWING DESCRIBED WORK AND/OR OTHERWISE ENCROACH ON A LOCAL AGENCY RIGHT-OF-WAY (ROW):**

### DESCRIPTION OF WORK OR ENCROACHMENT (Include plans or sketch):

Check all that apply to the project and provide a written description:

- |  |  |  |   |
|--|--|--|---|
| <input type="checkbox"/> Driveway Approach | <input type="checkbox"/> Sidewalk      | <input type="checkbox"/> Accessible Ramp | <input type="checkbox"/> Debris Box       |
| <input type="checkbox"/> Curb & Gutter     | <input type="checkbox"/> Water Service | <input type="checkbox"/> New Utilities   | <input type="checkbox"/> Special Event    |
| <input type="checkbox"/> Sewer Improvement | <input type="checkbox"/> Excavation    | <input type="checkbox"/> Landscaping     | <input type="checkbox"/> Other (Describe) |

**Describe:**

Road Surface Type:  Asphalt  Concrete  Other: \_\_\_\_\_

Trenching Work:  Yes  No Linear Feet: \_\_\_\_\_ Surface Thickness: \_\_\_\_\_

Traffic Control Plan:  Yes  No

**Applicant agrees that all work will be performed in accordance with the rules, regulations and standards of the Local Agency Department of Public Works and any Local Municipal Code. All work shall be subject to inspection and approval by the Department of Public Works. Applicant shall indemnify, defend and hold the Local Agency, its officers, agents and employees harmless from any and all claims, suits or liability, including, but not limited to, litigation costs and attorney's fees which the Local Agency may incur as the result of any and all claims and suits for personal injury, property damage or inverse condemnation by reason of applicants placement of/or maintenance of encroachments authorized by this permit. No work shall commence until permit is issued.**

APPLICANT'S NAME / COMPANY (PLEASE PRINT): \_\_\_\_\_

CONTRACTOR'S NAME: \_\_\_\_\_ Contractor License No: \_\_\_\_\_

APPLICANT'S MAILING ADDRESS: \_\_\_\_\_

AGENCY: \_\_\_\_\_

CONTACT NUMBERS: \_\_\_\_\_  
Daytime Phone Fax Email

APPLICANT'S SIGNATURE: \_\_\_\_\_

For Agency Use Only			Fees: _____
Accepted By: _____	Application: _____		
Insurance on file? <input type="checkbox"/> Yes <input type="checkbox"/> No	Final Insp. Cleared: <input type="checkbox"/>	Plan Review & Inspection: _____	
Road Moratorium? <input type="checkbox"/> Yes <input type="checkbox"/> No	Receipt #: _____	Total: _____	

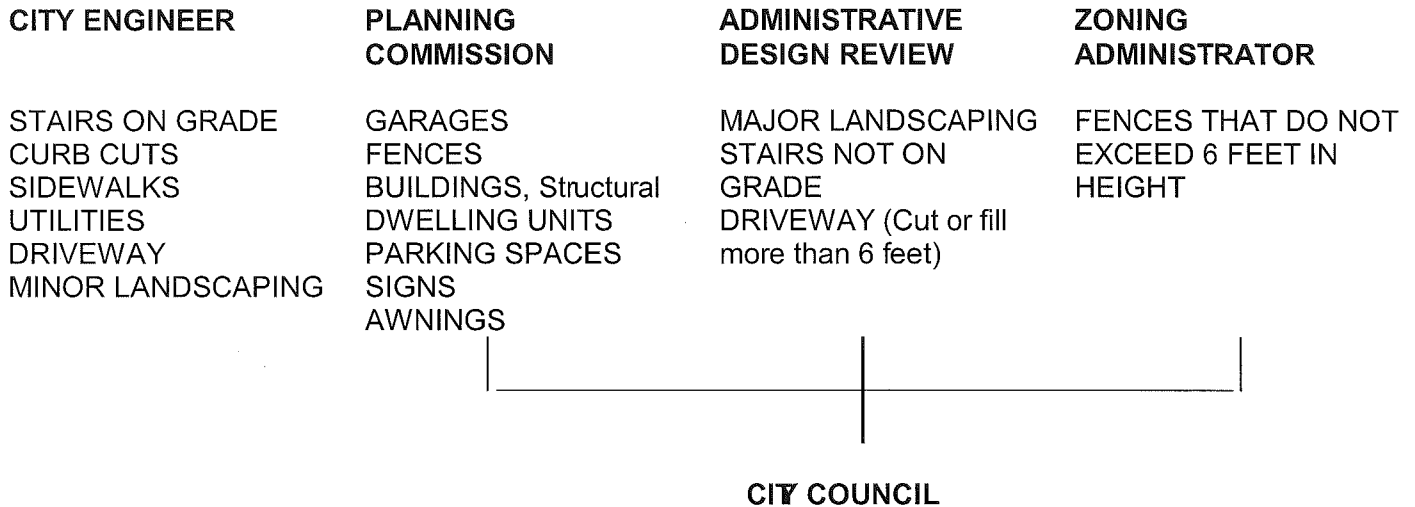
## Encroachment Permit Conditions

- Construction Standard(s): \_\_\_\_\_
- General Conditions: \_\_\_\_\_
- Comprehensive General Liability insurance in amounts not less than \$1,000,000 combined single limit applying to bodily injury, personal injury and property damage are required.
- Additional Insured Endorsement: The local agency must be named as an additionally insured on a separate endorsement sheet that modifies the general liability policy.
- Contact local Police Department, Fire Department, and Parking Services prior to start of work. 415-499-7234
- The Contractor shall maintain local access and provide emergency vehicle access at all times.
- Compaction test is required and shall be submitted to local Public Works Department.
- Provide a traffic control plan per the Manual on Uniform Traffic Control Devices (MUTCD).
- Provide safe pedestrian and wheelchair access, per ADA and State requirements, during construction.
- All work shall be performed between the hours of   8AM   and   6PM  .
- Please contact \_\_\_\_\_ prior to start of work and for final inspection.
- Planning review required: YES /  NO
- Special Conditions:   See Attached

### Encroachment Permit Approval

Approved By: _____	Date: _____
Inspected By: _____	Date: _____

## ENCROACHMENT APPLICATION REVIEW PROCEDURES



## ENCROACHMENT APPLICATION REVIEW GUIDELINES

1.     **Compatibility:**     Is the proposed encroachment compatible with the surrounding area?

Would the granting of the permit adversely affect the usability or enjoyment of adjoining parcels?

Would the encroachment create or extend an undesirable land use precedent?

Does the proposed encroachment conflict with the General Plan, adopted ordinance or any precise plan of the City of Sausalito?
2.     **Need:**                 Is the extent of the proposed encroachment justifiable?
3.     **Public Enjoyment:**    Would the proposed encroachment significantly diminish public enjoyment, either visual or physical, of the open space to be encroached upon?

Is the assignment of open space to private use and enjoyment justifiable in terms of public interest?

Could the value of the proposed improvements prejudice a policy decision to terminate the encroachments?
4.     **Circulation:**         Would the proposed encroachment adversely affect existing rights-of-way and preclude or make difficult the establishment or improvement of existing or potential streets or pedestrian ways?

Would the proposed encroachment adversely affect the existing circulation of vehicles or pedestrians?
5.     **Safety:**                Would granting of the encroachment application create or constitute a hazard to public safety?

## CITY OF SAUSALITO

STANDARD CONDITIONS FOR ENCROACHMENT PERMIT NO. \_\_\_\_\_

DESCRIPTION: Urgent Sewer Replacement Project

Condition Marked  Apply to this Project

THIS ENCROACHMENT PERMIT IS GOOD FOR  6 MONTHS  ONE YEAR  18 MONTHS  AS NOTED ON THE  
E.P. APPLICATION \_\_\_\_\_

1. This permit, or a complete copy, shall be kept at the work site at all times while work is being performed.
2. Notify Engineering Division staff at least 24 hours in advance of beginning work. Senior Engineer at (415) 289- 4180 ext. 111 and/or  Sewer Systems Coordinator at (415) 289-4192.
3. Contractor is to comply with all requirement of Ordinance No. 1048 (Noise Ordinance) including limiting hours of work in residential areas between 8:00AM and 6 PM, Monday through Friday, between 9:00AM and 5:00PM, Saturdays, and between 9:00AM and 7:00PM, on City Holidays. No work is permitted on Sunday, except by owner occupant between 9:00AM and 7:00PM.
4. Permittee shall comply with all Federal State and local laws regulation and statutes applicable to the work being performed under this permit. This also includes compliance with the requirements and permit conditions of the State of California Division of Industrial Safety.
5. The Permittee shall repair or replace at the discretion of the City Engineer, any and all public facilities damaged as a result of Permittee's actions in connection with this permit, and shall guarantee repairs or replacements to all work done under this permit, as deemed necessary by the City Engineer for a period of one year after completion of said work.
6. All traffic control shall be performed in accordance with the requirements of the current edition of Caltrans publication, "California Manual on Uniform Traffic Devices, Part 6- Temporary Traffic Control" including all specified advance construction signs and channelization devices. Construction warning signs and channelization devices are to be sufficient to adequately inform and protect vehicles, bicycle and pedestrian traffic. Permittee shall have available a copy of the Manual for workers at the construction site at all times during the progress of the work.
7. Where excavations have been permitted in paved streets, Permittee shall place temporary informational signs at each end of the work in addition to those signs required by the "California Manual on Uniform Traffic Devices, Part 6- Temporary Traffic Control." Such informational signs shall be a minimum of 18 x 24 inches, clearly identify the owner of the facility for which the work is being done, and shall show a telephone number of the owner where the public may obtain information relative to the work being done.
8. Traffic shall be permitted to pass through the work area at all times unless otherwise permitted in writing by the City Engineer. Any street closures shall be approved in advance by the City Engineer.
9. If the City Engineer determines that public convenience or safety is being jeopardized by Permittee's actions or inactions, the City Engineer may order the condition remedied by either verbal or written communication to the Permittee. If Permittee fails to remedy the condition within eight hours of such notice, the City Engineer may, at his or her discretion, either remedy the condition or contract to remedy the condition, and the cost thereof, including administrative expenses shall be charged to the Permittee.
10. If any work is performed in the location of an existing pedestrian path of travel, the Contractor shall restore the path of travel compliant with all ADA accessibility standards.
11. Any pavement marking and/or legends which are damaged or removed shall be replaced in kind by the Contractor at his/her expense. The repainting of any street markings or legends shall be performed using City stencils:
12. Wherever new work crosses any existing utilities, the Contractor shall pothole the existing utilities and determine their actual depth so as to avoid hitting these facilities during excavation.
13. All AC or PCC to be removed is to be sawcut at the edges.
14. All new AC street trench resurfacing is to be placed in maximum lifts of 3 inches and the final surface is to be fog sealed (unless a sand or slurry seal is called for on the plans).



## CITY OF SAUSALITO

STANDARD CONDITIONS FOR ENCROACHMENT PERMIT NO. \_\_\_\_\_

- 15. All sections of curb, gutter and sidewalk to be replaced, shall have 12 inch long dowels ( #4 reinforcing bars) inserted 6" into the existing concrete. A minimum of 2 dowels shall be placed into the curb and gutter. A minimum of 2 dowels shall be placed into sidewalk. Sidewalk dowel spacing shall be 24 inches on center.
- 16. Portions of existing sidewalk or curb and gutter to be removed shall be removed to the nearest expansion joint or sawcut at an existing score mark. Sawcuts must be at least 1-1/2 inches deep.
- 17. Concrete curbs, gutters and sidewalk shall consist of five sacks of cement per cubic yard with 3/8" maximum aggregate. ~~Two pounds of lampblack shall be added per cubic yard.~~ Slump shall not exceed 4 inches.
- 18. Special care shall be taken to match the existing finish, color, texture and score joining during replacement of the sidewalk.
- 19. Curb, gutter and sidewalk surfaces shall be broom finished unless otherwise approved by the City Engineer.
- 20. New sidewalk thickness shall be 4 inches minimum and driveway thickness shall be 6" minimum.
- 21. All excavations shall be backfilled and paved either temporarily or permanently at the end of each work day or covered with steel traffic plates held securely in place.
- 22. All backfill placement shall be approved by the City Engineer prior to permanent pavement replacement.
- 23. Tree roots shall not be cut or in any way damaged by Permittee.
- 24. Trench backfill shall be either concrete slurry containing one sack of cement per cubic yard with ¾ inch Maximum aggregate size, or Class 2 Aggregate Base compacted to 95% relative compaction as determined by California Test Method No. 216. All other trench details shall conform with Uniform Standard Drawing No. 330, 340 and 350 except as modified herein.
- 25. Permittee shall bear the entire cost of restoring the street or other property of the City, to the satisfaction of the City Engineer.
- 26. Excavated materials, equipment, construction materials or other debris shall not be stored or stockpiled on public streets
- 27. The top six inches of subgrade shall be compacted to at least 95% relative Compaction in accordance with California Test Method No. 236 and shall be dampened before placing concrete.
- 28. Where unsuitable subgrade material is encountered, the City Engineer may require remedial work to be done, including, but not limited to, placing a layer of crushed rock under the concrete section.
- 29. Undercut subgrade for gutter or sidewalk shall be filled with Class 2 Aggregate Base.
- 30. Where trench excavation is longitudinal with the traffic lane and extends 100 feet or more, a 2" minimum thickness of asphalt concrete paving with pavement reinforcing fabric shall be placed across the entire width of the affected traffic lane upon completion of trench work. Existing surfacing shall be removed as necessary to maintain satisfactory cross slopes.
- 31. One-half inch thick expansion joints shall be placed on both sides of driveway approaches, curb and sidewalk return points and at 4 feet on center. Weakened plane joints in sidewalk shall be at least 1-1/2 inch deep and placed at 16 feet on center.
- 32. All work shall be performed in accordance with the codes and ordinances of the City of Sausalito and the Uniform Construction Standards, Specifications of the Cities of Marin and County of Marin.
- 33. The Contractor is to provide a Storm Water Pollution Prevention Plan to the City for review and approval. City Approval must be obtained prior to commencing any work.
- 34. Underground Service Alert (USA) shall be notified at tel. (800) 642-2444, no later than 48 hours prior to excavation near utilities.
- 35. No new utility boxes or poles will be permitted in the sidewalk area without the written approval of the City Engineer.

**CITY OF SAUSALITO**

STANDARD CONDITIONS FOR ENCROACHMENT PERMIT NO. \_\_\_\_\_

High Priority Subsurface Installations

- 36. Work shall not commence until meeting with City Inspector has occurred at the work site. Permittee shall arrange for Inspector Meeting no less than 24 hours before commencing.
- 37. Permittee shall submit evidence of Liability and Workers Comp Insurance of \$2,000, 000 Single Limit and \$5,000,000 total. Submit evidence of Automobile insurance of \$1,000,000 Single Limit, \$2,000, 000 total.
- 38. By signing permit application and proposing to perform work near high priority subsurface installations, permittee and owner agree to indemnify, defend and save City, its officers, officials, employees and agents harmless from and against any and all liability, claims, suits, actions, damages and/or causes of action of any kind arising out of any bodily injury, personal injury, property damage or in violation of any federal, state or municipal law or ordinance or other cause in connection with the activities of Contractor, its employees, agents, subcontractors or on account of the performance or character of the Work or otherwise related to its performance of this permitted work. Approval of any insurance coverage's does not, in any way, relieve Contractor of liability under this Indemnification and hold harmless clause.
- 39. Additional Conditions: \_\_\_\_\_

*Rev. 05/23/2011*

## Urgent Sewer Replacement Project

### DRAFT Encroachment Permit Special Conditions:

1. The encroachment permit issued is only applicable to the City of Sausalito right of way.
2. No non-storm water shall be discharged into the public storm water drainage system.
3. Streets shall be swept a minimum of once per day or more frequently as may be directed by the City.
4. At the end of each working day, there shall be no open excavations. Excavations shall be fully backfilled and have temporary asphalt concrete installed to match adjacent grade or be covered with secure, traffic rated, slip resistant trench plates. Temporary pavement shall be a minimum of 1-1/2 inches thick. Temporary pavement shall be maintained in a smooth and usable condition at all times by the contractor until final pavement restoration. Temporary trench plates in pedestrian paths of travel shall be permitted to extend vertically above the adjacent surface vertical and without edge treatment up to one-quarter inch. Changes in level between one-quarter inch and one-half inch maximum shall be beveled with a slope not steeper than one vertical to 2 horizontal. Temporary trench plates shall be maintained so as not to be a tripping hazard.
5. Prior to issuance of an Encroachment Permit, a Traffic Control Plan(s), Pedestrian Control Plan(s), and an Erosion/Sediment (Storm Water Pollution Prevention) Control Plan(s) shall be submitted for review and approval by City of Sausalito Engineering staff. The Traffic Control Plan(s) shall include but not be limited to the following:
  - a. Project shall not increase emergency response time and shall allow emergency vehicles to pass without delay.
  - b. Contractor shall provide an emergency contact phone number to County Dispatch. Emergency contact phone shall be monitored at all times while contractors' equipment is within City of Sausalito City Limits.
  - c. No parking signs shall be posted and County Dispatch notified, 415-499-7234, a minimum of 72 hours prior to their becoming effective for enforcement. No parking signs shall be obtained from the City of Sausalito Community Development Department.
  - d. Bicycle traffic shall be accommodated as part of the Traffic Control Plan.
  - e. Any proposed street closures shall be identified and shall at a minimum conform to Sausalito Municipal Code 17.04.120 Road closures for construction projects or any additional requirements as determined by the City Engineer at time of traffic control plan submittal.
6. Prior to issuance of an Encroachment Permit, construction staging plan and construction schedule shall be provided for review and approval by the City Engineer or designee. The locations of construction materials, equipment, vehicles, debris box, portable restrooms, etc. shall be depicted. Approved plans shall be submitted to property owners adjacent to the subject property not less than one week prior to commencement of construction activities.
7. The contractor shall save and protect existing monuments. Any damaged monuments shall be reestablished along with the filing of all required documents including but not limited to Corner Record with Marin County Department of Public Works.
8. City Sanitary Sewer Coordinator shall be notified immediately of any broken sanitary sewer facilities outside the scope of the Urgent Sewer Replacement Project.



# **APPENDIX B**

## **Confined Space Entry Program**





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*NOTE: The most current, official version of this document is online. Before referencing a printed copy verify that it reflects the most current version.*

## Confined Space Program

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# Confined Space Program

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## 1. Purpose

This Program has been developed to:

- Establish a standardized system for identifying, evaluating, and protecting personnel from the hazards associated with confined spaces; and
- To fulfill California regulatory obligations under 8 CCR 5156-5158.

## 2. Scope

- All employees (full, part-time, temporary and seasonal) and any personnel operating on behalf of the Sausalito-Marín City Sanitary District (SMCSO) shall comply with the substance of this Program or the prevailing regulatory requirements, whichever is more stringent.
- This Program applies to any space or area meeting **all three** of the criteria for a **confined space**:
  - Is large enough and so configured that an employee can bodily enter; **and**
  - Has limited or restricted means for entry or exit; **and**
  - Is not designed for continuous human occupancy.

## 3. Process

### 3.1. Identification and Evaluation

All confined spaces shall be identified, characterized for potential hazards and included in the [Confined Space Inventory](#) (Appendix H).

- 3.1.1. Identified Confined Spaces shall be visibly labeled with "Danger – Confined Space DO NOT ENTER" or equally effective warning language.
- 3.1.2. All confined spaces, immediately prior to entry, require a documented [Confined Space Evaluation](#) (Appendix D) to determine/verify entry conditions. Past characterizations or evaluations may be used as a guide but not as a substitute for a pre-entry evaluation.
- 3.1.3. Until the pre-entry evaluation validates **safe for entry** conditions, a confined space may not, for any reason, be **entered** except with a **Confined Space Entry Permit**.
- 3.1.4. All atmospheric testing or monitoring shall be conducted in accordance with the [Atmospheric Testing and Monitoring](#) section.
- 3.1.5. If the confined space is proven to not qualify as a **Permit-Required Confined Space (PRCS)** based on the pre-entry evaluation, work may proceed (with caution) within the space. If at any time the conditions change, the space shall be immediately evacuated until a pre-entry evaluation verifies the entry status of the space and safe for entry conditions.
- 3.1.6. Only authorized, qualified employees trained on confined space hazards, work procedures, and their roles and responsibilities per this Program are allowed to participate on the **Confined Space Entry Team** or work in or around a PRCS.

# Confined Space Program

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## 3.2. Pre-Entry Planning

- 3.2.1. Determine if **entry** (any part of body breaking the plane of the space opening) into the space is required, or can the task be performed by an alternate method that would not require entry.
- 3.2.2. To protect personnel, prevent access by unauthorized personnel, and ensure no new hazards are introduced, utilize appropriate security measures such as:
  - Use fall protection barriers, equipment or devices around entrance to prevent accidental falls or falling objects;
  - Post warning signs and any required permit(s) at the work location; and
  - Install barriers and/or controls for vehicular and pedestrian traffic.
- 3.2.3. Without entering the space, conduct and document using the [Confined Space Evaluation](#) form (Appendix D) a pre-entry evaluation including required [Atmospheric Testing and Monitoring](#). Evaluate the surrounding area first, then the confined space for any actual or potential hazards. Ensure the evaluation documents any potential hazards that could affect worker safety such as traffic, drifting vapors, unsecured equipment, water pressure or flow, unauthorized personnel, poor footing, or extreme temperatures.

**NOTE: Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.**

- 3.2.4. From the confined space pre-entry evaluation, determine the necessary control measures for the identified potential hazards and the entry method –permit or non-permit.

## 3.3. Non-Permit Entry

Where a PRCS contains or could potentially contain *only* non-atmospheric hazards, and those hazards can be temporarily **eliminated** (conditions which caused the hazard to be created no longer exist) from outside the space for the time necessary to accomplish the work, the entry method of the PRCS may be reclassified from requiring a permit to a **non-permit entry**.

- 3.3.1. A confined space pre-entry evaluation (see Appendix D) shall be conducted immediately prior to entry to survey and document the conditions around and within the PRCS.
- 3.3.2. Entry into the space to test or eliminate hazards is acceptable but that entry shall *only* be made under an Entry Permit.

**NOTE: Use of forced air ventilation to control atmospheric hazards does not constitute elimination.**

- 3.3.3. Where the opening or entrance poses a fall hazard, the entrance to the space shall be guarded with a qualified railing or other type of fall protection barrier.
- 3.3.4. The signed pre-entry evaluation identifying the hazards and elimination methods and any monitoring results shall be made available to each person entering the space and remain at the site during entry.

## Confined Space Program

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- 3.3.5. If hazards arise in a space that has been reclassified for non-permit entry, all personnel shall immediately stop work, evacuate, and not reenter until a pre-entry evaluation has validated the non-permit entry status and determined the space to be safe for entry.

### 3.4. Permit Entry

The **Confined Space Entry Permit** is a signed authorization issued for a specific location, a specific work crew, and for a specified period of time. It verifies that all potential hazards have been identified, evaluated, documented, and either eliminated or appropriately controlled.

#### 3.4.1. Pre-Entry

- Based on entry and rescue strategies as identified in the pre-entry evaluation, verify that all required equipment and qualified Attendants, Entrants, and Rescue Personnel (if necessary) are available.

**NOTE: If the space does not qualify for non-entry rescue, entry shall require a qualified standby entry rescue team in addition to an Entry Permit.**

- Introduce **continuous forced air ventilation** from a clean air source, directed to the employees' work area.
  - Mechanical ventilation is required if there is or is any potential for a hazardous atmosphere.
  - Ventilation shall provide at least 12 **air changes per hour (ACH)**;
  - Place blower at least 5 feet from the space opening and verify it is operating properly;
  - Ensure that there is no recirculation of exhausted air from blowers or the introduction of contaminants from the outside, such as traffic exhaust, vapors, or toxic substances from other areas; and
  - After ventilation has been introduced, allow time for the ventilation to purge the existing air (at least 5 minutes), then repeat the atmospheric testing to verify safe for entry conditions.

**NOTE: If the ventilation does not adequately reduce the contaminants, the space may not be entered until it meets the safe for entry conditions.**

- Secure and lock out, according to the **Energy Control Program**, all energy sources (electrical, mechanical, hydraulic, pneumatic, and chemical) that are potentially hazardous to Entrants.
- The [Confined Space Entry Permit](#) (Appendix E) shall be completed from the testing data and information collected during the pre-entry evaluation. The Completed Confined Space Entry Permit, pre-entry evaluation and all monitoring data will constitute the **Permit Package**.

# Confined Space Program

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- The designated Confined Space Entry Supervisor shall review the conditions described in the Permit Package and verify team assignments (Attendant, Entrant(s), and Rescue Team). If the space is safe to enter and all required preparatory steps are complete, he/she shall sign the Permit certifying it meets requirements and authorizing the entry team to proceed with entry operations.
- The approved confined space entry **permit package** shall be made available to the entry team for their review prior to entry.
- The designated Confined Space Entry Supervisor shall conduct a pre-entry briefing for all personnel involved in the entry. The briefing shall at least include:
  - Work to be performed;
  - Anticipated hazards, including signs, symptoms and consequences of overexposure;
  - Hazard control measures;
  - Permit limitations and prohibited conditions (specified in permit); and
  - Specific rescue procedures (see [Confined Space Rescue Operations](#) section).
- The Entrant, prior to entry, shall verify that all safety equipment is in proper working order and verify safe for entry conditions.
- The Entry Supervisor shall contact administration staff (front office) to inform them of the entry location and time. As needed or required, administrative staff will assist with directing emergency services to the entry location.

## 3.4.2. Entry Procedures

- The signed permit package and a copy of this Program shall be available before entry and maintained by the Attendant at the entry site for the duration of the operation.
- The Attendant shall be at the exterior of the entrance to the confined space, in direct communication with the Entrant, prepared to order an evacuation and assist in non-entry rescue in the event of an emergency evacuation, injury or entrapment of an Entrant. He or she shall perform no other duties that would interfere with the primary duty of monitoring and protecting the Entrant(s).
- Results from the continuous atmosphere monitoring (required on all permit entries) within the space shall be logged every 15 minutes on the [Supplemental Monitoring Data](#) form (Appendix F) by the Attendant.
- The Entrant shall also maintain an awareness of all conditions within the space. If conditions become unsafe or the gas monitor alarms, the Entrant shall immediately stop work, don the **escape breathing apparatus (EBA)** and safely evacuate the space.
- The Attendant shall order an immediate evacuation of the space if he or she:

# Confined Space Program

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- Determines that the atmosphere or any other condition does not meet safe for entry limits as designated on the permit;
  - Detects a prohibited condition;
  - Loses communication with Entrant;
  - Observes any behavioral effects of overexposure to any hazard;
  - Identifies any change in condition, inside or outside the confined space which may affect the safety of the Entrant; or
  - Becomes unable to effectively and safely perform all required duties.
- An evacuated space may not be reentered until the source of the contaminant or hazard is identified, mitigated, and a documented evaluation indicates it is safe to enter once again.
  - Entry into a PRCS that cannot be completely isolated (such as a wet well) or where there is the potential that the atmosphere may change unexpectedly requires the Entrant to carry an **EBA**. Such units are intended only as an aid in emergency escape and shall not be used for entry into or working in a PRCS.
  - To help facilitate rescue, a harness and **retrieval system** *should* be used whenever an Entrant enters any PRCS and *shall* be used on any PRCS entry 5 feet or more deep, unless the retrieval equipment would increase the overall risk of injury or would not contribute to the rescue of the Entrant. (The space would then not qualify for non-entry rescue.)

The retrieval system shall consist of a full body harness (wristlets/anklets are acceptable as appropriate), a hoisting device, and a retrieval line attached to the harness. The retrieval line shall be attached at a point on the harness such that when rescued, the Entrant presents the smallest possible profile and would be suspended in the upright position during a vertical rescue (for example at the center of the Entrant's back near shoulder level, or above the Entrant's head). Each component of the retrieval system shall be inspected according to the manufacturer's specifications prior to each use.

### 3.4.3. Post-Entry Procedures

- After ensuring Entrants, tools, and safety equipment are out of the confined space, that all guards and barriers are in place, and the confined space is secured, the Entry Supervisor shall close the permit. He/she shall enter the date and time of cancellation and sign. Administration staff (front office) shall then be notified that the entry is complete.
- The Entry Supervisor shall conduct a debriefing with the Entry Team to identify any issues or problems encountered during the entry operations making notes in the comments section or reverse side of permit.
- Any equipment, safety gear or tools that require repair or replacement shall be tagged out of service, reported to the supervisor, and replaced as necessary.
- The closed permit package shall be submitted with any supporting documentation to the Safety Officer for review and filing.

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## 3.5. Rescue Operations

If instructed by the Attendant or Entry Supervisor, the atmosphere monitor alarms, or there are any overexposure symptoms, the Entrant shall immediately stop work, don the **EBA** and safely evacuate the space. Otherwise Entrants shall immediately leave the confined space:

- A prohibited condition is detected;
- Loss of communication with Attendant;
- Identification of any change in condition which may affect the safety of the Entrant;

Entries into a PRCS require rescue services to be available in the event that the Entrant cannot exit on his or her own. Spaces without obstructions, where an incapacitated Entrant may safely be extracted via the retrieval system, qualify for “non-entry rescue only”. All other spaces will require that a trained, properly equipped rescue team be available for entry within 4 minutes of an incident/emergency.

**NOTE: Unless an emergency situation exists that would cause an immediate danger to the Entrant’s life, 911 shall be called to extract Entrants who have been injured as a result of impact, have fallen into the space or may have traumatic injuries.**

### 3.5.1. Non-Entry Rescue

In the event of an emergency and the Entrant cannot immediately evacuate the space without assistance:

- If alone, the Attendant shall first contact the front office (or 911 if office is closed) to request assistance; then
- Attempt a non-entry rescue by retrieving the Entrant using the **retrieval system**.

**NOTE: The Attendant shall not, under any circumstances, enter the space without suitable equipment, backup and certification as a confined space entry rescue team member. If the Entrant is overcome and the retrieval system is unable to hoist the Entrant out of the space, then the Attendant shall immediately call 911 for outside assistance.**

### 3.5.2. Entry Rescue

A qualified, properly equipped rescue team shall be ready and available for entry into a PRCS within 4 minutes of an incident/emergency where retrieval would not be a direct straight-line passage from the entrance and/or where there are obstructions which may inhibit non-entry rescue.

- Only personnel meeting all of the training requirements, with the necessary knowledge and skills are permitted to perform the duties of a rescuer on a confined space entry team.

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- Rescuers are to assume that a hazardous atmosphere exists if an Entrant has slurred speech, appears dizzy, disorientated, confused, unconscious, or displays any unusual behavior, or if communication with Entrant is lost. If a hazardous atmosphere is suspected or if there is any chance that it can develop, a self-contained breathing apparatus or supplied air with an escape bottle shall be worn for entry rescues.

**NOTE: Escape Breathing Apparatus (EBA) shall under no circumstances be used to enter a confined space for rescue.**

- 3.5.3. Upon entering a space to perform rescue, rescue team members shall have adequate backup to assist in their extraction should it be necessary.
- 3.5.4. Trained, qualified confined space rescue teams are maintained by the Sewerage Agency of Southern Marin and Sausalito-Marín City Sanitation District. These teams are available through a mutual aid agreement between member agencies to act as a standby entry rescue team or augment the existing rescue team. Arrangements must be made well in advance of the entry to ensure team availability, for the team to gain familiarity with the space to be entered, and to allow adequate time for rescue planning. The rescue team shall be:
- Informed of the specific hazards they may confront when called upon to act as a standby rescue team; and
  - Provided access to the confined space where they will provide standby service so the rescue team can ensure they have the appropriate equipment available, develop rescue plans, and practice rescue operations.

## 3.6. Atmospheric Testing and Monitoring

Atmospheric testing and monitoring shall be performed to identify and evaluate the potential atmospheric hazards of a space, verify atmospheric conditions immediately prior to entry, and to monitor for changes in the atmosphere during entry. All monitoring data (including the pre-entry evaluation) shall be recorded on the [Confined Space Evaluation](#) form (Appendix D) or [Supplemental Monitoring Data](#) form (Appendix F).

- Persons utilizing monitoring or testing equipment shall be trained, knowledgeable, and skilled in the use of the specific atmosphere monitoring equipment to be used.
- Atmospheric monitoring equipment shall be direct-read, intrinsically safe, and provide an audible alarm whenever oxygen concentration is less than 19.5% or greater than 23.5%, flammable gas or vapor is greater than 5% of the **lower explosive limit (LEL)**, the hydrogen sulfide concentration is greater than 5 ppm, or the carbon monoxide concentration is greater than 12 ppm. If necessary, substance-specific monitoring devices shall also be used whenever additional contaminants are suspected.
- All monitoring equipment shall be properly maintained, calibrated, and bump tested in a safe environment per the manufacturer's recommendation.
- Entrants shall have access to all monitoring data and the opportunity to observe the pre-entry data collection process.

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- 3.6.1. Always test the area around the confined space opening first for any hazardous gases or vapors.
- 3.6.2. Second, evaluate the conditions inside the confined space to help determine the entry strategy.
  - When possible, insert the test probe into a vent hole; if the manhole cover or hatch has no vent opening, open the cover only enough to insert the probe into the space. All levels and remote areas of the space need to be evaluated. An extension hose or device should be used for this purpose.

**NOTE: Exercise extreme care when opening any confined space that may contain an explosive atmosphere. Although possibly too “rich” to burn, when the space is opened, entering air can quickly change the atmosphere, making it explosive. Sparks created by removing the hatch or cover could ignite the vapors in the space.**

- Order of testing - A test for oxygen is performed first because most combustible gas meters will not provide reliable readings in an oxygen atmosphere of less than 16 %. Combustible gases are tested for next and tests for toxic gases and vapors last.
  - Testing stratified atmospheres - Depending on their densities, gases may be heavier, lighter, or nearly the same weight as air and may stratify within a given space. When monitoring atmospheres that may be stratified, the atmospheric envelope shall be tested a distance of approximately 4 feet in the direction of travel and to each side. If a sampling probe is used, the probe’s rate of progress shall be slowed to accommodate the sampling speed and detector response.
- 3.6.3. After ventilation has been introduced, repeat the testing to verify safe for entry atmospheric conditions.
  - 3.6.4. For PRCS permit entries, continuous atmospheric monitoring of the space by the Attendant during the entry is required to ensure atmospheric conditions remain acceptable.
    - The results are to be logged on the [Supplemental Monitoring Data](#) form (Appendix F) every 15 minutes.
    - Atmospheric monitoring shall be done in the Entrant’s immediate work area.
    - If the Entrant will be mobile, he/she is required to carry a portable monitor to test the atmosphere in advance of the direction of movement.

## 4. Program Assessment

At least annually, a formal assessment (see [Confined Space Program Assessment](#) Appendix B) of the effectiveness of this Program shall be conducted to include a review of the pre-entry evaluations and closed entry permits, training documents and other supporting records as well as observation of an entry. When program deficiencies are identified, corrective actions shall be implemented (including necessary adjustments to this written program) to correct those deficiencies.



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## 5. Training

### 5.1. Initial Training

All employees who work in an area where confined spaces are present shall be provided awareness level training on the purpose and use of this Program, potential hazards associated with confined spaces, and entry prohibitions.

Employees participating in any phase of or with any responsibility in confined space entry as described in this Program shall receive training appropriate to their responsibilities. The training shall at least provide:

- A summary of the applicable regulatory standards including rights, responsibilities and limitations;
- Hazards associated with Confined Spaces including specific procedures, techniques and equipment required to ensure personnel safety;
- Training on each element of the Confined Space Program including the purpose and use of this Program, procedures to identify potential hazard(s), monitoring requirements, selection/use of appropriate protective measures and emergency/rescue procedures;
- The proper use of atmospheric monitoring and test equipment; and
- Certification in basic first aid and cardiopulmonary resuscitation (CPR).

Rescue Team – Each member of the rescue team, in addition to being trained as an authorized Entrant, shall be trained to perform the assigned rescue duties including how to properly use the personal protective equipment and rescue equipment necessary for making rescues from confined spaces.

### 5.2. Refresher Training

Refresher training is required for employees participating in any phase or with any responsibility in confined space entry every 12 months or when:

- Regulations, policies, programs, or procedures, stipulate more frequently;
- Job assignments have changed;
- Workplace hazards have changed;
- Policies, programs, or procedures that affect confined spaces have been changed; or
- Periodic assessments reveal, or management has reason to believe, that there are inadequacies in the employee's knowledge or application of the program.

For personnel expected to perform confined space rescue, annual refresher training shall also include practice making confined space rescues from representative confined spaces. They shall remove dummies, manikins, or actual persons from spaces which, with respect to opening size, configuration, and accessibility, shall simulate the types of confined spaces from which rescue is to be performed.

## 6. Documentation

Documentation and records in support of this program shall be maintained per the **Document Control Program**.

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## 6.1. Program Assessment Records

Assessment records (see [Confined Space Program Assessment](#) –Appendix B) and any completed checklists shall be maintained by the Safety Officer and at least identify the:

- Date of the assessment;
- Person performing the assessment;
- Policy, program, procedure or area(s) being assessed;
- Any findings; and
- Recommended actions, assignment of actions, expected completion date, and actual corrective action completion date.

## 6.2. Training Records

Training records shall be maintained per the **Injury and Illness Prevention Program**.

## 6.3. Confined Space Inventory

The [Confined Space Inventory](#) (Appendix H) shall be maintained by the Safety Officer, list all confined spaces, and at least provide the:

- Space identification;
- Location;
- Date evaluation conducted; and
- Categories of potential hazards within space.

## 6.4. Confined Space Evaluation

Confined space characterizations and pre-entry evaluations shall be documented using the [Confined Space Evaluation](#) form (Appendix D) or equivalent. Completed pre-entry evaluations and confined space characterizations are reviewed and filed by the Safety Officer.

## 6.5. Monitoring Data

Any atmospheric monitoring data collected shall be documented using the [Supplemental Monitoring Data](#) form (Appendix F) or equivalent, attached to the associated pre-entry permit to be reviewed and filed by the Safety Officer.

## 6.6. Confined Space Entry Permit

The [Confined Space Entry Permit](#) form (Appendix E) or equivalent, shall be used to properly document and authorize entry into a PRCS as described elsewhere in this Program. The Entry Permits are completed for a specific location, a specific work crew, and for a specified period of time to certify that all potential hazards have been identified, evaluated, documented and either eliminated or appropriately controlled. As such, when the entry is completed, the Permit shall be closed and the closed entry permit, pre-entry evaluation, monitoring data and any associated documentation are to be submitted to the Safety Officer for review and filing.

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## 7. Authorities and Responsibilities

### 7.1. Safety Director

- Develop and maintain this written Program including any documentation in support of this program in accordance with established Federal, State, and Local regulations.
- Provide document and change control for this document.
- Periodically monitor the elements of this program to ensure currency and compliance with the regulations and the intent of this Program.
- Ensure adequate training, appropriate to the hazards and the environment, is available to all personnel.
- Assist the Safety Officer in conducting the annual assessment of the effectiveness of the Program as identified in the [Program Assessment](#) Section of this program.
- In conjunction with Safety Officer, review and approve any exceptions to this program.
- Provide interpretation and department or process-specific guidance for compliance with this Program.

### 7.2. Safety Officer

- Ensure the most current safety policies, programs, and procedures are available, communicated and understood by all affected personnel.
- Coordinate applicable training to ensure the training is appropriate, timely and attended as required.
- Provide Managers and Supervisors with guidance and technical assistance in the implementation of this program and associated procedures.
- Assist management in providing appropriate equipment for personal protection, industrial hygiene, and fire prevention by reviewing and approving all PPE or specifications for PPE including protective features, prior to purchasing.
- Conduct periodic scheduled and unscheduled assessments to verify effective implementation of this Program and in conjunction with the Safety Director, annually conduct and document a formal assessment of the effectiveness of the Program as identified in the [Program Assessment](#) section of this Program.
- In conjunction with Safety Director, review and approve any exceptions to this program.
- Evaluate and characterize newly discovered or created confined spaces.
- Maintain all documentation (e.g.: assessments, closed permits, exceptions) in support of this Program.

When contractors perform work that involves PRCS entry:

- Inform the contractor that the workplace contains PRCS and that entry requires compliance with a confined space program meeting the applicable requirements of 8 CCR 5156-5158;
- Apprise the contractor of the elements, including the identified hazards and any experience with the space, that may impact or cause the space to be a PRCS;

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- Apprise the contractor of any precautions or procedures implemented for the protection of employees in or near the PRCS where contractor personnel will be working;
- Coordinate entry operations with the contractor, when both our personnel and the contractor will be working in or near PRCS; and
- Debrief the contractor at the conclusion of the entry operations regarding the PRCS program followed and any hazards encountered or created during entry operations.

## 7.3. Supervisors

- Within the scope of his or her responsibility, maintain familiarity with the applicable policies, programs, and procedures ensuring implementation and administration of this Program.
- Ensure personnel are properly trained prior to working with or around identified hazards within the scope of this program. This includes scheduling and/or coordinating personnel for training and providing training on process-specific procedures at the departmental level.
- Ensure appropriate personal protective measures, including personal protective equipment, tools, barricades or other equipment intended for their safety, are properly maintained and available to employees.

## 7.4. Employees

All employees are responsible for complying with the provisions of this Program including successful completion of training as identified. Failure by any employee to adhere to this Program or related procedures may be subject to disciplinary action as identified in the **IIPP**.

## 7.5. Contractors

Contractors (and their subcontractors) are responsible for providing safe working conditions, equipment and procedures for their employees. Work within the scope of the contract shall be performed in accordance with all the applicable laws and regulations, the contractor's accident prevention program and the contract specifications. Additionally contractors shall:

- Inform the Agency Project Manager, General Manager or Safety Officer of the confined space program they will follow and of any hazards confronted or created in permit-required confined spaces, either through a debriefing or during the entry operation;
- Coordinate their entry operations, when both our personnel and the contractor will be working in or near permit-required confined spaces; and
- Be encouraged to participate in our safety meetings when work within the scope of their contract is in progress.

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## 7.6. Confined Space Entry Team

### 7.6.1. Entry Supervisors

For all confined space entries, the designated confined space Entry Supervisor is responsible for verifying the appropriate testing has been properly completed and conditions are safe for entry before signing the permit or pre-entry evaluation authorizing entry. Additionally, depending on the entry status of the space, they shall:

- Review the evaluation to confirm and certify that conditions qualify for non-permit entry or non-entry rescue;
- Identify the hazards that may be encountered during the entry and health effects of overexposure including any behavioral/physiological symptoms;
- Ensure that all specified tests have been conducted by trained personnel using appropriate, properly calibrated atmospheric test equipment;
- Verify that the communications are adequate and that specified equipment and rescue procedures and services are in place;
- Provide and review with Entrants the pre-entry evaluation data and **safety data sheets (SDSs)** for all materials used in the confined space;
- Remain in immediate communication with the Attendant;
- Ensure entry conditions are maintained and unauthorized persons are removed from area;
- Terminate the entry and/or close the permit when a condition that is not allowed under the entry permit arises in or near the confined space;
- Notify Administrative Staff (front office) that a confined space entry is being made at a specific location and for a specified period of time;
- At the conclusion of the confined space operation, notify the Administrative Staff (front office) that the space has been vacated and secured;
- Determine, whenever responsibility for a confined space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that safe for entry conditions are maintained;
- Debrief the Confined Space Entry Team; and
- Once the job has been completed, cancel the permit and forward the closed permit and associated documentation to the Safety Officer for review and filing.

### 7.6.2. Attendants

Attendants shall perform no other activities that may interfere with the primary job of monitoring activities inside and outside the space to determine the safety and condition of Entrants currently in the confined space. They shall:

- Know the hazards that may be encountered during the entry and health effects of overexposure including any behavioral/physiological symptoms;

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- Maintain an accurate account of and in communication with each Entrant in the space, monitoring work activities and calling for an evacuation if necessary;
- Monitor the atmosphere monitoring readings and record the data every 15 minutes on the [Supplemental Monitoring Data](#) form (Appendix F);
- Remain outside the space during the entry operation until relieved by another Attendant;
- Prevent unauthorized persons from entering the space;
- Perform non-entry rescue procedures and summon rescue or other emergency services if warranted;
- Maintain the signed entry permit, rescue procedure and any other necessary documentation (e.g.: SDS, hot-work permit) at the entry location; and
- Forward completed entry forms to the confined space Entry Supervisor for review and forwarding to the Safety Officer for final review and filing.

## 7.6.3. Entrants

In addition to being trained and qualified to enter a confined space, the Entrants shall:

- Adhere to the procedures and precautions indicated on the permit and provided in training;
- Properly utilize or operate any equipment required for the safety of the entry operation;
- Know the hazards that may be encountered during the entry, as well as symptoms and health effects of overexposure;
- Maintain active communication with the Attendant so that the Attendant can monitor the mental and physical status of the Entrant(s);
- Notify the Attendant whenever the Entrant recognizes any unsafe condition, warning sign or symptom of overexposure to a hazardous atmosphere; and
- Exit as fast and safely as possible from the space if an evacuation order is given by the Attendant or Entry Supervisor, if any prohibited condition arises, or if the monitoring alarm is activated.

## 7.6.4. Rescue Personnel

Each member of the rescue team, in addition to being trained as an authorized Entrant, shall be trained to perform the assigned rescue duties including how to properly use the personal protective and rescue equipment necessary for making rescues from confined spaces.

- Rescue personnel shall have prepared a rescue strategy for the space, attend the pre-entry briefing, and be in ready-mode, prepared to make a rescue in less than 4 minutes of an incident.
- Entry rescue teams shall be also trained and qualified to use supplied air and extraction methods.

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## 8. Terminology

**Air changes per hour (ACH)** – a measure of how many times the air within a defined space is replaced expressed as  $ACH = 60 Q / V$  where:

- Q = flow rate of air in cubic feet per minute (either measured or from the blower specification)
- V = volume of the space  $L \times W \times H$ , in cubic feet

**Attendant** – individual stationed outside one or more permit-required confined spaces who monitors the authorized Entrants and performs all Attendants' duties as defined in the written confined space program

**Cal/OSHA** – California Occupational Safety and Health Administration

**CCR** – California Code of Regulations

**CFR** – Code of Federal Regulations

**Confined space** – a space that meets all three criteria:

- Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- Is not designed for continuous employee occupancy

**Confined Space Entry Team** – consisting of properly trained and qualified personnel to perform the functions of the Entry Supervisor, Attendant, Entrant, and rescue operations

**Continuous forced air ventilation** – an air delivery system or device that provides air into a space in the immediate area where the employees are working creating *positive pressure* within the space

**Control of hazard** – when the conditions which caused the hazard still exist but are being continuously managed to prevent the hazard (e.g.: providing continuous forced air ventilation to prevent a hazardous atmosphere from developing)

**Escape breathing apparatus (EBA)** – a self-contained supplied air respiratory protective device consisting of a loose fitting hood and air tank that will allow sufficient time (less than 30 minutes) for an individual working in a normally safe environment to escape from suddenly occurring respiratory hazards

**Emergency** – any occurrence (including failure of hazard control or monitoring equipment) or event, internal or external to the confined space, that could endanger Entrants

**Entrant** – employee who is trained and authorized by the employer to enter a permit-required confined space

**Engulfment** – the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing

**Entry** – considered to have occurred as soon as any part of the Entrant's body breaks the plane of an opening into the space

**Entry permit** – properly completed and signed document provided by the employer to document conditions and authorize entry into a permit-required confined space

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**Entry Supervisor** — the person responsible for certifying that safe for entry conditions are met, authorizing entry, overseeing entry operations and terminating entry

**NOTE: An Entry Supervisor may also serve as an Attendant or as an authorized Entrant, as long as that person is trained and equipped as required for each role he or she fills. Also, the duties of Entry Supervisor may be passed from one individual to another during the course of an entry operation.**

**Lower explosive limit (LEL)** — often also referred to a lower flammable limit (LFL); the lowest percentage concentration of a gas or a vapor in air capable of sustaining a flame; at a concentration (in air) below the LEL there is insufficient fuel to sustain a flame

**H&S** — Health and Safety

**Hazardous atmosphere** — an atmosphere that may expose employees to the risk of death, incapacitation, impair ability to escape unaided from a permit-required confined space, injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LEL);
- Airborne combustible dust at a concentration that meets or exceeds its LEL or dust obscures vision at a distance of 5 feet or less;
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- Atmospheric concentration of any substance in excess of its permissible exposure limit; or
- Any other atmospheric condition that is immediately dangerous to life or health

**Hot work** — work capable of providing a source of ignition (e.g.: riveting, welding, cutting, burning, and heating)

**IIPP** — Injury and Illness Prevention Program

**Immediately dangerous to life or health (IDLH)** — any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a space

**Inerting** — the displacement of the atmosphere in a permit-required confined space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible

**NOTE: This procedure produces an IDLH oxygen-deficient atmosphere.**

**Isolation** — process by which a permit-required confined space is removed from service and completely protected against new or additional hazards such as flooding, the release of energy, hazardous materials or toxic atmospheres

**Non-permit entry** — an exception to the confined space permitting requirements where a permit-required confined space with no potential for atmospheric hazards and the non-atmospheric hazards are temporarily eliminated for the time required to complete the entry operation may be entered without a permit

**Oxygen deficient atmosphere** — an atmosphere containing less than 19.5 percent oxygen by volume

**Oxygen enriched atmosphere** — an atmosphere containing more than 23.5 percent oxygen by volume

**Permissible exposure limit (PEL)** — maximum daily time weighted average exposure to a specific substance over an 8-hour shift



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**Permit Required Confined Space Permit Package (permit package)** – consisting of at least the completed pre-entry confined space evaluation, monitoring data and signed confined space entry permit.

**Permit-required confined space (permit space or PRCS)** — a space meeting the definition of a confined space that has, has the potential to, or the work to be performed has the potential to cause the space to meet any of the following characteristics:

- Contain or has a potential to contain a hazardous atmosphere;
- Contain a material that has the potential for engulfing an Entrant;
- Has an internal configuration such that an Entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- Contain any other recognized serious safety or health hazard

**PPE** – Personal Protective Equipment

**Prohibited condition** — any condition in a confined space that is not allowed by the permit during the period when entry is authorized

**Rescue personnel** — personnel trained and designated to rescue employees from confined spaces

**Retrieval system** — equipment used for extraction or non-entry rescue of persons from confined space; includes a retrieval line, a retrieval device (hoist or other lifting device), and chest or full-body harness, wristlets or anklets (as appropriate)

**Safe for entry [atmospheric conditions]** – atmospheric conditions in a confined space that would ensure that Entrants may safely enter into a permit-required confined space and perform work

- Atmospheric oxygen concentration between 19.5% and 23.5%;
- Flammable gas, vapor, or mist not greater than 5% of its lower explosive limit (LEL);
- Atmospheric concentration of any substance is less than 50% of its permissible exposure limit (i.e.: hydrogen sulfide <5 ppm or carbon monoxide <12 ppm).

**Safety Data Sheet (SDS)** – AKA material safety data sheet or MSDS; a form with the properties of a particular substance or product



# Confined Space Program

## 9. Document Control

For Change Control:	Reviewers:	For info:	
Safety Director	Safety Officer Treatment Plant Manager Manager - Engineer		
Word Processor & Version:	Author:	Total Pages	
MS Word 2010	Safety Director	37	

### 9.1. Change & History Record

Name	Last Update	Status	Version	Comment
Dale Thrasher	8/17/2012	Final	01	Major rewrite

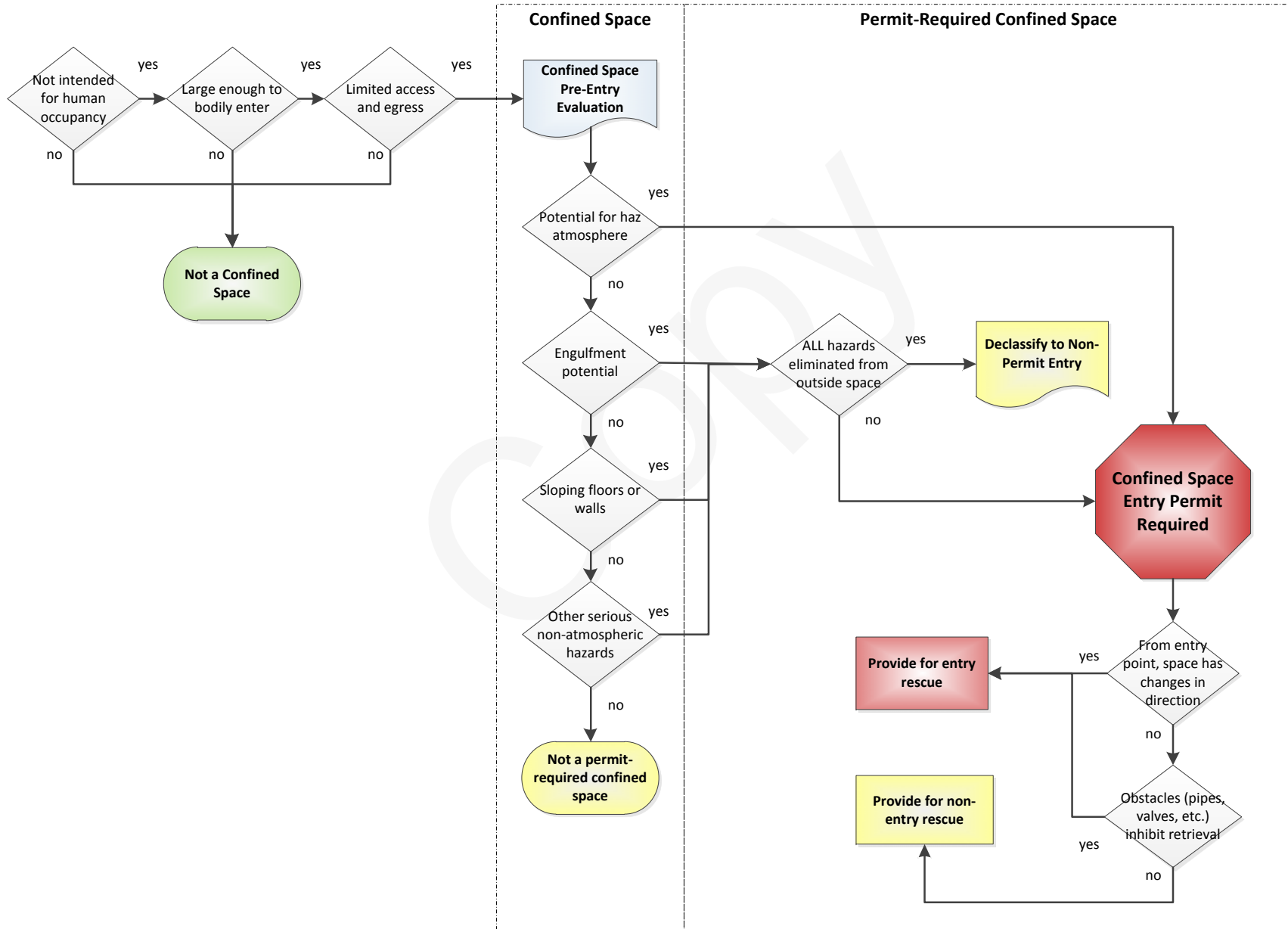
### 9.2. References

Title, Author	Last update	Status
Injury and Illness Prevention Plan	3/2011	Final
Document Control Program		Pending
Energy Control Program	5/2012	Final
<a href="#">8 CCR 5156-5158</a> Confined Spaces		
ANSI Z117.1 Confined Spaces	2009	
NFPA 820 Standard for Fire Protection in Wastewater Treatment and Collection Facilities	2012	

## 10. Appendices



### 10.1. Appendix A – Confined Space Determination





## 10.2. Appendix B – Confined Space Program Assessment

Participants: \_\_\_\_\_ Assessment Date: \_\_\_\_\_  
 Submitted by: \_\_\_\_\_ Date: \_\_\_\_\_

Element	As evidenced by:
Have all confined spaces been identified, evaluated and properly posted?	
When was the written Confined Space Program last evaluated and/or revised?	
If permit-required confined spaces have been reclassified as for non-permit entry, has the basis for that determination been properly documented?	
When contractor employees enter a permit-required confined space, are contractors informed that the work area contains permit-required confined spaces and that entry is only allowed using a permit-required confined space program meeting the requirements of 8CCR §5157 or §5158.	
If employees will be working with contractor employees in or near permit-required confined spaces, are entry operations coordinated with the contractor?	
When entry is made into a confined space, are there procedures in place to ensure that: <ul style="list-style-type: none"> <li>a) The space is isolated</li> <li>b) The space is flushed, purged, and/or ventilated to maintain safe for entry atmospheric conditions</li> <li>c) Pedestrian and/or vehicle barriers are in place when needed</li> <li>d) Entry conditions are acceptable</li> <li>e) Proper entry and rescue equipment is provided</li> <li>f) Communication means between the Attendant and Entrant is provided and/or established</li> </ul>	
When entry is made into a confined space, are the atmospheric conditions tested at various levels within the space to determine if conditions are safe for entry before entry is authorized?	
When entry is made into a permit-required confined space, are both pre-entry and continuous atmosphere monitoring performed in the areas where the Entrant will be working?	
When entry is made into a permit-required confined space, is at least one Attendant stationed outside the space for the duration of entry operations?	
Are there procedures in place for rescuing Entrants from confined spaces, for providing emergency services (i.e. first aid) to rescued employees, for summoning outside rescue services, and for preventing unauthorized personnel from attempting a rescue?	

Element	As evidenced by:
Are all Entry Team members certified in basic first-aid and CPR	
Are rescue drills conducted and documented every 12 months?	
<p>If using outside rescue services, has the rescue service:</p> <ul style="list-style-type: none"> <li>a) Been informed of the hazards they may confront;</li> <li>b) Been given access to all permit-required confined spaces where rescue may be necessary so that they can develop appropriate rescue plans;</li> <li>c) Been evaluated to determine that they are adequately trained, equipped and available to perform confined space rescues.</li> </ul>	
Whenever an Entrant enters a permit-required confined space, are retrieval systems or methods used to facilitate non-entry rescue?	
When making an entry into a permit-required space, does the Entry Supervisor sign an entry permit to authorize entry?	
When entry operations have been completed, or if a condition that is not allowed under the entry permit arises, does the Entry Supervisor terminate and cancel the entry permit?	
Are employees who perform the duties of an Entrant, Attendant, and Entry Supervisor, trained on those duties, and the training documented?	



### 10.1. Appendix C – Confined Space Entry Team Responsibilities

Duty/Responsibility	Entrant	Attendant	Entry Supv
Ensure barriers and/or controls and warning signs are installed for vehicular and pedestrian traffic			X
Ensure fall protection barriers, equipment or devices are set up around entrance to prevent accidental falls or falling objects			X
Determine acceptable entry conditions			X
Ensure that testing has been conducted by trained personnel using appropriate, properly calibrated equipment			X
Ensure Entrants have opportunity to witness pre-entry evaluation			X
Understand potential hazards and health effects of overexposure including behavioral/physiological symptoms	X	X	X
Review Permit Package, verifying space is properly characterized, entry and rescue methods are identified, and overall package is complete	X	X	X
Sign Permit Package, authorizing entry and certifying information is complete, accurate, and conditions are safe for entry			X
Ensure necessary communication and safety equipment is available and in proper working order	X		X
Verify that rescue services and an effective means for summoning is available			X
Notify Administrative staff of time and location of a Confined Space Entry			X
Conduct pre-entry briefing reviewing hazards, permit conditions, data and procedures with Entry Team			X
Remain outside the space during entry operations until relieved by another qualified attendant		X	
Inform unauthorized persons to stay out of the area and to not interfere		X	X
Ensure removal of unauthorized individuals who attempt to enter or interfere with the entry operation			X
Ensure acceptable entry conditions are maintained		X	X
Adhere to the procedures and precautions indicated on the permit and provided in training;	X	X	
Remain in immediate contact with the Attendant			X
Maintain constant communications between the Attendant and Entrant, alerting of overexposure symptoms, unsafe or prohibited conditions	X	X	
Maintain signed permit package and other required documentation (SDS, hot-work permit, Program, etc.) at the entry location		X	
Monitor activities both inside and outside the space to ensure no new hazards are introduced		X	
Monitor air testing equipment for safe to enter levels, recording data every 15 minutes		X	

<b>Duty/Responsibility</b>	<b>Entrant</b>	<b>Attendant</b>	<b>Entry Supv</b>
Properly utilize or operate any required equipment	X	X	
Terminate the entry and immediately evacuate the space as safely possible if an evacuation order is given, any prohibited condition arises, or if the monitoring alarm is activated	X	X	X
Perform non-entry rescue or initiate rescue operations, summoning additional services as needed		X	
Take steps to prevent unauthorized rescue attempts		X	
Debrief Entry Team upon completion of entry and notify Administrative staff of closed operation			X
Close permit and forward Permit Package to Safety Officer for review and filing			X

Copy

## 10.2. Appendix D – Confined Space Evaluation

Space Location/Name:	Completed by:	Date:
<input type="checkbox"/> Characterization (for file)	<input type="checkbox"/> Pre-Entry Evaluation (attach to Entry Permit)	

Yes	No	Space Determination
<input type="checkbox"/>	<input type="checkbox"/>	Is large enough or so configured that an employee can bodily enter and perform work, AND
<input type="checkbox"/>	<input type="checkbox"/>	Has limited or restricted means for entry or exit, AND
<input type="checkbox"/>	<input type="checkbox"/>	Is not designed for continuous employee occupancy.

**Any NO answers, then STOP assessment, this is NOT a Confined Space**

<input type="checkbox"/>	<input type="checkbox"/>	Contains or has a potential to contain a hazardous atmosphere... OR
<input type="checkbox"/>	<input type="checkbox"/>	Contains a material that has the potential for engulfing an entrant... OR
<input type="checkbox"/>	<input type="checkbox"/>	Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section... OR
<input type="checkbox"/>	<input type="checkbox"/>	Contains any other recognized serious safety or health hazard <i>Identify:</i>

**Any YES answers, then CONTINUE characterization, this is a Permit-Required Confined Space**

Hazards	Source/Type (description or N/A)	Safe for Entry Limits	Quantity (before controls)	Risk (1 to 5)	Hazard/Elimination Measures
Flammable Atmosphere		< 5% LEL	% LEL		
Oxygen level		19.5 – 23.5 %	%		
Toxic Atmosphere		< 50% of PEL	ppm		
Hydrogen Sulfide		< 5 ppm	ppm		
Carbon Monoxide		< 12 ppm	ppm		
Toxic Materials (non-gas)					
Electrical Hazards			V		
Thermal Hazards			°F		
Mechanical Hazards					
Biological Hazard					
Fall Hazard			ft		
Engulfment/ Entrapment					
Other Hazards					

Entry Point     Top     Side     Bottom

- Natural Circulation - No potential for atmospheric hazards in the space; additional ventilation may be required based on tasks to be performed, assess ventilation requirements prior to and during entry
- Installed Ventilation – Engineered continuous ventilation system
- Forced Air Ventilation - Required for venting hazardous atmospheric contaminants

_____ cf	_____ cfm	_____ ACH	_____ min
Volume of Space <small>V = HxWxD) or <math>V_{cyl} = 3.14 r^2 H</math></small>	Ventilation flow rate <small>(Q –from blower label or spec)</small>	Air changes per hour <small>ACH = 60 Q / V (min 12 required)</small>	Purge Time

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> PRCs is eligible for non-permit entry<br><i>(certify by signing form below)</i> | <input type="checkbox"/> Entry permit required<br><i>(attach this to Permit Package)</i> | <input type="checkbox"/> Eligible for non-entry rescue<br><input type="checkbox"/> Requires entry rescue |
|--|--|--|

Comments (use reverse if necessary)



### 10.3. Appendix E – Confined Space Entry Permit

<u>Space Location/Name</u>	<u>Date Issued</u>	<u>Exp Date</u>	<u>Exp Time</u>
<u>Reason for Entry</u>			
<b>Required Safety Equipment (check all that apply)</b>			
<input checked="" type="checkbox"/> Air monitor equipment	<input type="checkbox"/> Hard hat	<input type="checkbox"/> Full-body harness	<input checked="" type="checkbox"/> Barricades, cones, tape, signs
<input type="checkbox"/> EBA	<input checked="" type="checkbox"/> Goggles, glasses, &/or face shield	<input type="checkbox"/> Retrieval system	<input type="checkbox"/> Traffic control
<input type="checkbox"/> SCBA/SAR w/esc	<input type="checkbox"/> Hearing protection	<input type="checkbox"/> Life line	<input type="checkbox"/> Manhole hook
<input type="checkbox"/> Port ventilation and hose	<input type="checkbox"/> Gloves	<input type="checkbox"/> Wristlets	<input type="checkbox"/> Ladder
<input checked="" type="checkbox"/> Defibrillator	<input type="checkbox"/> Protective Clothing/ Rain suit	<input type="checkbox"/> Anklets	<input type="checkbox"/> Non-sparking tools
<input checked="" type="checkbox"/> First aid kit	<input type="checkbox"/> Rubber boots	<input type="checkbox"/> Railing	<input type="checkbox"/> Tool bucket and line
<input checked="" type="checkbox"/> Fire extinguisher	<input type="checkbox"/> Explosion-proof lighting	<input type="checkbox"/> Boson chair	<input type="checkbox"/>
<input type="checkbox"/> Communication equip (identify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Pre-Entry Checks (complete before obtaining work authorization):**

- |  |  |
|--|--|
| <input type="checkbox"/> Notify other affected work groups                     | <input type="checkbox"/> Air Monitoring equipment calibration is current & bump tested                       |
| <input type="checkbox"/> Notify office personnel                               | <input type="checkbox"/> Check ventilation system  |
| <input type="checkbox"/> Verify entry team training is current                 | <input type="checkbox"/> Perform pre-entry atmosphere tests  |
| <input type="checkbox"/> Ensure pre-entry evaluation is complete and attached  | <input type="checkbox"/> Check for physical hazards  |
| <input type="checkbox"/> Check condition of all safety equipment               | <input type="checkbox"/> De-energize, disconnect, secure, lock and/or block out energy sources               |
| <input type="checkbox"/> Ensure proper fall protection installed               | <input type="checkbox"/> Obtain work authorization signatures  |
| <input type="checkbox"/> Set up barrier at entrance to space/work area         | <input type="checkbox"/> Brief team on potential hazards and entry and emergency response procedures         |
| <input type="checkbox"/> Complete and attached a hot work permit (if required) | <input type="checkbox"/>   |
| <input type="checkbox"/> Non-entry rescue only (equipment in place)            | <input type="checkbox"/> Entry rescue team in place <input type="checkbox"/> Contracted rescue team in place |

**Special Instructions:**

	Name	Initials	Entry time	Exit time
Attendant	_____	_____	_____	_____
Entrant 1	_____	_____	_____	_____
Entrant 2	_____	_____	_____	_____
Entrant 3	_____	_____	_____	_____

**Entry Supervisor Authorization:**

I certify that the confined space work authorized by this permit has been reviewed with the entry team and that the required Pre-Entry Evaluation, monitoring data, and any additional permits are attached, that potential hazards have been eliminated or controlled to a safe for entry condition and that the necessary equipment appropriate for safe entry has been provided.

<u>Entry Supervisor -Name</u>	<u>Signature</u>	<u>Date</u>	<u>Time</u>
<u>Permit Closed by -Name</u>	<u>Signature</u>	<u>Date</u>	<u>Time</u>

**Problems Encountered/Comments**

This certified Entry Permit, Pre-Entry Evaluation, monitoring data, and any additional permits must remain at the work site until the job is complete. Once the Permit is closed, sign and submit all forms to the Safety Officer for review and filing.









## 10.5. Appendix G – Confined Space Rescue Drill

### Initial briefing of Team

Objective: To determine if confined space entry members understand their roles, responsibilities and procedures.

- Review team responsibilities (handout of section in confined space program that describes team member duties).
- Describe where entry is to be made and the reason for the entry.
- Answer questions team may have before proceeding with entry preparation.

### Entry Preparation

Objective: To ensure confined space entry team members are able to identify hazards and potential hazards and properly prepare for entry.

- Team prepares for entry as indicated on permit.
- Trainer verifies pre-entry procedures and permit information are complete and proper for the assignment.
- Equipment is set up and entry is made.

Things to observe

- Team assembles proper equipment for the job.
- Safety equipment is checked, set up, and used properly.
- Permit completed correctly and procedures followed.

### Rescue

#### —Self-Rescue

Objective: Entrant demonstrates self-rescue by immediately exiting space when told to by the attendant, or when entrant is aware of unsafe or potentially unsafe conditions.

- Trainer tells attendant or entrant of unsafe condition. Possible scenarios: exhaust fumes from outside source, potential flooding, faulty retrieval equipment, faulty gas detector, gas or low O2 alarm.

Things to observe

- Attendant is alert and maintains constant communication with entrant.
- Attendant quickly and clearly orders entrant to evacuate when aware of unsafe condition.
- No problems with verbal or radio communication.
- Entrant obeys attendant orders and exits when told to.

#### —Non-Entry Rescue

Objective: Attendant/rescuer demonstrates that he/she recognizes when situation requires retrieval of entrant and is able to retrieve entrant using the retrieval system equipment provided.

- Trainer tells attendant of unsafe condition. Possible scenarios: entrant has a minor injury, entrant's exhibits unusual behavior, entrant complains he doesn't "feel right" or something seems wrong, H2S alarm.

Things to observe:

- Attendant is alert and maintains constant communication with entrant.
- Attendant (if alone) radios for help

- Attendant(s) is able to use retrieval equipment to retrieve entrant without problems.
- No problems with verbal or radio communication.
- Attendant or rescuer describes what first aid would be administered if entrant's injury requires it.
- Attendant knows when 911 should be called.

—**Entry Rescue- Non Life Threatening**

Objective: Rescuer demonstrates that he/she is able to enter space and perform necessary tasks to rescue entrant.

- Trainer arranges for entrant to entangle lifeline (or simulate it). Entrant tells attendant of entanglement. Rescuer enters to disentangle entrant and then entrant is retrieved with retrieval equipment.

Things to observe:

- Same as in above non-entry rescue plus -
- Rescuer considers and prepares for potential development of a hazardous atmosphere or other hazards before entry. (i.e., does not put self in jeopardy).
- Attendant evaluates situation and determines whether 911 should be called.

—**Entry Rescue - Life-Threatening**

Objective: Rescuer and attendant demonstrate that they are able to quickly evaluate situation and decide best course of action - enter to rescue or assist entrant, not enter and summon outside emergency services, or some other course of action.

- Trainer sets scenarios in which entrant is unconscious with no observable injuries and another in which entrant is conscious and has sustained serious injury.

Things to observe:

- Attendant calls 911 immediately.
- Rescuer assumes dangerous atmosphere if entrant is unconscious, and uses SCBA.
- Rescuer helps attendant hoist up victim, if entrant life is threatened.
- Team waits for outside rescuers if moving entrant poses greater risk of injury and it is safe to stay in space.





# **APPENDIX C**

## **Table 1 - Discharge Limits for Non-Sanitary Wastewater Discharges into the SMCSD**



TABLE 1<sup>(1)</sup>

DISCHARGE LIMITS FOR NON-SANITARY WASTEWATER DISCHARGES INTO THE SMCSO

CONSTITUENT	UNITS		WASTEWATER	
	Avg.	Peak	Avg.	Peak
<b>I. GENERAL (Standard Methods for Examination of Water &amp; Wastewater)<sup>(2)</sup></b>				
Flow	GPD	GPM	X	10X
Ph	---	---	6-9	5-10
BOD	mg/L	mg/L	300	1000
Total Suspended Solids	mg/L	mg/L	500	1500
Settleable Solids	MI/L	MI/L	30	100
Oil and Grease	mg/L	mg/L	100	200
Detergent (MBAS)	mg/L	mg/L	10	30
Total Dissolved Solids	mg/L	mg/L	1000	2000
Chlorides	mg/L	mg/L	500	1000
Sulfates	mg/L	mg/L	500	1000
Dissolved Sulfides	mg/L	mg/L	0.5	1
Fluoride	mg/L	mg/L	2.5	5
Nitrates	mg/L	mg/L	25	50
Cyanide	mg/L	mg/L	0.05	0.1
Phenols	mg/L	mg/L	1	2
Color	C.U.	C.U.	25	50
<b>II. METALS (EPA Method 3005/3010 - AA/ICP)</b>				
Arsenic	mg/L	mg/L	0.5	1.0
Cadmium	mg/L	mg/L	0.05	0.1
Chromium	mg/L	mg/L	0.1	0.2
Copper	mg/L	mg/L	0.05	0.1
Lead	mg/L	mg/L	0.1	0.2
Mercury	mg/L	mg/L	0.001	0.002
Nickel	mg/L	mg/L	0.1	0.2
Selenium	mg/L	mg/L	0.1	0.2
Silver	mg/L	mg/L	0.05	0.1
Zinc	mg/L	mg/L	1	2
<b>III. PURGEABLE HALOCARBONS (EPA METHOD 601)</b>				
Carbon Tetrachloride	µg/L	µg/L	5	10
1,2-Dichloroethane	µg/L	µg/L	5	10
Vinyl Chloride	µg/L	µg/L	5	10
Tetrachlorethylene	µg/L	µg/L	10	20
1,1-Dichloroethane	µg/L	µg/L	20	40
Chloroform	µg/L	µg/L	5	10
All other 601 compounds	µg/L	µg/L	20	40

TABLE 1  
(CONTINUED)

CONSTITUENT	UNITS		WASTEWATER	
	Avg.	Peak	Avg.	Peak
IV. PURGEABLE AROMATICS (EPA METHOD 602)				
Benzene	µg/L	µg/L	2	4
1,2 Dichlorobenzene	µg/L	µg/L	25	50
1,3 Dichlorobenzene	µg/L	µg/L	10	20
1,4 Dichlorobenzene	µg/L	µg/L	5	10
Toluene	µg/L	µg/L	25	50
All other 602 compounds	µg/L	µg/L	10	20
V. VOLATILE ORGANIC COMPOUNDS (EPA METHOD 624)				
Each, not covered in III or IV	µg/L	µg/L	10	20
VI. TOTAL PETROLEUM HYDROCARBONS (MODIFIED EPA METHOD 8015)				
Total	mg/L	mg/L	50	100
VII. PHTHALATES (EPA METHOD 625)				
Total	mg/L	mg/L	0.5	1
VIII. POLYNUCLEAR AROMATIC HYDROCARBONS (EPA METHOD 625)				
TOTAL	µg/L	µg/L	50	100
IX. BASE/NEUTRAL COMPOUNDS (EPA METHOD 625)				
Each	µg/L	µg/L	25	50
X. MISC. EPA 625 CMPNDS.				
2,4 dichlorophenol	µg/L	µg/L	100	200
2,4,6 Trichlorophenol	µg/L	µg/L	50	100
4-chloro-3-methylphenol	µg/L	µg/L	10	20
Fluoranthene	µg/L	µg/L	200	400
Hexachlorobenzene	µg/L	µg/L	.005	.01
Pentachlorophenol	µg/L	µg/L	50	100
XI. TOTAL CHLORINATED HYDROCARBONS				
Total halomethanes	mg/L	mg/L	5	10
Total as ID'd by 601, 602, 624, and 625	mg/L	mg/L	0.05	0.1
XII. OTHER COMPOUNDS OF POTENTIAL CONCERN (Standard Methods for Examination of Water & Wastewater Analysis) <sup>(2)</sup>				
EDB	mg/L	mg/L	0.25	0.5
TEL	mg/L	mg/L	1	2
Aldrin	mg/L	mg/L	0.25	0.5
A-BHC	µg/L	µg/L	1	2
B-BHC	µg/L	µg/L	0.04	.1
Chlordane	µg/L	µg/L	0.04	.1
Cresols and Creosote	mg/L	mg/L	1	2



TABLE 1  
(CONTINUED)

CONSTITUENT	UNITS		WASTEWATER	
	Avg.	Peak	Avg.	Peak
DDT	mg/L	mg/L	0.01	0.02
Dichloromethane	mg/L	mg/L	5	10
Dieldrin	µg/L	µg/L	0.02	0.04
Endosulfan	µg/L	µg/L	0.1	0.2
Endrin	µg/L	µg/L	0.02	0.04
G-GHC (Lindane)	µg/L	µg/L	0.5	1
Heptachlor	µg/L	µg/L	0.02	0.04
Heptachlor Epoxide	µg/L	µg/L	0.01	0.02
PCBs (total)	µg/L	µg/L	0.1	0.2
Toxaphene	µg/L	µg/L	0.005	0.01
Tributyltin	µg/L	µg/L	0.1	0.2
Organic Solvents	mg/L	mg/L	1	2

- (1) Testing Schedule - All constituents listed above shall be tested initially and once per year from a 24-hour composite sample of the discharged wastewater. Then the general constituents listed in Part 1, and any other constituent that is within fifty percent of the constituent limit shall be tested from 24-hour composite samples once each month for the first year of permitted discharge, and then quarterly if all constituents meet the limit.
- (2) Standard Methods for the Examination of Water & Wastewater, APHA (latest edition will be used for sampling and analysis).



**APPENDIX D**

**GEOTECHNICAL ENGINEERING  
INVESTIGATION REPORT**



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To: Jill Shankel  
Carollo Engineers

From: Dave Mathy  
DCM Consulting, Inc.

Subject: City of Sausalito  
Urgent Sewer 2 Project  
Glen Court Sewer Replacement Project  
Sausalito, California

Date: October 29, 2015

File: No. 228

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## 1.0 INTRODUCTION

This technical memorandum presents the findings, conclusions and recommendations of a geotechnical and trenchless engineering evaluation of pipe bursting for the City of Sausalito's Urgent Sewer 2 Project – Glen Court Sewer Replacement. This project involves the replacement of approximately 382 feet of existing gravity sewer pipelines beneath Glen Court, uphill and south of the intersection of Glen Drive and Glen Court. The original pipelines are more than 70 years old (predating available 1946 aerial photography) and with the exception of approximately 27 feet of 6-inch PVC about 80 feet south of Glen Drive consist of 6-inch-inside-diameter clay pipe (VCP). Present plans are to replace approximately 332 feet of existing pipe by pipe bursting, a trenchless rehabilitation method that significantly reduces excavations in City streets when compared to conventional open-cut trenching. The pipe bursting replacement will be size for size, that is, the new pipeline will also be 6 inches in inside diameter. The depth of cover on the existing 6-inch VCP pipeline varies from a minimum of about 2 feet at the downhill, north end of Glen Court to about 5 feet at the west end of Glen Court (at Rose Court). A small portion of the project, approximately 50 feet at the northern (downhill) end of Glen Court immediately south of Glen Drive, includes open-cut removal of the VCP and replacement with 6-inch-inside-diameter ductile iron pipe (DIP). The use of DIP is due to very shallow cover depths and high live loads from vehicle traffic.

Project information described in this technical memorandum relative to the planned gravity sewer replacement in Glen Court has been taken from the project drawings by Carollo Engineers and dated "Submittal October 2015".

## 2.0 ALIGNMENT CONDITIONS – SURFACE

The north-south segment of Glen Court is a very narrow, relatively steep residential street (see Photo 1).



**Photo 1 - The north-south segment of Glen Court looking uphill and to the south.**

The east-west segment of Glen Court is a very narrow, relatively level residential street (see Photo 2).



**Photo 2 - The east-west segment of Glen Court looking to the west.**

The surface of Glen Court is paved with asphalt; however potholing encountered 5 to 6 inches of concrete pavement below the asphalt in two locations. Given the age and steepness of Glen Court, concrete pavement beneath the asphalt should be anticipated by the Contractor.

### 3.0 ALIGNMENT CONDITIONS - SUBSURFACE

A subsurface geotechnical investigation has been completed for the Glen Court Sewer Replacement project by Miller Pacific. The geotechnical investigation consisted of two test borings, B-7 and B-8 drilled just outside the original sewer trench section within native “undisturbed” soils. B-7 is located about mid-slope on the north-south segment of Glen Court and B-8 is located on the uphill east-west segment of Glen Court. See Appendix A for the Miller Pacific test boring locations and boring logs. Groundwater was not encountered in either test boring drilled to depths of 18 to 19.5 feet below street grade. Test boring B-8 at the top of the hill (east-west segment) encountered approximately 11.5 feet of clay soils over weathered bedrock. The depth of the existing pipeline (i.e., pipe zone) on this east-west segment is approximately 5 to 6 feet below street grade. Projecting the B-8 profile across the 60-foot length of the east-west segment of pipeline shows that the existing pipeline is within clay soil above bedrock. Selected engineering properties of the clay soils at and above the pipe zone in B-8 are:

- soil moisture content = 22% to 23%
- soil dry density = 102 pcf
- USCS soil classification = CH (high plasticity clay)
- Standard Penetration Test Blow Count, N-value = 16 to 20
- soil consistency = very stiff
- “undisturbed” soil behavior = firm (see Figure 1 for Tunnelman’s Ground Classifications describing soil behavior)

Test boring B-7 at about mid-slope of the north-south segment of Glen Court encountered approximately 13 feet of clay soils over bedrock. The depth of the existing pipeline (i.e., pipe zone) on this north-south segment is approximately 4 to 5 feet (or shallower at the north, downhill end) below street grade. Projecting the B-8 profile across the 322-foot length of the north-south segment of pipeline shows that the existing pipeline is within the clay soil above bedrock. Selected engineering properties of the clay soils at and above the pipe zone in B-7 are:

- soil moisture content = 15% to 18%
- soil dry density = 99 pcf to 103 pcf
- USCS soil classification = SC and CL (sandy clay and low plasticity clay)
- Standard Penetration Test Blow Count, N-value = 10 to 11

- soil consistency = medium dense (SC) to stiff (CL)
- “undisturbed” soil behavior = firm (CL) to slow raveling (SC) (see Figure 1 for Tunnelman’s Ground Classifications describing soil behavior)

The existing sewer trench backfill was viewed during potholing operations. On October 19, 2015 I met with the potholing crew (Exaro) and viewed the vacuum excavation of Pothole No. 2 at the top (uphill) end of the north-south segment of Glen Court (see Photo 3).



**Photo 3 - Exaro crew at pothole location No. 2.**

Backfill over the existing 6-inch sewer pipeline and pipe embedment material consisted of the same native clay soils described in the Miller-Pacific test boring logs. That is, the backfill and pipe embedment material consists of native soils (not unusual for this era of original construction). The clay soil backfill was very stiff in place and required water lancing to loosen sufficiently for vacuum excavation. It should be assumed that the native clay soil trench backfill and pipe embedment are at least as stiff as the surrounding native soils.

#### 4.0 PIPE BURSTING FEASIBILITY

Pipe bursting replacement of the existing Glen Court gravity sanitary sewer as described above is feasible but does present the following project challenges:

- While the existing sewer pipeline and original trench are above bedrock (a narrow bedrock trench severely limits pipe bursting cavity expansion), both the native soils outside the original trench and trench backfill and pipe embedment consist of stiff to very stiff medium to high plasticity clays. The very stiff higher blow count (N = 16 to 24) clays are likely within the top half



of the hillside with the stiff slightly lower blow count ( $N = 10$  to  $11$ ) clays likely within the bottom half of the hillside.

The stiff to very stiff clays surrounding the existing pipeline are considered displaceable by pipe bursting, however:

- Contractors should only use static-rod pipe bursting or pneumatic hammer pipe bursting with the highest possible energy rating given the host pipe inside diameter of 6 inches (i.e., static cable systems are not advisable as they provide the least bursting force).
  - Contractors should anticipate lower than typical production rates given the stiffness and medium to highly plastic clay composition of the native soils and trench backfill and pipe embedment material.
  - The stiff to very stiff clays will absorb little to none of the cavity expansion caused by pipe bursting. Therefore, all of the cavity expansion should be assumed to go to the surface heave discussed in Section 5.6 of this Technical Memorandum.
- A short, 27-foot-long segment of planned pipe bursting on north-south segment of Glen Court consists of PVC pipe. Appropriate pipe splitter tooling will have to be used for this segment of plastic pipe or this segment should be replaced by open-cut trenching.
  - The existing sewer pipeline is relatively shallow with depth of cover in the planned pipe burst segments of only 3 to 5 feet. All overcrossing utilities (e.g., water and gas as identified in the potholing log) must receive stress relief pits to isolate the utility from pipe bursting ground movements. A minimum air gap of 6 inches below the utility must be provided.
  - All laterals into the 6-inch sewer pipeline must be exposed and disconnected prior to pipe bursting.
  - Excavation and shoring for lateral excavations and pipe bursting entry and exit pits will encounter previously disturbed existing trench wall soils with reduced strength, stability and standup time relative to “undisturbed” native soils. Such previously disturbed soils’ classify as Cal OSHA Type C soil and should be expected to exhibit slow to fast raveling behavior. (see Figure 1 for Tunnelman’s Ground Classifications describing soil behavior)
  - Existing pipe sags will not be corrected by pipe bursting. Pipe bursting often lessens the magnitude of pipe sags but should not be counted on to remove sags.
  - Unidentified, buried manmade obstructions to pipe bursting such as pipeline and pipe joint repair clamps and concrete pipe encasement will slow down, if not stop, pipe bursting requiring dig ups.

- Unidentified changes in original pipe materials, and specifically original VCP to plastic, will stop pipe bursting advance requiring dig ups.
- Cavity expansion and ground deformation will manifest as ground heave and may damage overlying asphalt pavement as a function of pipeline depth.
- Pneumatic pipe bursting will impart ground vibrations with peak particle velocities approaching 2 inches/second at a distance of about 8 feet from the bursting head. A peak particle velocity of 2 inches/second and greater is a commonly accepted threshold for potential damage to surface structures. Given the very narrow width of Glen Court and close in residential structures, the project specification should require the Contractor to provide for vibration monitoring and reporting/documentation during all pneumatic pipe bursting.
- Pneumatic pipe bursting can produce noise levels above normal construction equipment (e.g., above truck traffic, generators, etc). Given the very narrow width of Glen Court and close-in residential structures, the project specifications should put noise restrictions on all construction activities and require the Contractor to provide for noise monitoring and reporting during all significant construction activities and specifically during pneumatic pipe bursting.

## 5.0 PIPE BURSTING

Pipe bursting is a trenchless method of pipeline replacement that uses an expansion tool to break apart the existing pipeline pushing the pipe fragments into the surrounding soil and displacing (i.e., compressing) the surrounding soils while the replacement pipeline is simultaneously being pulled in place behind it. The pipe bursting expansion tool (bursting head) can be statically pulled or pneumatically actuated.

The existing project pipeline consists of clay pipe which is conducive to pipe bursting replacement. The short 27-foot-long segment of existing PVC pipe as previously described will require special tooling to split the plastic pipe. The International Pipe Bursting Association (IPBA) classifies pipe bursting installations into four categories based on the following criteria: depth of the existing pipe, existing and new pipe diameters, and burst length (IPBA, 2012). The IPBA Pipe Bursting Classification System with the first three categories is presented in Table 1. The fourth criteria by IPBA includes new pipe diameters that are greater than three upsizes and is categorized by IPBA as “developmental”.

**Table 1 - IPBA Pipe Bursting Classification System<sup>1</sup>**

Classification	Depth of Pipe	Existing Pipe Diameter	New Pipe Diameter	Burst Length
A - Minimal Difficulty	< 12 feet	2 to 12 inches	size for size	0 to 350 feet
B - Moderate Difficulty	12 to 18 feet	12 to 18 inches	1 upsize <sup>2</sup>	350 to 500 feet
C - Comprehensive Difficulty	> 18 feet	20 to 36 inches	2 to 3 upsizes	500 to 1000 feet

<sup>1</sup>IPBA, 2012.

<sup>2</sup>An upsize is defined as a 2-inch increase in internal pipeline diameter.

For this project, the pipeline being replaced by pipe bursting is generally less than 6 feet deep with existing internal diameter of 6 inches and size for size replacement. Although exact burst lengths are not specified (burst length will be determined by the Contractor's means and methods), pipe bursting run lengths should be less than 275 feet. All conditions considered will lead to an IPBA pipe bursting classification of "A - Minimal Difficulty". However, as noted above in Pipe Bursting Feasibility, the native soils and trench backfill and pipe embedment material consist of medium to high plasticity, stiff to very stiff clays. These soils will significantly impact and slow down pipe bursting productivity. Contractors should account for decreased pipe bursting productivity when preparing their bids.

### 5.1. Review of Condition of Existing Pipe

Before proceeding with pipe bursting, hydraulic analysis should be performed to verify that the slope of the existing pipeline will be sufficient to meet conveyance goals for the replacement pipeline. A thorough video inspection should also be performed to verify the location of laterals and confirm/quantify the presence of defects in the original VCP pipeline or changes in pipe material. Replacement methods such as pipe bursting cannot alter the line or grade of a sewer line and have very limited ability to correct defects such as pipe sags and offset joints. The effect of these limitations should be carefully evaluated with respect to constructability and the long-term performance of the new sewer.

### 5.2. Review of As-Built Drawings and Maintenance Records

As-built drawings and maintenance records for the proposed pipe bursting alignment should be carefully reviewed for backfill details and past point repairs, which may not be visible from internal video inspection footage. Pipe sections that have been encapsulated in concrete or backfilled with controlled-density fill (i.e. CLSM), replaced with different pipe materials (for example, polyvinyl chloride [PVC], high density polyethylene [HDPE]) or repaired using metal clamps or collars may result in reduced pipe bursting production rates, or refusal of the bursting tools requiring dig ups to remove the tooling and directly observe and document the reason for refusal.

In addition to the above, research should also include confirmation of the existing pipe material(s). In particular, the presence of asbestos-cement pipe (commonly referred to as "transite" pipe) within any portion of the alignment proposed for pipe bursting should be investigated. Bursting of asbestos-cement pipe triggers U.S. Environmental Protection Agency (EPA) regulations, which can have a significant negative impact on the future operation and maintenance of the sewer and any nearby excavations in the City streets (that is, the sewer alignment is classified and regulated by the EPA as an asbestos waste disposal site).

### 5.3. Pipe Bursting Equipment

The Contractor's choice of bursting method (for example, static or pneumatic) and equipment should be compatible with the project requirements and subsurface conditions as described herein. Of particular importance is the ability of the equipment to complete the Contractor proposed burst lengths given the

size-for-size replacement, the alignment soil and groundwater conditions, the existing utility constraints and the existing surface constraints as described in this Technical Memorandum and/or shown on the project plans. Of particular note is the presence of medium to high plasticity, stiff to very stiff native clay soils and trench backfill and pipe embedment that will significantly impact pipe bursting productivity.

#### 5.4. Pipe Lubricant

A primary component of the installation load applied to pipelines installed using pipe bursting methods is the friction generated between the new pipe and the burst pipe/soil matrix as the new pipe is pulled into place. In many cases, friction (and, therefore, the installation load) on the installed pipe can be reduced through the use of pipe lubricants. Pipe lubricants (which generally consist of a mixture of bentonite and/or polymers with water) should be considered when (IPBA, 2012):

- pipe upsizing is greater than or equal to 2x;
- the new pipe diameter exceeds 12 inches;
- the burst length exceeds 300 feet;
- the host pipe is below groundwater;
- the ground conditions are unstable (e.g., flowing sands as described above); and/or
- lubricants are recommended by the bursting equipment manufacturer.

Given that the project will have burst lengths less than 275 feet, the host pipe is consistently above groundwater and the project area ground conditions include firm stiff to very stiff clays, lubrication should be left to the Contractor's discretion as a function of means and methods. Friction forces can be further reduced by increasing the diameter of the expander head relative to the O.D. of the new pipeline.

#### 5.5. Entry, Exit and Lateral Reconnection Pits

Excavation and shoring for all entry, exit and lateral reconnection pits should follow the project specifications for open-cut trenching. Pipeline, bedding and backfill at entry, exit and lateral reconnection pits should follow the project specifications.

The length of pipe bursting pipe entry pits for HDPE pipe should be at least 2.5 times the depth of the pipeline to be burst plus 12 times the outside diameter of the new pipeline in order to provide a uniform transition and reduce the bend radius of the pipe as it enters the entry pit and existing pipe (IPBA, 2012). In addition, the entry pit should be large enough so that when the pipe is fed into the existing pipe, the minimum bending radius specified by the pipe manufacturer is not exceeded. The positioning of entry and exit pits should be given careful consideration in order to minimize impacts on traffic resulting from equipment layout, pipe string layout, etc.

## 5.6. Potential Ground Deformation and Surface Heave

At present, research regarding potential ground deformation and surface heave as a result of pipe bursting is in its early stages. A common industry rule of thumb to define the pipe bursting “impact zone” and minimum depth of cover to avoid surface heave is: impact zone (in inches) = (expander head O.D. – existing pipe I.D.) x 12. For this project, assuming a maximum expander head of 9 inches, the impact zone is (9”-6”) x 12 = 36 inches or about 3 feet. This industry rule of thumb does not estimate the actual ground surface heave as a function of cavity expansion and cover depth. Research has, however, produced several empirical and analytical methods that can be used to provide an estimate of potential surface heave caused by pipe bursting cavity expansion. For this project, preliminary surface heave calculations were completed using the guidelines presented in NASTT’s Pipe Bursting Good Practices Guideline, 2011 by Bennett, Ariaratnam and Wallin which account for the volume of soil displaced (i.e., cavity expansion), depth of cover, outside diameter of expander head, inside diameter of existing pipe and soil strength as represented by the soil’s internal angle of friction ( $\phi$ ). For these calculations the internal angle of friction for the native clay soil and trench backfill has been estimated at  $\phi = 18^\circ$  based on soil classification, direct shear testing and average lower bound Standard Penetration Test Blow Count N-values of 10 to 11. Given the age of the existing VCP pipeline and the findings of potholing into the trench backfill, it is safe to assume that the composition and consistency of pipe embedment material and trench backfill is similar to the native soil. Under these conditions the cavity expansion will be relatively evenly distributed between trench backfill and native soils (i.e., uniform distribution of cavity expansion to the ground surface).

Table 2 assumes that cavity expansion and surface heave are relatively evenly distributed between trench backfill and areal fills and that the soils are too stiff to absorb any of the cavity expansion.

**Table 2 - Anticipated Surface Heave at Pipeline Centerline – Uniform Distribution**

Clayey Native Soil and Trench Backfill, $\phi = 18^\circ$					
Existing Pipe I.D. (inches)	New Pipe I.D. (inches)	Approximate New Pipe O.D. <sup>1</sup> (inches)	O.D. of Expander Head <sup>2</sup> (in.)	Depth of Cover (feet)	Anticipated Surface Heave (inches) <sup>3</sup>
6	6	6.90	8	3	0.4
6	6	6.90	8	5	0.2
6	6	6.90	9	3	0.6
6	6	6.90	9	5	0.4

<sup>1</sup> Assumes DR 17 HDPE pipe with an I.D. of 6.04” and an O.D. of 6.90”.

<sup>2</sup> Assumes one-half to one-inch radial overexpansion to minimize new pipeline installation pulling force and pipe stress.

<sup>3</sup> Directly over pipe centerline.

The distance from the pipeline centerline over which heave will occur can be approximated by guidelines presented in NASTT’s Pipe Bursting Good Practices Guideline, 2011 by Bennett, Ariaratnam and Wallin. Surface heave is a maximum over the centerline of the pipeline and tapers to zero at the approximate lateral distances given in Table 3.

**Table 3 - Anticipated Lateral Extent of Surface Heave**

Depth of Cover (feet)	Approximate Lateral Extent of Surface Heave from Centerline of Pipeline (feet) <sup>1</sup>
3	5'
5	8'

<sup>1</sup> The lateral distance where surface heave = 0 inches.

Surface heave over the pipeline centerline will be bracketed by the values given in Table 2 as a function of depth of cover and O.D. of the expander head. Even with the largest anticipated pipe bursting expander (i.e., 9") and the shallowest cover (i.e., 3') the maximum anticipated surface heave is less than 1 inch. It is not uncommon that initial surface heave caused by the passage of the pipe bursting expander will settle back down over the new smaller O.D. pipeline behind the expander. Typical countermeasures to control and limit pavement damage resulting from surface heave include saw cutting the pavement above the pipeline to be burst. In the event that unacceptable, permanent pavement damage occurs as the result of surface heave, the damage can generally be limited to the zone between saw cuts. Saw cutting the asphalt pavement overlying this project's pipe bursting should not be necessary for the relatively minor anticipated surface heave.

The surface heave estimates detailed above provide a general indication of ground movement directly above and away from the center of the bursting operation and can be assumed to apply, to some degree, in all directions above and beside the burst pipe. As a result, there is potential for damage to existing nearby utilities resulting from ground movements associated with the planned pipe bursting operations. All utilities crossing above the proposed pipe bursting should be protected by potholing beneath them to create a minimum 6-inch air gap beneath the protected utility (pre-bursting mitigation). Where utilities run parallel to the planned burst with a radial separation less than 5 feet, that utility should be evaluated for protection as a function of utility type, age, condition and consequence of damage. For example, a natural gas pipeline will take precedence over all others.

#### 5.7. Potential Vibrations and their Effect on Existing Utilities and Structures

Research by Atalah and others (1998) has shown that ground vibrations are generally of concern only where pneumatic pipe bursting equipment is used. For pneumatic pipe bursting equipment, Atalah and others (1998) report that damaging vibration levels (that is, peak particle velocities greater than 5 inches per second) for buried structures typically occur at distances less than 2.5 feet. Where existing utilities cross or run parallel to a planned pneumatic pipe burst with a radial separation less than 2.5 feet, that the utility should be potholed (crossing utility) or exposed (parallel utility) to provide vibration relief to the existing utility.

For sensitive surface structures, Atalah and others (1998) report that damaging vibration levels (that is, peak particle velocities greater than 2 inches per second) typically occur at distances less than 8 feet. The human perception of vibrations occurs at a level much lower than damage levels (generally on the order of 0.2 inches per second). As a result, reports of feeling vibrations within or in front of nearby buildings should be expected. While building damage is not expected, typical pre- and post-construction crack and damage surveys should be completed for buildings along the alignment to document pre-existing conditions and any damages that may occur. This is especially important for the Glen Court pipe bursting given the very narrow street and close in proximity of private property residences and improvements (see Photos 1 – 3). In addition the project specifications should require the

Contractor to provide for vibration monitoring and reporting/documentation during all pneumatic pipe bursting.

Regardless of the countermeasures put in place (e.g., saw cutting of surface pavements directly above pipe bursting alignment, exposure of crossing utilities in open potholes, etc.), the project specifications should require that the Contractor be responsible for all damage to adjacent utilities, pavements and private property improvements that result from project construction.

#### 5.8. Pipeline Design for Pipe Bursting Construction

For construction methods such as pipe bursting, installation loads rather than service loads can often govern pipeline design. Calculations of both loading conditions (installation and service) should be performed, and the most conservative loading condition used to determine the design pipeline stiffness and wall thickness. Pipelines for installation by pipe bursting should be designed with a minimum factor of safety of 2 for installation loading conditions. For burst lengths determined by the Contractor, the Contractor should submit calculations of estimated installation loading on the pipeline.

In addition to the above, the replacement pipeline should be designed with additional wall thickness as a countermeasure against possible gouging from displaced pipe fragments. The first few feet of all pipelines installed by pipe bursting should be inspected for gouges as they enter into the pipe bursting exit pit. Acceptable levels of gouging should be established in the project specifications, with specific countermeasures specified in case of excessive gouging. Countermeasures against gouging may include, but are not limited to:

- fusing additional pipe to the end of the new pipe and pulling additional length if the gouging is confined to the first few feet of the new pipe;
- full-length replacement of the gouged pipe by pulling a second, thicker pipe through the burst hole with a larger bursting head;
- replacement of the full length or sections of the gouged pipe by open-cut trenching; and/or
- repair of the gouged pipe by internal methods such as cured-in-place lining or sliplining.

#### 5.9. Lateral and Manhole Connections

Lateral connections, if left connected, will be damaged by pipe bursting. Lateral connections must be exposed and disconnected at the main line prior to pipe bursting operations (pre-bursting mitigation) to reduce the risk of damage to these services as a result of pipe bursting. Laterals can then be reconnected once the new pipe is in place.

Because pipe bursting expander heads are significantly larger in diameter than the host pipe, pipe bursting through manholes must accommodate the passage of the pipe bursting head and the new pipe without damage to the manhole. This requires that manhole ingress and egress be enlarged to accommodate the equipment. Therefore, the concrete collars at the manhole ingress and egress should be enlarged to accommodate the bursting head and maintain desired grade. Likewise, if “through manhole” pipe bursting runs are made, the manhole invert bottom should be removed to facilitate bursting through the manhole.

## 6.0 PIPELINE LOADING

The project specifications should make the Contractor responsible for protection of the new pipeline from installation loads (e.g., pipe bursting pull loads as discussed in section 5.4) and pipe embedment and excavation backfill compaction loads (e.g., at pipe bursting pits, lateral connection pits and stress relief pits). Long-term external loads on project pipelines will consist of dead loads imposed by soil overburden and live loads imposed by vehicle traffic on City streets. Intermittent live loads imposed on the project pipelines by vehicle traffic can be estimated as a function of cover depth. At 3 feet of cover the H-20 truck load + 50% impact loading is 4.2 psi.

### 6.1. Dead Loads on Flexible Pipelines

Dead loads from excavation backfill/soil overburden on a flexible pipeline (e.g., HDPE) may be estimated using the following prism method formula (Moser, 2008):

$$W = D \gamma H$$

Where:

W = Vertical soil load on a flexible pipeline due to trench backfill/soil overburden (lbs./ft.)

D = Pipeline outside diameter (ft.)

$\gamma$  = Unit weight of trench backfill/soil overburden (pcf)

H = Depth of trench backfill/soil overburden over the top of pipe (ft.)

Excavation backfill on new flexible pipelines will likely consist of well-compacted Class 2 aggregate base rock. The unit weight of Class 2 aggregate base rock should be taken as 150 pcf. In the event that CLSM is used as trench backfill, the unit weight of CLSM should also be taken as 150 pcf. Existing trench backfill above pipelines replaced by trenchless pipe bursting methods will consist of reworked native clays. The unit weight of existing trench backfill should be taken as 125 pcf.

### 6.2. Composite Modulus of Soil Reaction ( $E'c$ )

Vertical loads on a flexible pipeline cause the pipeline to decrease in vertical diameter and increase in horizontal diameter. The horizontal movement develops a passive soil resistance, which helps to support the pipeline. The composite modulus of soil reaction ( $E'c$ ) is useful for estimating the passive soil resistance that will develop in a trench for flexible pipelines.  $E'c$  is a function of the soil modulus of the pipe embedment material ( $E'pz$ ), the soil modulus of the trench wall material ( $E'tw$ ), trench width, pipeline depth of cover and pipeline diameter.  $E'pz$  and  $E'tw$  are in turn functions of the strength of each material.

The native clay soils at the pipe zone consists of stiff to very stiff clays with a lower bound Standard Penetration Test Blow Count of  $N=10$ . For new pipelines installed by pipe bursting,  $E'c$  should be taken as 500 psi.



## 7.0 LIMITATIONS

This Technical Memorandum has been prepared for the exclusive use of Carollo Engineers in designing the Urgent Sewer 2 – Glen Court Sewer Rehabilitation Project for the City of Sausalito as described herein. This Technical Memorandum may not be used for any other purpose or for any other project. Within the present limitations of scope, schedule and budget, DCM Consulting, Inc.'s services have been provided in substantial accordance with generally accepted practices in the field of geotechnical and trenchless engineering in the San Francisco Bay Area at the time this Technical Memorandum was completed. The conclusions and recommendations presented in this Technical memorandum are based on the author's professional knowledge, judgment and experience. No other warranty or other conditions, express or implied, should be understood.

## 8.0 REFERENCES

1. Bennett, Ariaratnam, Wallin, Pipe Bursting Good Practices Guidelines, Second Edition, NASTT 2011.
2. Hurrell and Attewell, Ground Movements and Their Effects on Structures, 1984 Survey University Press.
3. IPBA, International Pipe Bursting Association, Guideline for Pipe Bursting, January, 2012.
4. Moser, Buried Pipe Design, Third Edition, 2008, McGraw-Hill.



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David C. Mathy  
C.E. 28082  
G.E. 569

Classification		Behavior	Typical Soil Types
<b>FIRM</b>		Heading can be advanced without initial support and final lining can be constructed before ground starts to move	Loess above water table; hard clay marl, cemented sand and gravel when not highly overstressed.
<b>RAVELING</b>	<b>Slow Raveling</b>	Chucks or flakes of material begin to drop out of the arch or walls sometime after the ground has been exposed due to loosening or to overstress and “brittle” fracture (ground separates or breaks along distinct surfaces, opposed to squeezing ground). In fast raveling ground, the process starts within a few minutes; otherwise the ground is slow raveling.	Residual soils or sand with small amounts of binder may be fast raveling below the water table, slow raveling above. Stiff fissured clays may be slow or fast raveling depending upon degree of overstress.
	<b>Fast Raveling</b>		
<b>SQUEEZING</b>		Ground squeezes or extrudes plastically into tunnel, without visible fracturing or loss of continuity, and without perceptible increase in water content. Ductile, plastic yield and flow due to overstress.	Ground with low frictional strength. Rate of squeeze depends on degree of overstress. Occurs at shallow to medium depth in clay of very soft to medium consistency. Stiff to hard clay under high cover may move in combination of raveling at excavation surface and squeezing at depth behind surface.
<b>RUNNING</b>	<b>Cohesive, running</b>	Granular materials without cohesion are unstable at a slope greater than their angle of repose ( $\pm 30-35^\circ$ ). When exposed at steeper slopes, they run like granulated sugar or dune sand until the slope flattens to the angle of repose.	Clean, dry granular materials. Apparent cohesion in moist sand or weak cementation in any granular soil may allow the material to stand for brief period of raveling before it breaks down and runs. Such behavior is cohesive-running.
	<b>Running</b>		
<b>FLOWING</b>		A mixture of soil and water flows into the tunnel like a viscous fluid. The material can enter the tunnel from the invert as well as from the face, crown, and walls, and can flow for great distances, completely filling the tunnel in some cases.	Below the water table in silt, sand, or gravel without enough clay content to give significant cohesion and plasticity. May also occur in highly sensitive clay when such material is disturbed.
<b>SWELLING</b>		Ground absorbs water, increases in volume, and expands slowly into the tunnel.	Highly preconsolidated clay with plasticity index in excess of about 30, generally containing significant percentages of montmorillonite.
<b>REFERENCE:</b> Heuer, R. E., 1974, Important ground parameters in soft ground tunneling, Subsurface exploration for underground excavation and heavy construction, New England College, Henniker, New Hampshire, American Society of Civil Engineers, New York, P. 41-55.			

**Figure 1 – Tunnelman’s Ground Classification**

## **Appendix A – Miller Pacific Test Borings**



**Miller Pacific Test Boring Approximate Locations**

OTHER TEST DATA	OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	meters feet	DEPTH	SAMPLE SYMBOL (3)	BORING 7		
						0	0		EQUIPMENT: Portable Drill Rig with 3.5-inch solid flight auger		
									DATE: 10/7/15		
									ELEVATION: 161 - feet*		
									*REFERENCE: Google Earth, 2015		
			17	15.4	99	-1			3 Inches Asphalt Concrete		
									3.5 Inches Concrete		
									Clayey SAND with Gravel (SC) Dark red-brown, moist, medium dense, fine to coarse sand, ~35% low to medium plasticity clay, ~5-10% fine to medium angular to subangular chert gravel. [Colluvium]		
	LL:46 PI:22	1400 UC	16	18.0	103	5			Sandy CLAY with Gravel (CL) Dark brown, mottled orange, stiff, medium plasticity clay, ~20% medium to coarse sand, ~5-10% subangular to angular chert gravel. [Colluvium]		
			18	25.2	102	-3			CLAY (CL) Light brown to dark red-brown, moist, stiff, low to medium plasticity clay, ~5% fine subangular chert gravels. [Residual Soil]		
			54	28.3	98	-4			Silty CLAY with Gravel (CL) Light brown to dark red-brown, moist, very stiff, low to medium plasticity clay and silt, ~5% fine subangular chert gravel. [Residual Soil]		
			50/3"			-5			META-SANDSTONE Light gray and mottled orange, low hardness, pervasively sheared, highly weathered. [Bedrock]		
			50/2"			-6			Bottom of boring at 18 feet 2 inches. No groundwater encountered during drilling.		
NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf) (2) METRIC EQUIVALENT DRY UNIT WEIGHT kN/m <sup>3</sup> = 0.1571 x DRY UNIT WEIGHT (pcf) (3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY											
<b>Miller Pacific</b> ENGINEERING GROUP  <small>A CALIFORNIA CORPORATION, © 2014, ALL RIGHTS RESERVED                      FILE: 2213.001 DL.dwg</small>			504 Redwood Blvd. Suite 220 Novato, CA 94947 T 415 / 382-3444 F 415 / 382-3450 www.millerpac.com			<b>BORING LOG</b>  Carollo - SMCS D Sausalito Urgent Sewer Sausalito, California Project No. 2213.001      Date: 10/21/15			Drawn: <u>NGK</u> Checked:		<b>A-9</b> FIGURE

**Miller Pacific Test Boring B7**

OTHER TEST DATA	OTHER TEST DATA	UNDRAINED SHEAR STRENGTH psf (1)	BLOWS PER FOOT	MOISTURE CONTENT (%)	DRY UNIT WEIGHT pcf (2)	DEPTH meters feet	SAMPLE	SYMBOL (3)	BORING 8		
						0			EQUIPMENT: Portable Drill Rig with 3.5-inch solid flight auger		
									DATE: 10/7/15		
									ELEVATION: 177 - feet*		
									*REFERENCE: Google Earth, 2015		
						0			3.5 Inches Asphalt Concrete		
									5.0 Inches Aggregate Baserock		
									CLAY with Sand and Gravel (CH)		
		5600 UC	31	21.8	102	-1			Dark red-brown, moist, very stiff, medium to high plasticity clay, ~5-10% coarse sand to fine angular to subangular gravel. [Colluvium] Grades light brown and dark red-brown.		
		4000 UC	24	23.1	102	5					
						-2			CLAY (CH)		
	LL:71 Pl:45	3500 UC	37	19.5	108				Light brown and gray, mottled orange, moist, very stiff, high plasticity clay. [Colluvium]		
						-3					
			71	12.7	123	10			Silty CLAY with Gravel (CL)		
									Light gray and mottled orange, moist, very stiff, low plasticity clay and silt, ~10-15% chert gravel. [Residual Soil]		
						-4					
						15			META-SANDSTONE		
			38						Light gray and mottled orange, low hardness, pervasively sheared, highly weathered. [Bedrock]		
						-5					
			24								
						-6			Bottom of boring at 19.5 feet. No groundwater encountered during drilling.		
						20					
NOTES: (1) METRIC EQUIVALENT STRENGTH (kPa) = 0.0479 x STRENGTH (psf) (2) METRIC EQUIVALENT DRY UNIT WEIGHT (kN/m <sup>3</sup> ) = 0.1571 x DRY UNIT WEIGHT (pcf) (3) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY											
<b>Miller Pacific</b> ENGINEERING GROUP  <small>A CALIFORNIA CORPORATION, © 2014, ALL RIGHTS RESERVED                      FILE: 2213.001 BL.dwg</small>			504 Redwood Blvd. Suite 220 Novato, CA 94947 T 415 / 382-3444 F 415 / 382-3450 www.millerpac.com			BORING LOG  Carollo - SMCSD Sausalito Urgent Sewer Sausalito, California Project No. 2213.001      Date: 10/21/15			Drawn: NGK Checked:		<b>A-10</b> FIGURE

**Miller Pacific Test Boring B8**