SANTA ANA WATERSHED PROJECT AUTHORITY

Contract Documents for:

REPAIRS TO UNLINED RCP
REACH IV-B

SANTA ANA REGIONAL INTERCEPTOR PIPELINE

PREPARED BY:

RBF CONSULTING
9755 CLAIREMONT MESA BLVD., SUITE 100
SAN DIEGO, CA 92124

December 12, 2009
Design Engineer Date

THIS IS A PREVAILING WAGE PROJECT

INVITATION TO BID

Sealed Bids for construction of the **Repairs to Unlined RCP, Reach IV-B** Project, addressed to Santa Ana Watershed Project Authority (OWNER), will be received at the office of the General Manager, 11615 Sterling Avenue, Riverside, CA 92503, until 10:00 a.m. local time, on the 9th day of June, 2008, and then will be publicly opened and read. Any Bids received after this specified time and date will not be considered.

The WORK includes the rehabilitation of the existing 36" unlined reinforced concrete pipe using slip-lining technique, reconstruction or rehabilitation of maintenance access structures and related incidental work.

The WORK is located within the Prado Basin, behind Prado Dam within portions of Riverside County.

The WORK shall be completed in all respects within 600 successive calendar days from the effective date identified in the Notice to Proceed.

Bidding Documents may be examined, by appointment, in OWNER's office, Santa Ana Watershed Project Authority, 11615 Sterling Avenue, Riverside, CA 92503. For information concerning the proposed Work, contact David Ruhl, telephone: (951) 354-4220.

Bidding Documents may be purchased from the OWNER's office for $25. Please stop by the SAWPA office, call Sara Villa at (951) 354-4220 or email svilla@sawpa.org.

A non-mandatory pre-bid conference will be held on _____ at 10:00 a.m. at the SAWPA office, 11615 Sterling Avenue, Riverside CA 92503.

A Bid submittal consists of completed and executed forms contained in the Bid Forms section of the Bidding Documents. Return of the entire Bidding Document for the Bid Opening is neither required nor encouraged. The Bid Bond, included in the Bid Forms, must be completed, attached to the Bid and payable to the OWNER in an amount not less than 10 percent of the amount Bid.

The Successful Bidder will be required to furnish the necessary additional Bonds and Certificates for the faithful performance of the Work, as prescribed in the Contract Documents.

Each Bidder must be licensed in the State of California and qualified to perform the Work described in the Plans, Specifications, and Contract Documents. Pursuant to Public Contract Code Section 3300, the CONTRACTOR must possess a General Engineering Contractor's license (Class "A") at the time that Bid Proposals are opened. Failure to possess such a License shall render any bid submitted as non-responsive. Before a contract will be awarded for the Work contemplated herein, the OWNER will conduct such investigation as is necessary to determine the performance record and ability of the apparent low Bidder to perform the size and type of work specified under this contract. Upon request, the Bidder shall submit such information as deemed necessary by the Owner to determine that the Bidder is responsive and responsible.

California prevailing wages shall be paid to all construction workers on the job. The Director of the Department of Industrial Relations has established the prevailing rate of per diem wages for workers to be used on the job. This information is available on the internet at: http://www.dir.ca.gov/DLSR/PWD/index.htm, various regulations can be found at http://www.dir.ca.gov/t8/ch8sb3.html . The CONTRACTOR shall comply with California Labor Code and shall post a copy of the prevailing wages at the jobsite.

In accordance with California Public Code Section 3400, the CONTRACTOR shall have ten (10) days after Notice of Award is issued for submission of data substantiating a request for substitution of an "or equal" product.

The CONTRACTOR shall comply (and have a history of compliance) with the Executive Order 11246 entitled "Equal Employment Opportunity" as amended, and as supplemented in Department of Labor regulations (41 CFR Part 60).

Payment for the Work accomplished will be made upon completion and acceptance of the work by the OWNER.

OWNER reserves the right reject all Bids or any Bid not conforming to the intent and purpose of the Bidding Documents. OWNER reserves the right to postpone the award of the contract(s) for a period of time without affecting the price bid, however, the Notice of Award shall not be delayed beyond 90 days from the Bid opening date.

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS.

Terms used in these Instructions to Bidders have the meanings assigned to them in the General Conditions.

Certain additional terms used in the Bidding Documents have the meanings indicated below which are applicable to both the singular and plural thereof.

1.1. *Bidder* - one who submits a Bid to OWNER as distinct from a sub-bidder, who submits a Bid to a Bidder.

1.2. *Apparent Low Bidder* - that Bidder whose Base Bid, as read at the bid-opening, appears to be the lowest total cost for the work bid.

1.3. *Base Bid* - total of the Lump Sum Work plus extended total for Unit Price Work as identified in the Bid Form.

1.4. *Successful Bidder* - lowest, responsible and responsive Bidder to whom OWNER issues a Notice of Award.

2. BIDDING DOCUMENTS.

2.1. The Bidding Documents include all Contract Documents as defined in the General Conditions as they exist prior to the Bid Opening. Complete sets of Bidding Documents must be used in preparing Bids. Neither OWNER nor ENGINEER assume any responsibility for errors or misinterpretations resulting from use of incomplete sets of Bidding Documents.

3. RETAINAGE. (Reserved)

4. QUALIFICATIONS OF BIDDERS.

4.1. To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit, within 5 days after Bid opening, and upon OWNER's request, evidence, such as financial data, previous experience, present commitments, and other such data as may be relevant.

4.2. Nothing indicated herein will prejudice OWNER's right to seek additional pertinent information as is provided in the INVITATION TO BID.

5. PREBID CONFERENCE.

5.1 A mandatory pre-bid conference will be held on _____at 10:00 a.m. at the SAWPA office, 11615 Sterling Avenue, Riverside CA 92503

6. LICENSE REQUIREMENTS.

6.1. The classification of Contractor's License a Bidder must hold to be eligible for consideration of a contract for the Work is listed in the Invitation to Bid.

7. EXAMINATION OF CONTRACT DOCUMENTS AND SITE.

7.1. It is each Bidder's responsibility, before submitting a Bid, to:

7.1.1. Examine thoroughly the Contract Documents and other related data identified in the Bidding Documents (including "technical data" referred to below).

7.1.2. Inspect the site to become familiar with and satisfy Bidder as to the general, local, and site conditions that may affect cost, progress, performance, or furnishing of the Work.

7.1.3. Consider federal, state, and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work.

7.1.4. Study and carefully correlate Bidder's knowledge and observations with the Contract Documents and such other related data.

7.1.5. Promptly notify OWNER of all conflicts, errors, ambiguities, or discrepancies which Bidder has discovered in or between the Contract Documents and such other related documents.

7.2. (Reserved)

7.3. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Contract Documents due to differing or unanticipated conditions appear in Section 4 of the General Conditions.

7.4. Before submitting a Bid, each Bidder will be responsible to make or obtain 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 and which may affect cost, progress, performance, or furnishings of the Work and which Bidder deems necessary to determine its Bid.

7.5. By appointment, OWNER will provide each Bidder access to the site(s) to conduct such examinations, investigations, explorations, tests, and studies as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site(s) to its (their) former condition upon completion of such explorations, investigations, tests, and studies. Such examinations, etc., conducted along or within public right-of-way must be coordinated and approved by the controlling agency.

7.6. Reference is made to the General Requirements for identification of the general nature of work that is to be performed at the site(s) by OWNER or others and that relates to Work for which a Bid is to be submitted. On request, OWNER will provide to each Bidder, for examination, access to or copies of contract documents for such work by others that OWNER has possession and knowledge of.

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

8. INTERPRETATIONS AND ADDENDA.

8.1. All questions about the meaning or intent of the Bidding Documents are to be directed in writing to OWNER. Interpretations or clarifications considered necessary by OWNER in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the office issuing documents as having received the Bidding Documents. Questions received less than 3 days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect. Because of the urgency to begin this Work, Addenda will be emailed or faxed as late as the day before Bid Opening.

8.2. Addenda may also be issued to modify the Bidding Documents.

9. BID SECURITY.

9.1. Each Bid must be accompanied by Bid security made payable to OWNER in an amount of 10 percent of Bidder's maximum Bid price and in the form of a certified or cashier check or a Bid Bond on form attached, issued by a surety meeting the requirements of Section 5.1 of the General Conditions.

9.2. The Bid security of the apparent Successful Bidder will be retained until such Bidder has executed the Agreement, furnished the required Performance and Payment Bond(s), certificates of

insurance, and met the other conditions of the Bidding Documents. If the apparent Successful Bidder fails to sign and deliver the Agreement and furnish the required Bond(s) and certificates of insurance within the time period specified in Item 22 EXECUTION OF AGREEMENT below, OWNER may annul the award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until the earlier of the 10th day after the execution of the Agreement by the Successful Bidder or the rejection of all Bids by the OWNER. Bid security submitted with Bids which are not competitive will be returned within 15 days after the Bid opening.

10. CONTRACT TIMES.

10.1. Contract Times are set forth in the Agreement.

11. LIQUIDATED DAMAGES.

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

12. SUBSTITUTE AND "OR-EQUAL" ITEMS.

12.1. The contract, if awarded, will be on the basis of materials and equipment shown on the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Whenever it is shown on the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by CONTRACTOR, if acceptable to OWNER, application for such acceptance will not be considered by OWNER until after the Bid Opening. The procedure for submission of any such application by CONTRACTOR and consideration by OWNER is set forth in the Bid Forms.

13. SUBCONTRACTORS, SUPPLIERS, AND OTHERS.

13.1. Bidder shall submit with its Bid the names and business addresses of each proposed Subcontractor who will perform Work under these Bidding Documents in excess of 1/2 of 1 percent of the amount of the total Bid, and shall provide such other information for such Subcontractor as required in the Bid Forms. If the Bidder fails to specify a Subcontractor for any portion of the Work to be performed under the Bidding Documents, the Bidder agrees to perform that portion of the Work itself, and further agrees that it is qualified to perform that portion of the Work.

Bidder shall submit letters from material suppliers confirming when the materials should be available.

14. (Reserved)

15. WAGE RATES.

15.1. Refer to the Invitation to Bid for specifics. California prevailing wages shall be paid.

16. BID FORM.

16.1. The Bid Forms and other attachments are included with the Bidding Documents. No substitution of forms will be allowed.

16.2. All blanks on the Bid Form must be completed by typing or printing with ink. All price information shall be shown in both words and figures where required. No changes shall be made in the phraseology of the forms.

16.3. Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown above the signature.

16.4. Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear on the line below the signature.

16.5. All names must be typed or printed on the line with the signature.

16.6. The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

16.7. The address and telephone number for communications regarding the Bid must be shown.

16.8. The Bid Form also lists certain equipment, product, or systems for which manufacturers or Suppliers for each are to be identified in the Bid Form, with the furnishing and installation cost included in the appropriate unit price item work. Failure to comply with this requirement within 3-hours of the Bid Opening will render the Bid nonresponsive.

17. SUBMISSION OF BIDS.

17.1. Bid Form and attachments may be photocopied for submission of Bids subject to all signatures being original.

17.2. Submit Bids not later than the time prescribed, at the place, and in the manner set forth in the Invitation to Bid. Enclose Bids, along with the Bid Security/Bond and other required attachments, in an opaque, sealed envelope, labeled with the Project Title and the name and address of Bidder. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it. Bids must be made on the prescribed Bid Form provided and submitted with the attachments listed below.

17.3. Bidders shall complete and submit the following attachments with its Bid:

Bid Security/Bond

Statement/Affidavit of Noncollusion

Acknowledgment of Insurance Requirements and Certification of Ability to Provide Coverages Specified

Letter from Pipe Supplier

Letter from Manhole Supplier

Letter from Bidder

Contractor References

17.4. Only one Bid from any individual, firm, partnership, or corporation, under the same or different names, will be considered. Should it appear to the OWNER that any Bidder is interested in more than one Bid for Work contemplated, all Bids in which such Bidder is interested will be rejected.

18. MODIFICATION AND WITHDRAWAL OF BIDS.

18.1. Bids may be modified or withdrawn by an appropriate document duly executed (in the same manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

18.2. If, within 24 hours after Bids are opened, any Bidder files a duly signed, written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further consideration on the Work to be provided under the Contract Documents.

19. OPENING OF BIDS.

19.1. Bids will be opened and read aloud publicly. A summary of the amounts of the Base Bids and major alternates (if any) will be made available to Bidders within 7 days after the date of Bid opening.

20. BIDS TO REMAIN SUBJECT TO ACCEPTANCE.

20.1. All Bids will remain subject to acceptance for 90 days after the date of the Bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.

21. BASIS OF AWARD; AWARD OF CONTRACT.

21.1. If the contract is to be awarded, OWNER will give Successful Bidder a Notice of Award within 90 days after the day of the Bid opening.

21.2. OWNER reserves its right to reject any, or all, Bids, including without limitation the rights to reject any, or all, nonconforming, nonresponsive, unbalanced or conditional Bids, and to reject the Bid of any Bidder if OWNER believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive, or the Bidder is unqualified, or of doubtful financial ability, or fails to meet any other pertinent standard or criteria established by OWNER. OWNER also reserves the right to waive any irregularity not involving price, time, or changes in the Work. Discrepancies in the quantity multiplied by unit price and the extended total amount will be resolved in favor of the quantity multiplied by unit price. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

21.3. In evaluating Bids, OWNER will consider the qualifications of Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award. OWNER shall have the right to accept alternates in any order or combination unless otherwise provided in the Bidding Documents.

21.4. OWNER may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which the identity was required. OWNER also may consider the operating costs, maintenance requirements, performance data, and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data are required to be submitted prior to the Notice of Award.

21.5. OWNER may conduct such investigations as OWNER deems necessary to assist in Bid evaluation and to establish responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to execute Work in accordance with the Contract Documents to OWNER's satisfaction within the prescribed time.

21.6. If, at the time this contract is to be awarded, the total of the lowest acceptable Bid exceeds the funds then estimated by the OWNER as available, the OWNER may reject all Bids or take such other action as best serves the OWNER's interests.

21.7. If the contract is to be awarded, it will be awarded to lowest Bidder whose evaluation by OWNER indicates to OWNER that the award will be in the best interests of the OWNER.

21.8. In the event of failure of the Successful Bidder to sign the Agreement and provide an acceptable Performance and Payment Bond(s), insurance certificate(s), and other required documents, the OWNER may award the contract to the next lowest responsive, responsible Bidder.

22. EXECUTION OF AGREEMENT.

22.1. When OWNER gives a Notice of Award to Successful Bidder, it will be accompanied by unsigned copies of the Agreement and other appropriate documents. Within 7 calendar days thereafter, CONTRACTOR shall sign and deliver the copies of the Agreement and, attached documents, along with acceptable Performance and Payment Bond(s) and insurance certificate(s), to OWNER. Within 7 days thereafter, OWNER shall deliver two fully executed copies of the Agreement to CONTRACTOR.

END OF SECTION

BID FORM AND ATTACHMENTS CHECKLIST

This checklist is provided as a convenience to bidders in areas where past experience indicates such instruction can be helpful. It is not represented as being comprehensive and compliance therewith does not relieve the bidder of responsibility for compliance with any bid requirement which may not be mentioned specifically in these instructions.

Complete **Repairs to Unlined RCP, Reach IV-B** Project Bid Package for submission consists of:

	Document	**Completed by**	**Signed by**
	Bid Form	Contractor	Contractor
	Bid Bond	Contractor and Surety	Contractor and Surety
	Noncollusion Affidavit	Contractor	Notarized Signature of Contractor
	Acknowledgement of Insurance Requirements and Certification of Ability to Provide Coverage Specified	Insurance Provider and/or Insurance Provider' Agent	Insurance Provider and/or Insurance Provider's Agent
	Letter from Pipe Supplier	Pipe Supplier	Pipe Supplier
	Letter from Manhole Supplier	Manhole Supplier	Manhole Supplier
	Letter from Bidder	Contractor	Contractor
	Contractor References	Contractor	Contractor

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NOTE TO BIDDER: Use BLACK ink for completing this Bid Form.

BID FORM

To:	Santa Ana Watershed Project Authority
Address:	11615 Sterling Avenue Riverside, California 92503
Project Identification:	Repairs to Unlined RCP, Reach IV-B Project

1. BIDDER'S DECLARATION AND UNDERSTANDING.

   1.1. 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.

   1.2. Bidder acknowledges that no special interpretation or inference of intent is to be given to different formats of different Specification sections.

   1.3. In submitting this Bid, Bidder acknowledges and accepts CONTRACTOR's REPRESENTATIONS as more fully set forth in the Agreement.

2. CONTRACT EXECUTION AND BONDS.

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

   2.2. Bidder accepts the terms and conditions of the Bidding Documents.

3. INSURANCE.

   3.1. Bidder further agrees that the Bid amount(s) stated herein includes specific consideration for the specified insurance coverages.

4. CONTRACT TIMES.

   4.1. Contract completion times are specified in the Agreement.

5. LIQUIDATED DAMAGES.

   5.1. Bidder accepts the provisions in the Agreement as to liquidated damages.

6. ADDENDA.

   6.1. Bidder hereby acknowledges that it has received Addenda No's. _____, _____, _____, _____, _____, _____, _____, (Bidder shall insert No. of each Addendum received) and agrees that Addenda issued are hereby made part of the Contract Documents, and Bidder further agrees that this Bid includes impacts resulting from said Addenda.

7. SUBCONTRACTORS.

   7.1. Bidder further proposes that the following firms or businesses will be awarded subcontracts for the following portions of the Work in the event that Bidder is awarded the contract. The name and locations of place of business of each Subcontractor who will perform work or labor or render service to the general CONTRACTOR in or about the construction of the Work or improvements in an amount in excess of one-half of one percent of the general CONTRACTOR's total Bid, and the portion of the Work which will be done by each Subcontractor is set forth as follows:

_____
Name

_____, _____, _____ _____
Street City State Zip

_____ _____
CONTRACTOR's License No. Portion (Type of Work)

_____
Name

_____, _____, _____ _____
Street City State Zip

_____ _____
CONTRACTOR's License No. Portion (Type of Work)

_____
Name

_____, _____, _____ _____
Street City State Zip

_____ _____
CONTRACTOR's License No. Portion (Type of Work)

_____
Name

_____, _____, _____ _____
Street City State Zip

_____ _____
CONTRACTOR's License No. Portion (Type of Work)

8. SALES AND USE TAXES.

8.1. The Bidder agrees that all federal, state, and local sales and use taxes are included in the stated Bid prices for the Work.

9. BASE BID

9.1. Unit Price Work:

Bidder further proposes to accept as full payment for the Unit Price Work proposed herein the amounts computed under the provisions of the Contract Documents and based on the following unit price amounts, it being expressly understood that the unit prices are independent of the exact quantities involved. Bidder agrees that the unit prices represent a true measure of the labor, materials, and services required to furnish and install the item, including all allowances for overhead and profit for each type and unit of Work called for in these Contract Documents.

Item	Description	Quantity	Unit	Unit Price	Extended Total Amount
1.	Mobilization and Demobilization	1	LS	$	$
2.	Sheeting, Shoring, and Bracing	1	LS	$	$
3.	Dewatering	1	LS	$	$
4.	Slip-liner Installation (30" Pipe, including annular grout)	15950	LF	$	$
5.	Clear and Grub	297,000	SF	$	$
6.	Pipe Cleaning, Debris Removal and Disposal	315	CY	$	$
7.	Access Pit with new FRP MAS	8	EA	$	$
8.	Rehab existing MAS with FRP Liner	8	EA	$	$
9.	Closure pit with No MAS	1	EA	$	$
10.	Connection within MAS 4B-0010	1	LS	$	$
11.	Connection with MAS 4B-0150	1	LS	$	$
12.	Installation and Removal of Access Road Bridges	6	EA	$	$
13.					
TOTAL OF EXTENDED AMOUNT FOR ALTERNATE 1					$

9.2. Base Bid Summary

9.2.1. Total of Extended Amount for Unit Priced Item Work $_____

9.2.2. Total Adjustment (add or delete) $_____

(Identify Bid Item(s) impacted by adjustment) Item Nos. _____

TOTAL BID $_____

TOTAL BID (in words) _____

9.3. Material Suppliers

9.3.1. Bidder further proposes that the following material suppliers will be awarded subcontracts for the following portions of the work in the event that Bidder is awarded the Contract. Failure to fill out this list will render the Bid nonresponsive.

9.3.2 All materials installed on this project shall be manufactured in the United States of America unless prior approval is obtained.

Pipe Type _____

Suppliers Name _____

Street Address _____

City _____ State _____ Zip _____

Manhole Type _____

Suppliers Name _____

Street Address _____

City _____ State _____ Zip _____

9.3.3 Bidder shall submit letters from material suppliers confirming when the materials should be available.

10. SURETY.

10.1. If Bidder is awarded a construction contract from this Bid, the surety who provides the Performance and Payment Bond(s) is

Surety's Name _____

Street Address _____

City _____ State _____ Zip _____

11. LICENSE.

11.1. Class _____ , California Contractor License No.: _____

12. BIDDER. As appropriate, complete signature block below for An Individual, A Partnership, A Corporation, OR A Joint Venture.

An Individual

By _____

(Individual's printed Name and Signature)

Name, Phone Number, and Address for receipt of official communications and for additional information on this Bid:

_____

(Printed Name, Phone Number)

_____

(Address)

SUBMITTED ON _____, 20____.

A Partnership

By _____

(Partnership name)

_____

(Printed Name and Signature of General Partner)

_____

(Title)

Name, Phone Number, and Address for receipt of official communications and for additional information on this Bid:

_____

(Printed Name, Phone Number)

_____

(Address)

SUBMITTED ON _____, 20_____.

A Corporation

By _____
(Corporation name)

_____
(Corporate Address)

_____
(State of Incorporation)

By _____
(Printed Name and Signature of Person Authorized to Sign)

_____
(Title)

(Corporate Seal)

Attested By _____
(Printed Name and Signature of Corporations Secretary, or Assistant Secretary)

Name, Phone Number, and Address for receipt of official communications and for additional information on this Bid:

_____
(Printed Name, Phone Number)

_____
(Address)

SUBMITTED ON _____, 20____.

A Joint Venture

By _____
(Business name)

_____
(Printed Name and Signature of Person Authorized to Sign)

By: _____
(Business Name)

_____
(Printed Name and Signature of Person Authorized to Sign)

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

Name, Phone Number, and Address for receipt of official communications and for additional information on this Bid:

_____
(Printed Name, Phone Number)

_____
(Address)

SUBMITTED ON _____, 20_____.

END OF SECTION

BID BOND

BOND NO. _____

AMOUNT: $_____

KNOW ALL MEN BY THESE PRESENTS, that _____

_____

hereinafter called the PRINCIPAL, and _____

_____

a corporation duly organized under the laws of the State of _____

having its principal place of business at _____

_____ in the State of _____

and authorized to do business in the State of California, as SURETY,

are held and firmly bound unto Santa Ana Watershed Project Authority (SAWPA),

as OWNER, hereinafter called the OBLIGEE, in the sum of _____

_____ DOLLARS ($_____)

for the payment for which we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND IS SUCH THAT:

WHEREAS, the PRINCIPAL is herewith submitting his or its Bid for _____

_____

_____

said Bid, by reference thereto, being hereby made a part hereof.

NOW, THEREFORE, if said Proposal shall be rejected, or in the alternate, if said Proposal shall be accepted and the PRINCIPAL shall sign and deliver a Contract to OBLIGEE, in the form of Contract attached hereto and shall execute and deliver Performance and Payment Bonds in the forms attached hereto (all completed in accordance with said Proposal) to OBLIGEE, and shall in all other respects perform the agreement created by the acceptance of said Proposal;

Then, this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the SURETY for any and all default of the PRINCIPAL hereunder shall be the amount of this obligation as herein stated.

The SURETY, for value received, hereby stipulates and agrees that the obligations of said SURETY and its bond shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such Proposal, and said SURETY does hereby waive notice of any such extension.

In case suit is brought upon this Bond, SURETY shall pay OWNER all court costs and actual attorneys' fee incurred by OWNER.

IN WITNESS THEREOF, the above-bounded parties have executed this instrument under their several seals, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Signed and sealed this _____ day of _____, 20_____

_____
PRINCIPAL

By _____
(Printed Name/Title)

_____
SURETY

By _____
Attorney-In-Fact

The rate of premium on this bond is _____ per thousand.

Total amount of premium charged $_____.

NONCOLLUSION AFFIDAVIT

(to be executed by Bidder and submitted with Bid)

STATE OF _____}
} ss.
COUNTY OF _____}

_____, being first duly sworn, deposes and says that he or she is _____of _____ the party making the foregoing Bid that the Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the Bid is genuine and not collusive or sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and has not directly or indirectly 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.

_____
Name of Contractor

_____
Bidder (Affiant)

Subscribed and sworn to before me this _____ day of _____, 20_____

My commission expires: _____

_____ Notary Public

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INSURANCE REOUIREMENTS ACKNOWLEDGEMENT

Insurance Requirement Summary

The CONTRACTOR shall purchase and maintain insurance provided by insurance companies admitted in and regulated by the State of California, as required in the Contract Documents, and in amounts equal to the requirements set forth in the Contract Documents, and shall not commence work under this contract until all insurance required by the Contract Documents is obtained in a form acceptable to the OWNER, nor shall the CONTRACTOR allow any subcontractor to commence work on a subcontract until all insurance required for the Subcontractor has been obtained.

The CONTRACTOR shall provide the insurance Certifications and Endorsements on the forms provided in Appendix B of the Contract Documents. Such insurance shall include as additional insureds: OWNER, its commissioners, OWNER's employees, consultants, and all public agencies from whom permits will be obtained for this contract; coverage of each named entity shall include their directors, officers, employees and agents. The insurance required herein shall provide that the coverage is Primary, and that no other insurance carried by OWNER will be called upon to contribute to a loss. Insurers must have a current Best's rating of "A" and a current Best's financial rating of at least Class VII.

The CONTRACTOR shall also expressly name the OWNER, and its officers, directors, employees, agents and consultants as "additional insureds" under the insurance policies.

OWNER reserves the right to establish different coverage limits for Public Liability and Property Damage including Motor Vehicle by so providing in writing as an official notice, as a permit requirement, or as a requirement contained elsewhere in the Contract Documents. In such event, the coverage limits therein shall prevail, otherwise, the CONTRACTOR shall meet the following requirements:

A. Workers' Compensation and Employer's Liability Insurance: The CONTRACTOR shall provide Workers' Compensation Insurance as required by the Labor Code of the State of California. The CONTRACTOR shall require all Subcontractors similarly to provide such Workers' Compensation Insurance for all the latter's employees. CONTRACTOR shall provide Employer's Liability Insurance of at least $1,000,000.00 per occurrence for bodily injury or death. The CONTRACTOR shall furnish OWNER and the engineer and their additional insureds with an Endorsement of Waiver of Subrogation under the terms of the Workers' Compensation Insurance.

B. General Liability and Property Damage Insurance: The CONTRACTOR shall carry and maintain general liability insurance coverage for bodily injury, personal injury, including death, and property damage in the sums of not less than $5,000,000 per occurrence, and property damage in the sum of not less than $500,000 resulting from, any one accident or any one occurrence which may arise from the operation of the CONTRACTOR in the performance of the project. The policy(ies) shall include a "Cross Liability" and/or "Severability of Interest" clause.

   The Liability Insurance Coverage shall include each of the following types of insurance:

   1) Owner's and, Contractor's Protective.

   2) XCU Hazard.

   3) Products/Completed Operations Hazard.

   4) Contractual Insurance.

   5) Broad Form Property Damage, including Completed Operations.

   6) Personal Injury/Wrongful Death.

   7) Premises Operation.

C. Motor Vehicle Public Liability And Property Damage Insurance: The CONTRACTOR shall carry and maintain motor vehicle liability insurance for bodily injury, personal injury and property damage insurance coverage on each automobile, truck and other vehicles which are used in the performance of the contract in an amount of not less than $5,000,000 per occurrence. The vehicle liability insurance shall include each of the following types:

1) Comprehensive form, including loading and unloading.

2) Owned.

3) Hired.

4) Non-owned.

D. Builder's Risk (Course Of Construction) Insurance: The CONTRACTOR shall maintain such all risk insurance with limits of at least the completed value of the project plus equipment with no coinsurance penalty. OWNER shall be named as loss payee.

Each of the policies of insurance provided for shall contain a clause substantially in the following words:

"It is hereby understood and agreed that this policy may not be canceled nor the amount of the coverage thereof be reduced until thirty (30) days after receipt by OWNER and its additional insureds of a written notice of such cancellation or reduction in coverage, by certified mail."

If an insurance coverage is canceled, the Contractor shall have a replacement policy in force prior to the cancellation of the previous with the same conditions and requirements as stated herein.

The Contractor shall have presented, at the time of execution of the Contract, the Insurance Certifications and Endorsements required in the Contract Documents.

ACKNOWLEDGEMENT OF INSURANCE REQUIREMENTS AND CERTIFICATION OF ABILITY TO PROVIDE COVERAGE SPECIFIED

(To be filled out by Insurance Agent, Carrier, Provider)

I, _____ , the _____ of
(President, Manager, Owner)

_____ (Name of Company, Corporation)

certify that these insurance requirements have been read and understood and that

_____
(Insurance Providers Name)

is able to provide the coverage, as specified.

_____
Signature of President, Manager, Owner

_____
Date

Letter from PIPE SUPPLIER regarding availability of pipe materials

Letter from MANHOLE SUPPLIER regarding availability of manhole materials

Letter from BIDDER regarding availability of materials

AGREEMENT

THIS AGREEMENT is between the Santa Ana Watershed Project Authority (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR). OWNER and CONTRACTOR may be individually referred to as "Party" or collectively as "the Parties". OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

1. WORK.

   1.1. CONTRACTOR shall complete WORK as specified or indicated in the Contract Documents entitled **Repairs to Unlined RCP, Reach IV-B** Project. The WORK is generally described as follows: the rehabilitation of the existing 36" unlined reinforced concrete pipe using slip-lining technique, reconstruction or rehabilitation of maintenance access structures and related incidental work.

2. ENGINEER.

   2.1. RBF Consulting is hereinafter called ENGINEER and is to act as OWNER's representative, assume duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents and/or as identified in separate agreement(s) in connection with completion of the WORK in accordance with the Contract Documents.

3. CONTRACT TIMES AND LIQUIDATED DAMAGES.

   3.1. Contract Times: CONTRACTOR shall achieve Substantial Completion within 600 calendar days from the commencement date stated in the Notice to Proceed. The WORK shall be completed and ready for final payment within 30 calendar days from the date when the Notice of Completion is filed with the County Recorder.

   3.2. Liquidated Damages: OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the WORK is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof. The Parties recognize the delays, expense, and difficulties involved in proving in a legal or other dispute resolution process the actual loss suffered by OWNER if the WORK is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER two thousand dollars ($2,000.00) for each day that expires after any of the times or deadlines specified in paragraph 3.1 above, including Substantial Completion, Completion or the Milestone Dates.

4. CONTRACT PRICE.

   4.1. OWNER shall pay CONTRACTOR for completion of the WORK in accordance with the Contract Documents in current funds the amount set forth in the Bid Schedule (included as an Exhibit to this Agreement), for a total contract price of_____ _____($_____).

5. RETENTION.

5.1. OWNER shall retain ten (10) percent from the progress payments. At any time after fifty (50) percent of the WORK has been completed as determined by ENGINEER and OWNER, and if the character and progress of the WORK have been, and continue to be, satisfactory to OWNER and ENGINEER, on the recommendation of ENGINEER, OWNER may elect to make any of the remaining progress payments in full for actual WORK completed thereafter.

5.2. CONTRACTOR may elect to substitute securities of equivalent value in accordance with the requirements and procedures of Section 22300 of the Public Contract Code of the State of California.

6. INTEREST.

6.1. Monies not paid when due as provided in the Invitation to Bid and in Section 14 of the General Conditions shall accrue interest at the rate of one half (1/2%) percent per month.

7. CONTRACTOR'S REPRESENTATIONS.

7.1. In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

7.1.1. CONTRACTOR has thoroughly investigated and reviewed the Contract Documents, site, locality, general nature of WORK to be performed by CONTRACTOR or others at the site that relates to the WORK required by the Contract Documents, the physical conditions of the WORK site and area, and federal, state, and local Laws and Regulations that may affect, directly or indirectly, cost, progress, performance, or completion of the WORK.

7.1.2. CONTRACTOR has thoroughly investigated and reviewed reports of explorations and tests of subsurface soil conditions and drawings of physical conditions, including soil conditions, which are identified in the Contract Documents. CONTRACTOR accepts the limitation set forth in General Conditions at Section 4.2 as to accuracy of the data contained in such reports and drawings upon which CONTRACTOR is entitled to rely. CONTRACTOR acknowledges that such reports and drawings are not Contract Documents.

7.1.3. CONTRACTOR has obtained and thoroughly investigated and reviewed examinations, investigations, explorations, tests, and studies (in addition to or to supplement those referred to above) which pertain to the conditions (subsurface, surface or physical) at or contiguous to the site or otherwise and which may affect the cost, progress, performance, or completion of the WORK as CONTRACTOR deems necessary for the performance and completion of the WORK at the Contract Price, within the Contract Times, and in accordance with the terms of the Contract Documents: CONTRACTOR represents that no additional examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by CONTRACTOR in order to perform and complete the WORK.

7.1.4. CONTRACTOR has thoroughly investigated and reviewed the information and data shown or indicated in the Contract Documents on the existing Utilities at or contiguous to the site and has included in its bid sufficient funds to cover all associated costs, without expectation of additional compensation.

7.1.5. CONTRACTOR has given ENGINEER written notice of conflicts, inconsistencies, errors, ambiguities, or discrepancies that it has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR, and the Contract Documents are sufficient to indicate and convey the understanding of terms and conditions for performing and furnishing the WORK. It shall be conclusively presumed that CONTRACTOR waives any claim that it may have, now or in the future, concerning any such conflicts, inconsistencies, errors, ambiguities or discrepancies.

7.1.6. CONTRACTOR assumes all risks for the following: All loss and damages which may arise out of the nature of the WORK required by the Contract Documents, or from the action of the elements, or from any unforeseen difficulties which may arise or be encountered in the prosecution of the WORK until acceptance by the OWNER, together with all risks in connection with the WORK and any and all expenses incurred by or in consequence of any suspension or discontinuance of the WORK, except where the Contract Documents expressly provides that such costs are to be borne by the OWNER.

7.1.7. CONTRACTOR understands, accepts and has included in its bid, as part of the WORK, the responsibility to perform and pay for the following:

7.1.7.1. The design and implementation of any required shoring.

7.1.7.2. The design and implementation of any required traffic control plans.

7.1.7.3. Materials testing through an independent laboratory, including concrete mix design, sampling and testing, and; any other materials testing required in the Contract Documents.

7.1.7.4. The costs of having ENGINEER perform any plant inspections identified in the Contract Documents.

7.1.7.5. The protection of and/or replacement cost of any survey staking performed by OWNER/ENGINEER as identified in the Contract Documents.

7.1.7.6. The additional costs to retest failed inspection tests incurred by the OWNER.

7.1.7.7. The additional costs incurred by OWNER providing overtime inspection services as identified in the Contract Documents.

8. CONTRACT DOCUMENTS.

8.1. The Contract Documents which comprise the entire Agreement between OWNER and CONTRACTOR concerning WORK are defined in Section 1 of the General Conditions.

9. WORKERS COMPENSATION INSURANCE.

9.1. By signing this Agreement, CONTRACTOR represents that it is aware of, and compliant with, the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-

insurance in accordance with the provisions of that code, and it will comply with such provisions before commencing the performance of the WORK of this Agreement.

10. ARBITRATION.

10.1. Any dispute which may arise under this Agreement by and between the OWNER and the CONTRACTOR, including the CONTRACTOR's subcontractors, laborers, and suppliers, shall be submitted to binding arbitration. The arbitrator shall decide each and every dispute in accordance with the laws of the State of California, and all other applicable laws. Unless the Parties stipulate to the contrary in writing, prior to the appointment of the arbitrator, all disputes shall first be submitted to non-binding mediation.

11. MISCELLANEOUS.

11.1. This Agreement and the Contract Documents may not be assigned by the CONTRACTOR without the written consent in advance of the OWNER. Monies that may become due and monies that are due may not be assigned without such written consent, and any such assignment will not release or discharge the CONTRACTOR from its obligations under the Contract Documents.

11.2. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other Party hereto, its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents.

11.3. If any arbitration or court action is commenced to enforce or interpret the terms of the Contract Documents, each Party shall bear its own attorneys' fees, costs, and other disbursements in pursuing such action. However, if any third party action is filed against the OWNER to enforce a Stop Notice or other claim related to the Contract Documents, the OWNER shall be entitled to recover from CONTRACTOR its attorneys' fees, costs, and other disbursements incurred in resolving or defending against such third-party action.

11.4. This Agreement, and the Contract Documents incorporated herein, constitutes the entire agreement between the Parties. No oral or written communications or negotiations that occurred before or during the execution of this Agreement will be considered to be a part of the Contract Documents. The Contract Documents can be modified only by a written document signed by both Parties or as may be provided in the Contract Documents.

11.5. There are no intended third party beneficiaries of any right or obligation assumed by the Parties under the Contract Documents.

11.6. This Agreement may be signed in counterparts. Each person executing this Agreement represents that the execution of the Agreement has been duly authorized by the Party on whose behalf the person is executing the Agreement, and that such person is authorized to execute the Agreement on behalf of such Party.

11.7. If any provision of the Contract Documents is determined by an arbitrator or court of law to be illegal or unenforceable, the same shall be severed from the Contract Documents, and the remainder of the Contract Documents shall be given full force and effect.

11.8. Time is of the essence of the Contract Documents.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed ___ copies of this Agreement. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR.

OWNER: Santa Ana Watershed Project Authority

Dated: _____ By: _____
CELESTE CANTÚ, General Manager

Address for giving notices: SAWPA, P.O. Box 7729, Riverside, CA 92513

CONTRACTOR:_____

License No. _____ _____

Date: _____ By: _____
(President or Vice President)

(Name and Title) _____

Date: _____ By: _____
(Secretary or Treasurer)

(Name and Title) _____

[CORPORATE SEAL]
(if CONTRACTOR is a corporation, attach evidence of authority to sign.)

Address for giving notices: _____

Agent for service of process: _____

PERFORMANCE BOND

BOND NO.: _____

PREMIUM: _____

WHEREAS, the _____, (hereinafter designated as "Obligee") and _____(hereinafter designated as "Principal") have entered into an agreement whereby principal agrees to install and complete certain designated public improvements, which said agreement, dated _____, and identified as project _____is hereby referred to and made a part hereof; and

WHEREAS, said principal is required under the terms of said agreement to furnish a bond for the faithful performance of said agreement;

NOW, THEREFORE, we, the principal and _____as surety, are held and firmly bound unto the Obligee in the penal sum of _____dollars ($ _____) lawful money of the United States for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally firmly by these present.

The condition of this obligation is such that if the above bound Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and provisions in the said agreement and any alteration thereof made as therein provided, on his or their part, to be kept and performed and at the time and in the manner therein specified in the Agreement, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the Obligee, its officers, agents and employees, as therein stipulated, then this obligation shall be come null and void; otherwise it shall be and remain in full force and effect.

As part of the obligation secured hereby and in addition to the face amount specified therefore, shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the Obligee in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the work to be performed thereunder or the specification accompanying the same shall in any wise affect its obligations on this bond, and it does herby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument has been duly executed by the principal and surety above named, on

By: _____
PRINCIPAL

By: _____
PRINCIPAL

By: _____
(ATTORNEY-IN-FACT)

PAYMENT BOND

BOND NO.: _____

KNOW ALL MEN BY THESE PRESENT, that we, _____as Principal, and _____ , incorporated under the laws of the State of California and authorized to execute bonds and undertakings as sole surety, as Surety, are held and firmly bound unto any and all persons named in California Civil Code Section 1181 whose claim has not been paid by the contractor, company or corporation, in the aggregate total of _____dollars ($_____), for the payment whereof, well and truly to be made, said Principal and Surety bind themselves, themselves, their heirs, administrators, successors and assigns, jointly and severally, firmly by these present.

The condition of the foregoing obligation is such that; whereas the above bound Principal has entered into a contract, dated _____, with the _____to do the following work, to-wit:

NOW, THEREFORE, if the above bound Principal contractor, person, company or corporation, or his or its subcontractor, fails to pay any claimant named in Section 3181 of the Civil Code of the State of California, or amounts due under the Unemployment Insurance Code, with respect to work or labor performed by any such claimant, that, the Surety on this bond will pay the same, in an amount not exceeding the aggregate sum specified in this bond, and also in case suit is brought upon this bond, a reasonable attorney's fee, which shall be awarded by the court to the prevailing party in said suit, said attorney's fee to be taxed as costs in said suit.

This bond shall inure to the benefit of any person named in Section 3181 of the Civil Code of the State of California so as to vie a right of action to them or their assignees in any suit brought upon this bond.

This bond is executed and filed to comply with the provisions of the act of Legislature of the State of California as designated in Civil Code Sections 3247-3252 inclusive, and all amendments thereto.

Signed and sealed this _____ day of _____, 20_____

By: _____

By: _____
(ATTORNEY-IN-FACT)

GENERAL CONDITIONS

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GENERAL CONDITIONS

SECTION 1 - DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated in this Section 1 which meanings are applicable to both the singular and plural thereof. If a word which is entirely in upper case in these definitions is found in lower case in the Contract Documents, then the lower case word will have its ordinary meaning.

Addenda - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

Agreement - The written contract, including the Contract Documents, between the OWNER and the CONTRACTOR covering the WORK to be performed.

Application for Payment - The form accepted by the ENGINEER which is to be used by the CONTRACTOR to request progress payments or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

Bid - The offer or proposal of the Bidder submitted on the prescribed form setting forth the price or prices for the WORK.

Bonds - CONTRACTOR's Bid, Performance, and Payment Bonds and other instruments of security.

Change Order - A document issued by the OWNER, authorizing an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

Clarification - A document issued by the ENGINEER to the CONTRACTOR that interprets the requirement(s) and/or design intent of the Contract Documents, which does not represent an addition, deletion, or revision in the WORK or an adjustment in the Contract Price or the Contract Times.

Contract Documents - The Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates, affidavits and other documentation), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Technical Specifications, Drawings, Greenbook (SSPWC), all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents, covering the Work to be performed. Shop Drawings and Geotechnical Reports are not Contract Documents.

Contract Price - The total monies payable by the OWNER to the CONTRACTOR under the terms and conditions of the Contract Documents.

Contract Times - The number or numbers of successive calendar days or dates stated in the Contract Documents for the completion of the WORK.

CONTRACTOR - The individual, partnership, corporation, joint-venture, or other legal entity with whom the OWNER has executed the Agreement.

Day - A calendar day of 24 hours measured from midnight to the next midnight.

Defective Work - Work that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or work that has been damaged prior to final payment.

Drawings - The drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have

been prepared by the ENGINEER and are included and/or referred to in the Contract Documents. Shop Drawings are not Drawings as so defined.

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

ENGINEER - The individual, partnership, corporation, joint-venture, or other legal entity named as such by the OWNER in the Contract Documents.

Field Order - A written order issued by the ENGINEER which may or may not involve a change in the WORK.

Final Payment - The Final Payment made to CONTRACTOR 35-days after filing the Notice of Completion and pursuant to Section 14.

General Requirements – as identified in the first part of the Technical Specifications.

Greenbook – Standard Specifications for Public Works Construction (SSPWC), latest edition.

Hazardous Waste - The term shall have the meaning provided in Section 4.5of the General Conditions and Section 1004 of the Solid Waste Disposal Act (42 USC Section 690) as amended from time to time.

Laws and Regulations – Any applicable federal, state or local laws, rules, regulations, ordinances, codes and orders.

Lien - A Stop Notice filed with the OWNER.

Milestone - A principal event specified in the Contract Documents relating to an intermediate completion date of a separately identifiable part of the WORK or a period of time within which the separately identifiable part of the WORK should be performed prior to Substantial Completion of all the WORK.

Notice of Award - The written notice by the OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein within the time specified, the OWNER will enter into an Agreement.

Notice of Completion - A form signed by the OWNER that the WORK is Complete and fixing the date of Completion. After acceptance of the WORK by the OWNER's governing body, the form is signed by the OWNER and filed with the County Recorder.

Notice to Proceed - The written notice issued by the OWNER to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement of the Contract Times.

OWNER - The public body or authority, corporation, association, firm, or person with whom the CONTRACTOR has entered into the Agreement and for whom the WORK is to be provided.

Partial Utilization - Use by the OWNER of a substantially completed part of the WORK for the purpose for which it is intended prior to Substantial Completion of all the WORK.

Project - The total construction project of which the WORK to be provided under the Contract Documents may be the whole or a part.

Resident Project Representative - The authorized representative of the ENGINEER who is assigned to the Site or any part of the WORK.

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

Shop Drawings - All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the CONTRACTOR and submitted by the CONTRACTOR to illustrate some portion of WORK and all illustrations, brochures, schedules, performance charts, instructions, and diagrams to illustrate material or equipment for some portion of the WORK.

Site - Lands or other areas designated in the Contract Documents as being furnished by the OWNER for the performance of the WORK, and related storage or access.

Specifications - (Same definition as for Technical Specifications hereinafter).

Stop Notice - A legal remedy for subcontractors and suppliers who contribute to public works, but who are not paid for their work, which may secure payment from construction funds possessed by the OWNER.

Subcontractor - An individual, partnership, corporation, joint-venture, or other legal entity having a direct contract with the CONTRACTOR or with any other Subcontractor for the performance of a part of the WORK at the Site.

Substantial Completion - The date when the WORK can be utilized for the purposes for which it was intended; only minor punch list items of work remain; and, the Notice of Completion is expected to be executed and filed with the County within thirty (30) days.

Supplementary General Conditions - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

Supplier - A manufacturer, fabricator, distributor, materialman, or vendor having a direct contract with the CONTRACTOR or with any Subcontractor to furnish materials, equipment, or product to be incorporated in the WORK by the CONTRACTOR or any Subcontractor.

Technical Specifications – The various sections of the Contract Documents which describe the materials and workmanship required to complete the WORK, including the General Requirements, Civil, Architectural, Mechanical and Electrical engineering descriptions, standards of construction and drawings.

Utilities - All pipelines, conduits, ducts, cables, wires, tracks, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground or above the ground to furnish any of the following services or materials: water, sewage, sludge, drainage, fluids, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic control, or other control systems.

WORK - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. WORK is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

SECTION 2 - PRELIMINARY MATTERS

2.1 DELIVERY OF BONDS AND INSURANCE CERTIFICATES

When the CONTRACTOR delivers the signed Agreement to the OWNER, the CONTRACTOR shall also deliver to the OWNER such Bonds and insurance policies and/or certificates as the Contract Documents and the Notice of Award may require.

2.2 COPIES OF DOCUMENTS

The OWNER will furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Contract Documents.

2.3 COMMENCEMENT OF CONTRACT TIMES; NOTICE TO PROCEED

The Contract Times will start to run on the commencement/effective date stated in the Notice to Proceed.

2.4 STARTING THE WORK

A. The CONTRACTOR shall begin to perform the WORK on the commencement date stated in the Notice to Proceed, but no work shall be done at the Site prior to said commencement date.

B. Before undertaking each part of the WORK, the CONTRACTOR shall review the Contract Documents in accordance with Section 3.3.

2.5 PRECONSTRUCTION CONFERENCE

The CONTRACTOR is required to attend a preconstruction conference. This conference will be attended by the OWNER, ENGINEER, and others as appropriate in order to discuss the WORK in accordance with the applicable procedures specified in Section in the Contract Documents on Summary of Work.

2.6 FINALIZING INITIAL SUBMITTALS

At least 7 days before submittal of the first Application for Payment a conference attended by the CONTRACTOR, the ENGINEER, and others as appropriate will be held to finalize the initial CONTRACTOR submittals in accordance with the Section in the Contract Documents on Contractor Submittals. As a minimum, the CONTRACTOR's representatives should include its project manager and schedule expert. The CONTRACTOR should plan on this meeting taking no less than 8 hours. If the submittals are not finalized at the end of the meeting, additional meetings will be held so that the submittals can be finalized prior to the submittal of the first Application for Payment. No Application for Payment will be processed prior to receiving acceptable initial submittals from the CONTRACTOR.

SECTION 3 - INTENT AND USE OF CONTRACT DOCUMENTS

3.1 INTENT

A. The Contract Documents comprise the entire agreement between the OWNER and the CONTRACTOR concerning the WORK. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the State of California.

B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not called for specifically.

C. All WORK shall be done in accordance with “Greenbook” Standard Specifications for Public Works Construction, latest edition, except as presented in the drawings and specifications.

D. When words or phrases which 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 unless a definition has been provided in Section 1 of the General Conditions.

3.2 REFERENCE TO STANDARDS

Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, the ENGINEER, or any of their consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER, or any of ENGINEER's consultants, agents, or employees any duty or authority to direct the performance of the WORK or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.3 REVIEW OF CONTRACT DOCUMENTS

If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual, or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once, and CONTRACTOR shall not proceed with the work affected thereby (except in an emergency as authorized by Section 6.12) until a Clarification, Field Order, or Change Order to the Contract Documents has been issued.

3.4 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

A. If there is a conflict between Contract Documents, the document with the most stringent requirements, as determined by the ENGINEER, shall control. In other cases, the precedent shall be:

1. Permits from other agencies as may be required by law
2. Supplementary General Provisions
3. Drawings
4. General Conditions
5. Technical Specifications
6. Referenced Standard Plans
7. Referenced Standard Specifications

B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over general drawings
3. Addenda/Change Order drawings govern over any other drawings
4. Drawings govern over standard drawings

3.5 AMENDING CONTRACT DOCUMENTS

The Contract Documents may be amended to provide for additions, deletions, and revisions in the WORK or to modify the terms and conditions thereof by a Change Order (pursuant to Section 10).

3.6 REUSE OF DOCUMENTS

Neither the CONTRACTOR, nor any Subcontractor or Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent of OWNER.

SECTION 4 - SITE OF THE WORK

4.1 AVAILABILITY OF LANDS

The OWNER will furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement agreement has been executed by the CONTRACTOR and the property owner, and a copy of said easement furnished to the ENGINEER prior to said use; and, neither the OWNER nor the ENGINEER will be liable for any claims or damages resulting from the CONTRACTOR's trespass on or use of any such properties. The CONTRACTOR shall provide the OWNER with a signed release from the property owner confirming that the lands have been satisfactorily restored upon completion of the WORK.

4.2 REPORTS OF PHYSICAL CONDITIONS

A. Subsurface Explorations: Reference is made to the Contract Documents for identification of those reports of explorations and tests of subsurface conditions at the Site that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. Existing Structures: Reference is made to the Contract Documents for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except underground Utilities referred to in Section 4.3 herein) which are at or contiguous to the Site that have been utilized in the preparation of the Contract Documents.

C. Neither the OWNER nor ENGINEER makes any representation to the completeness of the reports or drawings referred to in Section 4.2 A or B above or the accuracy of any data or information contained therein. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports and drawings. However, the CONTRACTOR may not rely upon any interpretation of such technical data, including any interpolation or extrapolation thereof, or any non-technical data, interpretations, and opinions contained therein.

4.3 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

A. Indicated: The information and data indicated in the Contract Documents with respect to existing underground Utilities at or contiguous to the Site are based on information and data furnished to the OWNER or the ENGINEER by the owners of such underground Utilities or by others. Unless it is expressly provided in the Contract Documents, the OWNER and the ENGINEER will not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of all of which are deemed to have been included in the Contract Price.

B. Not Indicated: If an underground Utility is uncovered or revealed at or contiguous to the Site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, or could not have been located by CONTRACTOR's use of Underground Service Alert (USA), the CONTRACTOR shall identify the owner of such underground Utility and give written notice thereof to that owner and shall notify the ENGINEER in accordance with the requirements of the Contract Documents.

4.4 DIFFERING SITE CONDITIONS

A. The CONTRACTOR shall notify the ENGINEER, in writing, of the following unforeseen conditions, hereinafter called differing Site conditions, promptly upon their discovery (but in no event later than 14 days after their discovery) and before they are disturbed:

1. Subsurface or latent physical conditions at the Site of the WORK differing materially from those indicated, described, or delineated in the Contract Documents, including those reports discussed in Section 4.2, 4.3, and 4.5; and

2. Unknown physical conditions at the Site of the WORK of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents, including those reports and documents discussed in Section 4.2, 4.3, and 4.5.

B. The ENGINEER will review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto, and advise the OWNER, in writing, of the ENGINEER's findings and conclusions.

C. If the OWNER concludes that because of newly discovered conditions a change in the Contract Documents is required, a Change Order will be issued as provided in Section 10 to reflect and document the consequences of the difference.

D. In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Times, or any combination thereof, will be allowable to the extent that they are attributable to any such difference. If the OWNER and the CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Section's 11 and 12.

E. The CONTRACTOR's failure to give notice of differing Site conditions within 14 days of their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith, whether direct or consequential in nature.

4.5 HAZARDOUS WASTE

A. Reference is made to the Contract Documents for identification of those reports and drawings relating to Hazardous Waste, including Asbestos, PCBs, Petroleum and/or Radioactive Material identified at the Site that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. OWNER shall be responsible for any Hazardous Waste uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the WORK and which may present a substantial danger to persons or property exposed thereto in connection with the WORK at the Site. OWNER shall not be responsible for any such material brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

1. Upon discovery of any Hazardous Waste the CONTRACTOR shall immediately stop all work in any area affected thereby (except in an emergency as required by Section 6.12) and notify OWNER and ENGINEER (and thereafter confirm such notice in writing). CONTRACTOR shall not be required to resume any work in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice. Such written notice will specify that such condition and any affected area is or has been rendered safe for the resumption of the work or specify any special conditions under which the work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of adjustment, if any, in Contract Price or Contract Times as a result of such work stoppage or such special conditions under which work is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided in Sections 11 and 12.

2. If, after receipt of such special written notice, CONTRACTOR does not agree to resume such WORK based on a reasonable belief it is unsafe, or does not agree to resume such WORK under special conditions, then OWNER may order such portion of the WORK that is in connection with such hazardous condition or in such affected area to be deleted from the WORK. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the WORK then either party may make a claim therefor as provided in Sections 11 and 12. OWNER may have such deleted portion of the WORK performed by OWNER's own forces or others in accordance with Section 7.

C. The provisions of Sections 4.2, 4.3, and 4.4 are not intended to apply to Hazardous Waste uncovered or revealed at the Site.

4.6 REFERENCE POINTS

A. The OWNER will provide one bench mark, near or on the Site of the WORK, and will provide two points near or on the Site to establish a base line for use by the CONTRACTOR for alignment control. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.

B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks, and in case of their removal or destruction by any party, the CONTRACTOR shall be

responsible for the accurate replacement of such reference points by personnel qualified under the applicable state codes governing land surveyors.

SECTION 5 - BONDS AND INSURANCE

5.1 BONDS

A. The CONTRACTOR shall furnish Performance and Payment Bonds, each in the amount set forth in the Contract Documents, as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until two years after the date of Final Payment, except as otherwise provided by Law or Regulation or by the Contract Documents. The CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents.

B. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such California admitted sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by the following:

1. The original, or a certified copy, of the unrevoked appointment, power of attorney, bylaws or other instrument entitling or authorizing the person who executed the bond to do so;

2. A certified copy of the certificate of authority of the insurer issued by the Insurance Commissioner;

3. A certificate from the County Clerk that the certificate of authority of the insurer has not been surrendered, revoked, cancelled, annulled, or suspended or, in the event that it has, that renewed authority has been granted;

4. Copies of the insurer’s most recent annual statement and quarterly statement filed with the Department of Insurance;

5. Current documents demonstrating to the OWNER’s satisfaction that surety’s assets exceed its liabilities in an amount equal to or in excess of the amount of the bonds.

C. If the surety on any Bond furnished by the CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and surety, which must be acceptable to the OWNER.

D. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed and admitted in the State of California to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Contract Documents.

E. CONTRACTOR’s liabilities under the Contract Documents shall not be limited in any way to the Bonds required herein.

5.2 INSURANCE

A. The CONTRACTOR shall purchase and maintain the insurance required under this Section. Such insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Contract Documents, or required by Laws or Regulations, whichever are greater. All insurance shall be maintained continuously during the life of the Agreement including through the Warranty / Guarantee period and at all times when the CONTRACTOR may be correcting, removing, or replacing Defective Work in accordance with Section 13.5. The CONTRACTOR's liabilities under the Contract Documents shall not be deemed limited in any way to the insurance coverage required herein. The insurance required herein shall provide that the coverage is primary, and that no other insurance held carried by OWNER will be called to contribute to a loss.

B. All insurance required by the Contract Documents to be purchased and maintained by the CONTRACTOR shall be obtained from insurance companies that are duly licensed and admitted to issue insurance policies for the limits and coverages so required in the State of California. Such insurance companies shall have a current Best's Rating of at least an "A" (Excellent) general policy holder's rating and a Class VII financial size category and shall also meet such additional requirements and qualifications as may be provided in the Contract Documents.

C. The CONTRACTOR shall furnish the OWNER, with copies to each additional insured who is indicated in the Contract Documents, with certificates and original endorsements showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be canceled, reduced in coverage, or renewal refused until at least 30 days prior written notice has been received by the OWNER and additional insureds by certified mail. All such insurance required herein (except for worker's compensation) shall name the OWNER and ENGINEER, and their consultants and subconsultants and their officers, directors, agents, and employees as "additional insureds" under the policies. The CONTRACTOR shall purchase and maintain the following insurance:

1. Workers' Compensation and Employer’s Liability: This insurance shall protect the CONTRACTOR against all claims under applicable workers' compensation laws or federal acts, including claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. The CONTRACTOR shall require each subcontractor similarly to provide workers' compensation insurance and employer’s liability insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the CONTRACTOR's workers' compensation insurance. The CONTRACTOR and each Subcontractor shall provide a waiver of subrogation in favor of the OWNER and ENGINEER, and their additional insureds.

2. Commercial General Liability: This insurance shall be written in comprehensive form and shall be at least as broad as insurance services office commercial general liability coverage (occurrence Form CG 0001), and shall protect the CONTRACTOR and OWNER against all claims arising from injuries to persons or damage to property arising out of any act or omission of the CONTRACTOR or its agents, employees, or subcontractors. The policy shall also include "owner's and contractor's protective liability" endorsement and contractual coverage to insure the contractual liability assumed by the CONTRACTOR under

the indemnification provisions in the General Conditions. To the extent that the CONTRACTOR's work, or work under its direction, may require blasting, explosive conditions, or underground operations, the comprehensive or commercial general liability coverage shall specifically include coverage relative to blasting, explosion, collapse, and/or underground hazards.

3. Commercial Automobile Liability: This insurance shall be written in comprehensive form and shall be at least as broad as Insurance Services Office Business Auto Coverage (Form CA 0001), covering Code 1 (any auto), and shall protect the CONTRACTOR and OWNER against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the Site of all motor vehicles licensed for highway use, whether they are owned, nonowned, or hired.

4. Subcontractor's Liability Insurance: The CONTRACTOR shall either require each of the Subcontractors to procure and to maintain subcontractors liability, property damage insurance and vehicle liability insurance of the type and in the same amounts specified in the Contract Documents for the CONTRACTOR.

5. Builder's Risk: This insurance shall be of the "all risks" type, shall be written in completed value form, and shall protect the CONTRACTOR, Subcontractors, the OWNER, and the ENGINEER, against risks of damage to buildings, structures, and materials and equipment (including any stored off-site and while in transit), CONTRACTORS' equipment, debris removal and including demolition and contingent loss occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for ENGINEER'S services and expenses required as a result of such insured loss. The amount of such insurance shall be not less than the insurable value of the WORK at completion plus equipment. Builders risk insurance shall provide for losses to be payable to the CONTRACTOR and the OWNER, as their interests may appear. This insurance shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the CONTRACTOR, the OWNER, and the ENGINEER. This insurance shall insure against all risks of loss (including earthquake, flood and collapse) and, at the option of the OWNER, shall include comprehensive boiler and machinery coverage including coverage for installation and testing.

6. Deductibles and Self-Insured Retentions: Any deductibles or self-insured retentions shall be declared to an approved by the OWNER in advance.

SECTION 6 - CONTRACTORS RESPONSIBILITIES

6.1 SUPERVISION AND SUPERINTENDENCE

A. The CONTRACTOR shall supervise, inspect, and direct the WORK safely, competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and all safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.

B. The CONTRACTOR shall designate in writing and keep on the Site at all times during the performance of the WORK a technically qualified, English-speaking superintendent, who is an employee of the CONTRACTOR and who shall not be replaced without written notice to the OWNER and the ENGINEER. The superintendent shall be the

CONTRACTOR's representative at the Site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR.

C. The CONTRACTOR's superintendent shall be available by phone for emergencies 24 hours per day, 7 days per week. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the Site.

D. CONTRACTOR shall be responsible for protecting the WORK from any and all acts or occurrences including the weather.

6.2 LABOR, MATERIALS, AND EQUIPMENT

A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any required temporary works. The CONTRACTOR shall at all times maintain good discipline and order at the Site. Except in connection with the safety or protection of persons or the WORK or property at the Site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all work at the Site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday, or any federally observed holiday without the OWNER's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER in writing a minimum of 24 hours in advance.

B. Except as otherwise provided in this Section, the CONTRACTOR shall receive no additional compensation for overtime work (i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week), even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid to the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and a Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.

C. All increased costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The OWNER has the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.

D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, lubricants, power, light, heat, telephone, water, sanitary facilities, and all other facilities, consumables, and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK.

E. All materials and equipment incorporated into the WORK shall be of specified quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the OWNER. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance

with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the OWNER, ENGINEER, 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 contrary to the provisions of Section 9.9 C.

6.3 SCHEDULE

The CONTRACTOR shall comply with the Schedule requirements of the Contract Documents.

6.4 SUBSTITUTES OR "OR EQUAL" ITEMS

The CONTRACTOR shall submit proposed substitutes or "or equal" items in accordance with the provisions on Products, Materials, Equipment, and Substitutions in the Contract Documents.

6.5 RESPONSIBILITY FOR SUBCONTRACTORS, SUPPLIERS AND OTHERS

The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its Subcontractors, Suppliers, and their employees to the same extent as CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this Section shall create any contractual relationship between any Subcontractor and the OWNER or the ENGINEER, nor relieve the CONTRACTOR of any liability or obligation under the Contract Documents. The CONTRACTOR shall include these General Conditions and the Contract Documents as a part of all its subcontract and supply agreements.

6.6 PERMITS

Unless otherwise provided in the Contract Documents, the CONTRACTOR shall obtain and pay for all construction permits and licenses required for the work from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements shall not be made the basis for claims for additional compensation by CONTRACTOR. When necessary, the OWNER will endeavor to assist the CONTRACTOR in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK. The CONTRACTOR shall pay all charges of utility owners for inspection or connections to the WORK.

6.7 PATENT FEES AND ROYALTIES

The CONTRACTOR shall pay all license and patent fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product, or device which is the subject of patent or license rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the OWNER or the ENGINEER its use is subject to patent or license rights or copyrights calling for the payment of any fee or royalty to others, the existence of such rights will be disclosed by the OWNER in the Contract Documents. The CONTRACTOR's indemnification obligation for all claims and liabilities arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product, or device not specified in the Contract Documents shall be in accordance with Section 6.16 of these General Conditions.

6.8 LAWS AND REGULATIONS

The CONTRACTOR shall observe and comply with all Laws and Regulations which in any manner affect those individuals, entities, employees, agents, subcontractors and suppliers engaged or employed on the WORK, the materials used in the WORK, or the conduct of the

WORK. If any discrepancy or inconsistency should be discovered between the Contract Documents and any such Laws or Regulations, the CONTRACTOR shall report the same in writing to the ENGINEER. Any particular Law or Regulation specified or referred to in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all Laws and Regulations. The CONTRACTOR's indemnification obligations for all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, agents, subcontractors or suppliers shall be in accordance with Section 6.16 of these General Conditions.

6.9 TAXES

The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations which are applicable during the performance of the WORK.

6.10 USE OF PREMISES

The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site, the land and areas identified in and permitted by the Contract Documents, and the other land and areas permitted by Laws and Regulations, rights-of-way, permits, and easements. The CONTRACTOR shall assume full liability and responsibility for any injuries or damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the OWNER or the ENGINEER by any such owner or occupant or any other third party because of the performance of the WORK, the CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim through litigation at the CONTRACTOR's sole expense. The CONTRACTOR's indemnification obligations for all claims and liability, arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner, occupant or third party against the OWNER, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents to the extent caused by or based upon the CONTRACTOR's performance of the WORK shall be in accordance with Section 6.16 of these General Conditions.

6.11 SAFETY AND PROTECTION

A. The CONTRACTOR shall be solely responsible for the health and safety of its employees, agents and subcontractors in performing the work. CONTRACTOR shall ensure strict compliance with all Cal/OSHA safety requirements. The CONTRACTOR shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. All persons at the Site and other persons and organizations who may be affected thereby including all employees, subcontractors, laborers and suppliers, and their employees;

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

3. Other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of the performance of the WORK.

B. The CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property or to the protection of persons or property from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. CONTRACTOR'S duties and responsibilities for safety and for protection of the WORK shall continue until Final Payment.

C. The CONTRACTOR shall designate a qualified and experienced safety representative for the WORK and at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be made available at the Site by the CONTRACTOR for every hazardous product used.

E. Material usage shall strictly conform to OSHA safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.

F. The CONTRACTOR shall be responsible for the exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

G. The CONTRACTOR shall notify the ENGINEER if it considers a specified product or its intended use to be unsafe. This notification shall be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.

6.12 EMERGENCIES

In emergencies affecting the safety or protection of persons or the WORK or property at the Site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, is obligated to immediately act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER and OWNER prompt written notice if CONTRACTOR believes that any significant changes in the WORK or variations from the Contract Documents have been caused thereby. If OWNER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Change Order will be issued to document the consequences of such action.

6.13 SUBMITTALS

A. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Conditions, the CONTRACTOR shall submit to the ENGINEER for review all Shop Drawings in accordance with the accepted schedule of Shop Drawing submittals specified in the Section in the Contract Documents on Contractor Submittals.

B. The CONTRACTOR shall also submit to the ENGINEER for review all Samples in accordance with the accepted schedule of Sample submittals specified in the Section in the Contract Documents on Contractor Submittals.

C. Before submittal of each Shop Drawing or Sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect

thereto and reviewed or coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the WORK and the Contract Documents. The CONTRACTOR shall provide submittals in accordance with the requirements of the Section in the Contract Documents on Contractor Submittals.

6.14 CONTINUING THE WORK

The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No WORK shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the OWNER may otherwise agree in writing.

6.15 CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE

A. CONTRACTOR warrants and guarantees to OWNER, ENGINEER and ENGINEER's consultants that all WORK will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. Abuse, improper modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, or Suppliers, or any other individual or entity for whom CONTRACTOR is responsible, provided the CONTRACTOR has been previously relieved of responsibility for protection of such equipment by written action of the OWNER;

2. Normal wear and tear under normal usage.

B. CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. None of the following shall constitute an acceptance of WORK that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents:

1. Observations by ENGINEER;

2. Recommendation by ENGINEER or payment by OWNER of any progress or final payment;

3. The issuance of a Certificate of Completion by the OWNER or the use or occupancy of the WORK or any part thereof by the OWNER;

4. Any acceptance by OWNER or any failure to do so;

5. Any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to Section 14.7 B.;

6. Any inspection, test, or approval by others; or

7. Any correction of Defective Work by OWNER.

6.16 INDEMNIFICATION

A. To the fullest extent permitted by Laws and Regulations, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees, and agents of each and any of them, against and from all claims and liability, including attorneys and litigation costs, arising under, by reason of, related, or incidental to the Contract Documents or any performance of the WORK, but not from the active negligence or willful misconduct of the

OWNER and/or the ENGINEER. Such indemnification by the CONTRACTOR shall include, but not be limited to, the following:

1. Liability or claims arising directly or indirectly from the negligence, carelessness or willful misconduct of the CONTRACTOR, its employees, agents, subcontractors or suppliers in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, or agents;

2. Liability or claims arising, directly or indirectly, from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's, subcontractor's, or supplier's own employees, or agents engaged in the WORK resulting in actions brought by or on behalf of such employees or agents against the OWNER and/or the ENGINEER;

3. Liability or claims arising, directly or indirectly, related to the work, from or based on the violation of any Laws or Regulations, by the CONTRACTOR, its employees, agents, subcontractors or suppliers;

4. Liability or claims arising, directly or indirectly, from the improper or unapproved use or manufacture by the CONTRACTOR, or its subcontractors or suppliers, or any of their employees or agents of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, or appliance in the performance of this Agreement;

5. Liability or claims arising, directly or indirectly, from the breach of any warranties, whether express or implied, made to the OWNER and/or ENGINEER or any other parties by the CONTRACTOR, or its subcontractors or suppliers, or any of their employees, or agents;

6. Liability or claims, arising directly or indirectly, from any breach of the obligations assumed in this Agreement by the CONTRACTOR, Subcontractors, Suppliers, or any of their employees or agents;

7. Liability or claims arising, directly or indirectly, from, relating to, or resulting from a hazardous condition created by the CONTRACTOR, Subcontractors, Suppliers, or any of their employees or agents; and

8. Liability or claims arising, directly or indirectly, out of any court or administrative action brought against the OWNER, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents of any of them, to the extent caused by the CONTRACTOR's use of any premises acquired by permits, rights of way, or easements, the Site, or any land or areas contiguous thereto or its performance of the WORK thereon.

B. The CONTRACTOR shall reimburse the OWNER and the ENGINEER for all costs and expenses, (including but not limited to fees and expenses of engineers, architects, attorneys, and other professionals and court costs) incurred by said OWNER and ENGINEER in enforcing the provisions of this Section 6.16, or related to any indemnification obligation in the Contract Documents.

C. The indemnification obligation under this Section 6.16 shall not be limited in any way by any limitation on the amount or type of insurance carried by CONTRACTOR or by the amount or type of damages, compensation, or benefits payable by or for the

CONTRACTOR or any subcontractor, supplier, agent, employee or other person or entity.

6.17 CONTRACTOR'S DAILY REPORTS

The CONTRACTOR shall complete a daily report indicating location worked, total manpower for each construction trade, major equipment on Site, each subcontractors manpower and equipment, weather conditions, and other related information involved in the performance of the WORK. The daily report shall be completed on forms approved by the ENGINEER, and shall be submitted to the ENGINEER at the conclusion of each workday. The daily report shall comment on the daily progress and status of each major component of the WORK. The breakdown of these components will be decided by the ENGINEER.

SECTION 7 -- OTHER WORK

7.1 RELATED WORK AT SITE

A. The OWNER may perform other work related to the Project at the Site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts for such other work. Within Public Right-of-Way other Agencies may have contracts for their Work at the Site. There shall be no distinction between any other public work at the Site; Contractor is required to cooperate and coordinate with all other Contractors. If such other work to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.

B. The CONTRACTOR shall afford each person who is performing the other work with proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.

C. If the proper execution or results of any part of the CONTRACTOR's work depends upon such other work by another, the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work except for latent or nonapparent defects and deficiencies in the other work.

7.2 COORDINATION

If OWNER contracts with others for the performance of other work at the Site, the CONTRACTOR shall cooperate and coordinate access and work with such other contractors so that each can complete their work to their mutual benefit.

SECTION 8 - OWNER'S RESPONSIBILITIES

8.1 COMMUNICATIONS

All routine and/or daily communications to and from the CONTRACTOR are expected to go through the ENGINEER. Contract Documents are expected to go directly to the contracting entities, with copies to the ENGINEER.

8.2 PAYMENTS

The OWNER will make payments to the CONTRACTOR as provided in the Contract Documents.

8.3 LANDS, EASEMENTS, AND SURVEYS

The CONTRACTOR shall provide all required surveys.

8.4 REPORTS AND DRAWINGS

The OWNER will identify and make available to the CONTRACTOR copies of reports of physical conditions at the Site and drawings of existing structures identified in Section 4.2.

8.5 CHANGE ORDERS

The OWNER will execute Change Orders as indicated in Sections 10, 11 and 12.

8.6 INSPECTIONS AND TESTS

The OWNER's responsibility for inspections and tests is set forth in Section 13.3.

8.7 SUSPENSION OF WORK

The OWNER's right to stop work or suspend work is set forth in Sections 13.4 and 15.1.

8.8 TERMINATION OF AGREEMENT

The OWNER's right to terminate services of the CONTRACTOR is set forth in Sections 15.2 and 15.3.

8.9 LIMITATION ON OWNER'S RESPONSIBILITIES

The OWNER shall not supervise, direct or have control or authority over, nor be responsible for, CONTRACTOR's means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the WORK or the health and safety of CONTRACTOR's employees, agents, subcontractors or suppliers. OWNER shall not be responsible for CONTRACTOR's failure to perform or furnish the WORK in accordance with the Contract Documents.

8.10 UNDISCLOSED HAZARDOUS ENVIRONMENTAL CONDITIONS

OWNER's responsibility for an undisclosed hazardous waste condition is set forth in Section 4.5.

SECTION 9 -- ENGINEER'S STATUS DURING CONSTRUCTION

9.1 OWNER'S REPRESENTATIVE

The ENGINEER will be the OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of the ENGINEER as the OWNER's representative during construction are summarized in the Contract Documents. Separate contractual agreements between OWNER and ENGINEER exist.

9.2 OBSERVATIONS ON THE SITE

The ENGINEER will make observations on the Site during construction to monitor the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents.

9.3 PROJECT REPRESENTATION

The ENGINEER shall furnish a Project Representative to accomplish obligations identified in this SECTION. The duties, responsibilities, and limitations of authority of any such Project Representative will be as provided in the Contract Documents.

9.4 CLARIFICATIONS

The ENGINEER will issue with reasonable promptness such written Clarifications of the requirements of the Contract Documents as the ENGINEER may determine necessary or as requested by the CONTRACTOR, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

9.5 AUTHORIZED VARIATIONS IN WORK

The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the Contract Times. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Times, the CONTRACTOR may request consideration for a Change Order in accordance with Sections 10, 11 or 12.

9.6 REJECTING DEFECTIVE WORK

The ENGINEER will have authority to reject Defective Work and will also have authority to require special inspection or testing of the WORK as provided in Section 13.

9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals.

B. The ENGINEER's responsibilities for Change Orders are set forth in Sections 10, 11, and 12.

C. The ENGINEER's responsibilities for Applications for Payment are set forth in Section 14.

9.8 DECISIONS ON DISPUTES

The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and of the acceptability of the WORK thereunder. Claims, disputes, and other matters relating to the acceptability of the WORK and interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK will be initially determined by the ENGINEER. Any claims in respect to changes in the Contract Price or Contract Times shall be resolved in accordance with the requirements of Sections 10, 11, and 12.

9.9 LIMITATION ON ENGINEER'S RESPONSIBILITIES

A. Neither the ENGINEER's authority to act under this Section 9 or other provisions of the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety for any of them, or any other person or entity performing any of the WORK.

B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory,"

or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Section 9.9 C.

C. The ENGINEER shall not supervise, direct, control, or have authority over or be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the CONTRACTOR to comply with Laws and Regulations applicable to the performance of the WORK. The ENGINEER will not be responsible for the CONTRACTOR's failure to perform the WORK in accordance with the Contract Documents. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, Supplier, or any other person or entity performing any of the WORK

SECTION 10 -- CHANGES IN THE WORK

10.1 GENERAL

A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK. Such additions, deletions or revisions will be authorized by a Change Order or Field Order. Upon receipt of any such document, CONTRACTOR shall promptly proceed to implement the additions, deletions, or revisions in the WORK in accordance with the applicable conditions of the Contract Documents.

B. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Times for any work performed except as provided in a Change Order. A valid Change Order is either by mutual consent or by unilateral directive from the OWNER. The OWNER prefers to issue Change Orders that are mutually agreeable and signed by both parties. Should the parties be unable to agree on the terms, the OWNER has the right to issue a unilateral Change Order which establishes the value and time impacts and the work to be accomplished by the CONTRACTOR. The CONTRACTOR is obligated to comply with a unilateral Change Order. Should a unilateral Change Order be issued, the burden of proof falls solely upon the CONTRACTOR to prove that the value and time included therein is unreasonable.

C. If notice of any change in the WORK is required to be given to a surety, the giving of any such notice shall be the CONTRACTOR's responsibility. If the change in the WORK affects the Contract Price, the OWNER may require an adjustment to the amount of any applicable Bond and the amount of each applicable Bond shall be adjusted accordingly.

10.2 VARIATIONS IN ESTIMATED QUANTITIES

A. If the actual quantity of a unit price bid item varies from the estimated quantity identified in the bid by more than 25% either greater or lesser, either party may request consideration for a Change Order to adjust the unit price based upon the increase or decrease in costs due solely to the variation by more than 25%, and applied only to the amount exceeding 25%. If this variation should cause an increase in the time to complete the WORK, the CONTRACTOR shall, within 20 days of the beginning of the delay or the date the CONTRACTOR should have recognized the beginning of the delay,

notify the OWNER of the delay and the impacts in sufficient detail to allow a decision to be made as to the justification and extent of the Changed Time resulting from the variation in quantities exceeding the 25% limit.

B. In the event a part of the WORK is to be entirely eliminated, the Contract Price shall be decreased by the lump sum or unit price for the eliminated WORK. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is identified in the Contract Documents to cover such eliminated work, the Contract Price shall be decreased by the value of the eliminated work.

SECTION 11 -- CHANGE OF CONTRACT PRICE

11.1 GENERAL

A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.

B. Any claim by CONTRACTOR for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER within 10 days after the start of the event giving rise to the claim and stating the general nature of the claim. A detailed written claim with supporting data shall be delivered by the CONTRACTOR to ENGINEER within 60 days after the start of such event and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of such event. All claims for adjustment in the Contract Price will be evaluated by the ENGINEER and OWNER. No claim by CONTRACTOR for an adjustment in the Contract Price will be considered if not submitted in accordance with this Section 11.1 B. If CONTRACTOR’s claim is acceptable to OWNER, OWNER will issue an appropriate Change Order.

11.2 COSTS RELATING TO WEATHER

The CONTRACTOR shall have no claims against the OWNER for damages for any injury to work, materials, or equipment, resulting from the action of the weather. If, however, in the opinion of the OWNER, the CONTRACTOR has made all reasonable efforts to protect the materials, equipment, and work, the CONTRACTOR may be granted a reasonable extension of Contract Times to make proper repairs, renewals, and replacements of the work, materials, or equipment.

11.3 CALCULATION OF COST OF EXTRA WORK (BASED ON TIME AND MATERIALS)

A. General: The term "cost of extra work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in Section 11.5.

B. Labor: The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, workers compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs required by federal, state or local laws, as well as assessments or benefits required by lawful collective bargaining agreements for those workers. Labor costs for equipment operators and helpers will be paid only when such costs are not included in the invoice

for equipment rental. The labor costs for foremen shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. Nondirect labor costs including superintendence shall be considered part of the markup set out in Section 11.4.

C. Materials: The cost of materials reported shall be at invoice or lowest current price at which materials are locally available and delivered to the Site in the quantities involved, plus the cost of freight, delivery and storage, subject to the following:

1. All trade discounts and rebates shall accrue to the OWNER, and the CONTRACTOR shall make provisions so that they may be obtained;

2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Except for actual costs incurred in the handling of such materials, markup shall not be allowed;

3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the Site, whichever price is lower; and

4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the Site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim will be allowed by the CONTRACTOR for costs and profit on such materials.

D. Equipment: The CONTRACTOR will be paid for the use of equipment for extra work at the rental rate listed for such equipment specified in the Contract Documents. Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment will be the rate resulting in the least total cost to the OWNER for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the publication specified in the Contract Documents, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate. Payment for equipment shall be subject to the following:

1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used;

2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number;

3. Unless otherwise specified, manufacturers ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer; and

4. Individual pieces of equipment or tools having a replacement value of $500 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefor.

E. Equipment Rental Time: The rental time to be paid for equipment on the Site will be the time the equipment is in productive operation on the extra work being performed and, in addition, will include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the Site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the Site of the extra work on other than the extra work. Rental time will not be allowed while equipment is inoperative due to breakdowns. The rental time of equipment on the work Site will be computed subject to the following:

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation will be considered to be half-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation;

2. When daily rates are listed, any part of a day less than 4 hours operation will be considered to be half-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Sections 3, 4, and 5, following;

3. Payment for the equipment will be made in accordance with the provisions in Section 11.3 D., herein;

4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the Site, or in the absence of such labor, established by collective bargaining agreements for the type of workmen and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Section 11.3 B., herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages; and

5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Section 11.4, herein.

F. Special Services: Special work or services for extra work are defined as that work characterized by extraordinary complexity, sophistication, innovation, or a combination of the foregoing attributes which are unique to the construction industry. The ENGINEER will make estimates for payment for special services and may consider the following:

1. When the ENGINEER and the CONTRACTOR, determine that a special service or work is required which cannot be performed by the forces of the CONTRACTOR or those of any of its Subcontractors, the special service or work may be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for special services or work based upon the current fair

market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs;

2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the Site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as a special service and accordingly, the invoices for the work may be accepted without detailed itemization; and

3. All invoices for special services will be adjusted by deducting all trade discounts. In lieu of the allowances for overhead and profit specified in Section 11.4, herein, an allowance of 15 percent will be added to invoices for special services.

G. Sureties: All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference thereto as under the original Agreement. Copies of all amendments to Bonds or supplemental Bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

11.4 CONTRACTOR'S OVERHEAD AND PROFIT

A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. The allowance for overhead and profit will include compensation for superintendence, taxes, field office expense, extended overhead, and home office overhead. The allowance for overhead and profit will be made in accordance with the following schedule:

Overhead and Profit Allowance

Labor …….. 20 percent

Materials ..... 15 percent

Equipment ..... 15 percent

B. It is understood that labor, materials, and equipment for extra work may be furnished by the CONTRACTOR or by the Subcontractor on behalf of the CONTRACTOR. When all or any part of the extra work is performed by a Subcontractor, the allowance specified herein will be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractors total cost for the extra work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent increase above the Subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only.

11.5 EXCLUDED COSTS OF EXTRA WORK

A. The term "cost of extra work" shall not include any of the following:

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, proprietors, partners, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by CONTRACTOR whether at the Site or in CONTRACTOR's principal or a branch office for general administration of the WORK;

2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site;

3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments;

4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same;

5. Costs due to the acts, omissions, willful misconduct or negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property; and

6. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in Section 11.4.

11.6 CONTRACTOR'S EXTRA WORK REPORT

In order to be paid for extra work, the CONTRACTOR must submit a daily extra work report on the form furnished by the ENGINEER. The form must be completely filled out consistent with the provisions of Sections 11.3 through 11.5 and signed by the CONTRACTOR and ENGINEER at the end of each workday. Failure to complete the form and obtain appropriate signatures by the next working day after the extra work of the previous day was completed will result in CONTRACTOR's costs for extra work not being considered by the OWNER.

SECTION 12 -- CHANGE OF CONTRACT TIMES

12.1 GENERAL

A. The Contract Times may only be changed by a Change Order. Any claim for an extension of the Contract Times shall be based on written notice delivered by the CONTRACTOR to the ENGINEER within 10 days after the start of the event giving rise to the claim and stating the general nature of the claim. A detailed written claim with supporting data shall be delivered to the ENGINEER within 60 days after the start of the event giving rise to the claim and shall be accompanied by the CONTRACTOR's written statement that the extension claimed is the entire extension to which the CONTRACTOR is entitled as a result of said event. All claims for extension in the Contract Times will be evaluated by the ENGINEER. No claim for an extension in the Contract Times will be considered if not submitted in accordance with this Section 12.1 A. If CONTRACTOR's claim for an extension is acceptable to OWNER, OWNER will issue an appropriate Change Order. An increase in Contract Times does not mean that the CONTRACTOR is entitled to an increase in Contract Price.

B. All time limits stated in the Contract Documents are of the essence of the Agreement.

C. When CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the WORK due to such delay, if a claim is made therefor as provided in Section 12.1.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or negligence of the OWNER, fires, floods, epidemics, or acts of God. Delays attributable to any Subcontractor or Supplier are not included and shall be deemed to be delays within the control of the CONTRACTOR.

D. In no event will OWNER be liable to CONTRACTOR, any subcontractor, supplier, laborer or any other person or entity, or to any surety, or employee or agent of any of them, for any increase in the Contract Price or other damages arising out or resulting from the following:

1. Delays caused by or within the control of CONTRACTOR or its laborers, subcontractors or suppliers; or

2. Delays beyond the control of both OWNER and CONTRACTOR including, but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by those performing other work as contemplated by Section 7.

12.2 EXTENSIONS OF CONTRACT TIMES FOR DELAY DUE TO WEATHER

Contract Times may be extended by the OWNER because of delays in the completion of the WORK due to unusually severe and extreme weather, provided that the CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing of the cause of delay and request an extension of Contract Times. The ENGINEER will ascertain the facts and the extent of the delay, and in reliance on ENGINEER's evaluation, OWNER may extend the Contract Times. However, OWNER will not be liable to CONTRACTOR, any subcontractor, supplier, laborer and any other person or entity, or to any surety, or any employee or agent of any of them for any increase in contract price or other damages arising from such contract time extension.

SECTION 13 -- INSPECTIONS AND TESTS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

13.1 NOTICE OF DEFECTIVE WORK

Prompt notice of Defective Work known to the OWNER or ENGINEER will be given to the CONTRACTOR. All Defective Work, whether or not in place, may be rejected, corrected, or accepted as provided in this Section 13. Defective Work may be rejected even if approved by prior inspection.

13.2 ACCESS TO WORK

OWNER, ENGINEER, their consultants, subconsultants, other representatives and personnel of OWNER, independent testing laboratories, and other governmental agencies shall have access to the WORK at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

13.3 INSPECTIONS AND TESTS

A. The CONTRACTOR shall employ and pay for an experienced licensed Land Surveyor or Civil Engineer to establish and verify the elevation of all elements and to layout all detailed dimensions and elevations from reference points, using recognized engineering survey methods and documentation techniques.

Trench backfill shall be tested by CONTRACTOR at its expense at the time of placement to determine moisture content and relative compaction. At least one field density test shall be taken for each 500 feet of trench and at vertical intervals of 1 – 2 feet. Field density tests shall be performed in accordance with ASTM D2922 and D 3017 by a geotechnical engineer or qualified experienced technician.

Any field density results that are less than the required relative compaction shall be

reworked, moisture conditioned and re-compacted as necessary under observation of an approved inspector. Alternatively, the substandard material can be removed, moisture conditioned and replaced as properly compacted fill.

B. The OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. For inspection, tests, or approvals covered by Sections 13.3C. and 13.3D. below;

2. That costs incurred in connection with tests or inspections conducted pursuant to Section 13.3G. shall be paid as provided in said Section 13.3G.; and

3. As otherwise provided in the Contract Documents.

C. If Laws and Regulations of any public body having jurisdiction require any WORK (or any part thereof) to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith, and furnish the ENGINEER the required certificates of inspection or approval.

D. The CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for the ENGINEER's acceptance of materials or equipment to be incorporated in the WORK or acceptance of materials, mix designs, or equipment submitted for approval prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. Such inspections, tests, or approvals shall be performed by entities acceptable to the ENGINEER.

E. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. Unless otherwise specified in the Contract Documents, the cost of such inspection and testing will be borne by the OWNER. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent re-inspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

F. If any WORK (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER not less than 72 business hours notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.

G. If any WORK is covered contrary to the request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.

H. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in

question, furnishing all necessary labor, material, and equipment. If it is found that such work is Defective Work, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to, fees and charges of engineers, architects, attorneys, and other professionals. However, if such work is not found to be Defective Work, 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, inspection, testing, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Sections 11 and 12.

13.4 OWNER MAY STOP THE WORK

If Defective Work is identified, the OWNER may order the CONTRACTOR to stop performance of the WORK, or any portion thereof, until the Defective Work is corrected. OWNER's right to stop the WORK shall not give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.

13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK

If required by the ENGINEER or OWNER, the CONTRACTOR shall promptly either correct all Defective Work, whether or not fabricated, installed, or completed, or, if the work has been rejected by the ENGINEER or OWNER, remove it from the Site and replace it with non-defective WORK. The CONTRACTOR shall bear all direct and indirect costs and damages related to such correction or removal, including but not limited to fees and expenses of engineers, architects, attorneys, and other professionals.

13.6 ACCEPTANCE OF DEFECTIVE WORK

Instead of requiring correction or removal and replacement of Defective Work, the OWNER may accept such Defective Work. The CONTRACTOR shall bear all direct and indirect costs attributable to the OWNER's evaluation and acceptance of such Defective Work. If any such acceptance occurs prior to final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

13.7 OWNER MAY CORRECT DEFECTIVE WORK

A. If the CONTRACTOR fails within a reasonable time after written notice from the ENGINEER to correct Defective Work, or to remove and replace Defective Work as required by the ENGINEER in accordance with Section 13.5., or if the CONTRACTOR fails to perform the WORK in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the OWNER may, after seven days written notice to the CONTRACTOR, correct and remedy any Defective Work.

B. In correcting such Defective Work, the OWNER may exclude the CONTRACTOR from all or part of the Site, take possession of all or part of the WORK, and suspend the CONTRACTOR's services related thereto and incorporate in the WORK all materials and equipment for which the OWNER has paid the CONTRACTOR whether stored at the Site or elsewhere. The CONTRACTOR shall provide the OWNER, OWNER's representatives, ENGINEER, and ENGINEER's consultants access to the Site and to all necessary materials and equipment to enable OWNER to exercise the rights and remedies under this Section.

C. All direct and indirect costs and damages incurred by the OWNER in exercising the rights and remedies under this Section will be charged against the CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, the OWNER may issue a unilateral change order. Such a change order will include, but not be limited to, all costs of repair or replacement of work of others, destroyed or damaged by correction, removal, or replacement of CONTRACTOR's Defective Work and all direct, indirect, and consequential damages associated therewith.

D. The CONTRACTOR shall not be allowed an extension of Contract Times (or Milestones) because of any delay in the performance of the WORK attributable to the exercise by OWNER of OWNER's rights and remedies under Section 13.

13.8 WARRANTY PERIOD

A. The warranty period for the correction of Defective Work shall be the longer of:

1. Two years after the date of final payment;

2. Such time as may be prescribed by Laws and Regulations;

3. Such time as specified by the terms of any applicable special guarantee required by the Contract Documents; or

4. Such time as specified by any specific provision of the Contract Documents.

B. If, during the warranty period as defined in Section 13.8A above, any work is found to be Defective Work, the OWNER shall have the same remedies as set forth in Sections 13.5, 13.6, and 13.7 above.

C. Where Defective Work (and damage to other work resulting therefrom) has been corrected, removed, or replaced under this Section 13.8, the warranty period hereunder with respect to such work is extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed, if the correction occurs in the second year of the original warranty period.

SECTION 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 SCHEDULE OF VALUES

The schedule of values established as provided in the General Requirements shall serve as the basis for progress payments and shall be incorporated into a form of Application for Payment acceptable to the ENGINEER.

14.2 UNIT PRICE BID SCHEDULE

Progress payments on account of unit price work will be based on the number of units completed.

14.3 APPLICATION FOR PROGRESS PAYMENT

A. Unless otherwise prescribed by law, once each month, the CONTRACTOR shall submit to the ENGINEER for review, the Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the date of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents.

B. The Application for Payment shall identify, as a subtotal, the amount of the CONTRACTOR total earnings to date; plus the value of materials stored at the Site which have not yet been incorporated in the WORK; and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions for payment for materials stored at the Site.

C. The net payment due the CONTRACTOR shall be the above-mentioned subtotal from which shall be deducted the retention specified in the Contract Documents, any obligations to the OWNER, and the total amount of all previous payments made to the CONTRACTOR.

D. The payment for materials stored at the Site shall not exceed 80 percent of the value of such materials as set forth in the Contract Documents. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the Site or at another location agreed to in writing; provided, each such individual item has a value of more than $5,000 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that the CONTRACTOR has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER.

14.4 CONTRACTOR'S WARRANTY OF TITLE

The CONTRACTOR warrants and guarantees that title to all WORK, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, shall pass to the OWNER no later than the time of payment, free and clear of all Liens.

14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the application to the OWNER, or return the application to the CONTRACTOR indicating in writing the ENGINEER's reasons for refusing to recommend payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the application. If the ENGINEER still disagrees with any portion of the application, it will submit the application recommending the undisputed portion of the application to the OWNER for payment and provide reasons for recommending non-payment of the disputed amount. Within thirty (30) days after presentation to the OWNER of the Application for Payment with the ENGINEER's recommendation for payment, unless OWNER submits written objections to the Application, the amount recommended will (subject to Section 14.5) be paid by the OWNER to the CONTRACTOR.

B. The ENGINEER, in its discretion, may refuse to recommend payment of the whole or any part of any application for payment. The ENGINEER, in its discretion, may also revoke any previously recommended Application for Payment, whether paid or not, based on subsequently discovered evidence or the results of subsequent inspections or tests, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

1. The work is Defective Work or the completed WORK has been damaged requiring correction or replacement.

2. The Contract Price has been reduced by written amendment or Change Order.

3. The OWNER has corrected Defective Work or completed WORK in accordance with Section 13.7.

4. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in Sections 15.1 through 15.4 inclusive.

C. The OWNER may refuse to make payment of any amount recommended by the ENGINEER because:

1. Claims have been made against OWNER related to CONTRACTOR's performance or furnishing of the WORK.

2. Lien(s) or stop notice(s) have been filed in connection with the WORK, except where CONTRACTOR has delivered a specific Bond satisfactory to OWNER to secure the satisfaction and discharge of such Lien(s) or stop notice(s).

3. There are other items entitling OWNER to a off-set against the amount(s) recommended; or

4. The occurrence of any of the events enumerated in Sections 14.5B. through 14.5C and 15.1 through 15.4 inclusive.

5. The OWNER does not agree with ENGINEER's recommendation for payment based on a good faith dispute with CONTRACTOR and/or ENGINEER.

D. The OWNER must give the CONTRACTOR prompt written notice (with a copy to the ENGINEER) stating the reasons for such action, and promptly pay the CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

14.6 SUBSTANTIAL COMPLETION

When the CONTRACTOR considers the WORK ready for its intended use, the CONTRACTOR shall notify the OWNER and the ENGINEER in writing and request that the WORK be declared substantially complete. The CONTRACTOR shall attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Substantial Completion. Within a reasonable time thereafter, the OWNER, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER or the OWNER does not consider the WORK substantially complete, the ENGINEER will notify the CONTRACTOR in writing giving the reasons therefor. If the ENGINEER and OWNER consider the WORK substantially complete, the ENGINEER will prepare and deliver to the OWNER for its execution and recordation the Notice of Substantial Completion, which shall fix the date of Substantial Completion.

14.7 PARTIAL UTILIZATION

A. The OWNER shall have the right to utilize or place into service any item of equipment or other useable portion of the WORK prior to completion of the WORK. Whenever the OWNER plans to exercise said right, the CONTRACTOR will be notified in writing by the OWNER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.

B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of Partial Utilization, the

OWNER will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.

C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER, and the CONTRACTOR's two year warranty period shall commence only after the date of Final Payment for the WORK.

14.8 FINAL APPLICATION FOR PAYMENT

After the Notice of Substantial Completion has been filed, and after CONTRACTOR has completed all of the remaining work items referred to in Sections 14.6 and 14.7.C and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in the General Requirements), and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for Final Payment following the procedure and limitations for progress payments at Section 14.5, and subject to 14.9.B. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the OWNER) of all Stop Notices arising out of or filed in connection with the WORK.

14.9 FINAL PAYMENT AND ACCEPTANCE

A. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will, within 14 days after receipt of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the application and recommendation to the OWNER.

B. Thirty-five (35) days after posting the Notice of Completion for the WORK, the OWNER will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained by OWNER pursuant to the Contract Documents, including the following:

1. Liquidated damages, as applicable;

2. Amounts withheld by OWNER under Section 14.5 B. and C. which have not been released; and

3. One hundred fifty percent (150%) of the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the OWNER and ENGINEER within the time stated in the Notice of Completion or other document issued by OWNER and/or ENGINEER, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the OWNER to cover the value of all such uncompleted or uncorrected items.

C. As a condition of final payment, the CONTRACTOR shall be required to execute a release on the form provided by OWNER, releasing the OWNER from any and all claims of liability for payment on the Project except for such amounts as may be specifically described and excluded from the release.

14.10 RELEASE OF RETAINAGE AND OTHER DEDUCTIONS

A. Upon satisfaction of conditions leading to the reduction in the Final Payment under Section 14.9 above, OWNER shall release funds as appropriate. It is contemplated that such a release will be a single event culminating in complete closure of the Contract.

SECTION 15 -- SUSPENSION OF WORK AND TERMINATION

15.1 SUSPENSION OF WORK BY OWNER

The OWNER may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt of a notice of resumption of WORK. The CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to any suspension if the CONTRACTOR makes an approved claim therefor in compliance with Sections 11 and 12.

15.2 TERMINATION OF AGREEMENT BY OWNER FOR DEFAULT

A. In the event of default by the CONTRACTOR, the OWNER may give seven days written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default within a specified period of time. It will be considered a default by the CONTRACTOR whenever CONTRACTOR shall:

1. Declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors;

2. Disregard or violate, the Laws or Regulations;

3. Fail to provide materials or workmanship in compliance with the requirements of the Contract Documents;

4. Disregard, breach or violate the provisions of the Contract Documents or ENGINEER's instructions;

5. Fail to prosecute the WORK according to the approved progress schedule, milestones or Contract Times;

6. Fail to provide a qualified superintendent, competent workmen, or materials or equipment in compliance with the requirements of the Contract Documents; or

7. Disregard the authority of the ENGINEER and/or OWNER.

B. If the CONTRACTOR fails to remedy the conditions constituting default within the above-referenced seven (7) days, the OWNER may then issue the notice of termination.

C. In the event the Agreement is terminated, the OWNER will file a Claim against the Surety and may take possession of the WORK and may complete the WORK by whatever method or means the OWNER 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 and Surety shall pay the excess amount to the OWNER.

15.3 TERMINATION OF AGREEMENT BY OWNER FOR CONVENIENCE

A. Upon seven days written notice to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy of the OWNER, elect to terminate the Agreement. OWNER may also terminate this Agreement for environmental or other considerations as permitted by Section 7105(d) of the Public Contract Code. In such case, the CONTRACTOR shall be paid (without duplication of any items):

1. For acceptable WORK performed and completed in accordance with the Contract Documents, prior to the effective date of termination, including reasonable sums for overhead and profit (as defined in Sections 11.4 and 11.5) for such WORK; or

2. For costs incurred prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents for partially completed WORK, plus reasonable sums for overhead and profit (as defined in Sections 11.4 and 11.5).

B. CONTRACTOR shall not be paid for loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination. OWNER shall not have any further responsibility or liability to CONTRACTOR , any subcontractors, suppliers or laborers for any other costs or damage allegedly arising from such termination.

15.4 TERMINATION OF AGREEMENT BY CONTRACTOR

A. The CONTRACTOR may terminate the Agreement upon 14 days written notice to the OWNER, whenever:

1. The WORK has been suspended under the provisions of Section 15.1, herein, for more than ninety (90) consecutive days through no fault, act, omission, willful misconduct or negligence of the CONTRACTOR, and notice to resume work or to terminate the Agreement has not been received from the OWNER within this time period; or

2. The OWNER should fail to pay the CONTRACTOR any undisputed monies due it in accordance with the terms of the Contract Documents and within 60 days after presentation to, and approval by, the OWNER of the CONTRACTOR's Application for Payment, unless within said 14-day period the OWNER shall have remedied the condition upon which the payment delay was based or unless OWNER does not have the funds, but identifies when funds are anticipated to be available.

B. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Section 15.3, herein.

SECTION 16 - MISCELLANEOUS

16.1 GIVING NOTICE

Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the entity or to an officer of the corporation or public agency for whom it is intended, or if delivered at or sent by facsimile, or certified mail, postage prepaid, to the last business address known to the giver of the notice.

16.2 TITLE TO MATERIALS FOUND ON THE WORK

The CONTRACTOR shall have exclusive responsibility for removal and disposal of all soils, stone, sand, gravel, and other materials developed and obtained from excavations and other operations connected with, or related to, the WORK and not incorporated into the WORK. The CONTRACTOR will use any such materials which meet the requirements of the Contract Documents. Such excess materials may be left on-site, with OWNER's written approval, or shall otherwise be disposed of properly by and at the expense of the CONTRACTOR.

16.3 RIGHT TO AUDIT

If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, to audit the CONTRACTOR's books. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plans, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon Subcontractors and suppliers. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.

16.4 SURVIVAL OF OBLIGATIONS

All representations, indemnifications, warranties, and guaranties made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the WORK or termination or completion of the Agreement.

16.5 CONTROLLING LAW

This Agreement is to be governed by the law of the State of California.

16.6 SEVERABILITY

If any term or provision of the Contract Documents is declared invalid or unenforceable by any court of lawful jurisdiction, the remaining terms and provisions of the Contract Documents shall not be affected thereby and shall remain in full force and effect.

16.7 WAIVER

The waiver by the OWNER of any breach or violation of any term, covenant or condition of the Contract Documents or of any Laws and Regulations shall not be deemed to be a waiver of any other term, covenant, condition, Laws and Regulations or of any subsequent breach or violation of the same. The subsequent payment of any monies by the OWNER which may become due hereunder shall not be deemed to be a waiver of any preceding breach or violation by CONTRACTOR or any term, covenant, condition of the Contract Documents or of any laws or regulations.

16.8 STATE WAGE DETERMINATIONS

A. As required by Section 1770 and following, of the California Labor Code, the CONTRACTOR shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations. Copies of such prevailing rate of per diem wages are on file at the office of the OWNER, which copies shall be made available to any interested party on request. The CONTRACTOR shall post a copy of such determination at each job site.

B. In accordance with Section 1775 of the California Labor Code, the CONTRACTOR shall, as a penalty, forfeit to the OWNER $50.00 (or such other amount required by law) for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the Director for the work or craft in which the worker is employed for any public work done under the Contract Documents by him or her or by any subcontractor under him or her.

16.9 WORKERS' COMPENSATION

A. In accordance with the provisions of Section 3700 of the California Labor Code, the CONTRACTOR shall secure the payment of workers' compensation for its employees.

B. Prior to beginning work under the Contract, the CONTRACTOR shall sign and file with the OWNER the following certification:

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

C. Notwithstanding the foregoing provisions, before the Contract is executed on behalf of the OWNER, a bidder to whom a contract has been awarded shall furnish satisfactory evidence that it has secured in the manner required and provided by law the payment of workers' compensation.

16.10 APPRENTICES ON PUBLIC WORKS

The CONTRACTOR shall comply with Section 1777.5 of the California Labor Code relating to employment of apprentices on public works.

16.11 WORKING HOURS

The CONTRACTOR shall comply with all applicable provisions of Section 1810 to 1815, inclusive, of the California Labor Code relating to working hours. The CONTRACTOR shall, as a penalty, forfeit to OWNER $25.00 (or such other amount required by law) for each worker employed in the performance of the WORK under the Contract Documents by the CONTRACTOR or by any subcontractor for each calendar day during which such worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week, unless such worker receives compensation for all hours worked in excess of 8 hours at not less than 1-1/2 times the basic rate of pay.

16.12 CONTRACTOR NOT RESPONSIBLE FOR DAMAGE RESULTING FROM CERTAIN ACTS OF GOD

As provided in Section 7105 of the California Public Contract Code, the CONTRACTOR shall not be responsible for the cost of repairing or restoring damage to the WORK which damage is determined to have been proximately caused by an act of God, which damage is in excess of five

percent (5%) of the Contract Price, provided, that the WORK damaged was built in accordance with the Contract Documents and accepted and applicable building standards. Consistent with Section 5.2. above, the CONTRACTOR shall obtain insurance to indemnify the OWNER for any damage to the WORK caused by an act of God as defined in said Section 7105.

16.13 CONCRETE FORMS, FALSEWORK, AND SHORING

The CONTRACTOR shall comply fully with all Laws and Regulations and the requirements of the Construction Safety Orders, State of California, Department of Industrial Relations, regarding the design of concrete forms, false work and shoring, and the inspection of same prior to placement of concrete. Where such Orders require the services of a civil engineer registered in the State of California to approve design calculations and working drawings of the false work or shoring system, or to inspect such system prior to placement of concrete, the CONTRACTOR shall employ a registered civil engineer for these purposes, and all costs therefor shall have been included in the Contract Price, and CONTRACTOR shall not be entitled to an increase in Contract Price or Contract Times.

16.14 SUBSTITUTION OF SECURITIES FOR WITHHELD FUNDS

A. Pursuant to Section 22300 of the California Public Contract Code, the CONTRACTOR may substitute securities for any money withheld by the OWNER to insure performance under the Contract Documents. At the request and expense of the CONTRACTOR, securities equivalent to the amount withheld shall be deposited with the OWNER or with a state or federally chartered bank in California as the escrow agent, who shall return such securities to the CONTRACTOR upon satisfactory completion of the Contract Documents.

B. Alternatively, the CONTRACTOR may request and the OWNER 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 Documents, the CONTRACTOR will receive from the escrow agent all securities, interest, and payments received by the escrow agent from the OWNER, pursuant to the terms of the Contract Documents.

C. Securities eligible for investment under Section 22300 shall be limited to those listed in Section 16430 of the Government Code and to bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the CONTRACTOR and the OWNER.

16.15 PUBLIC WORKS CONTRACTS; ASSIGNMENT TO AWARDING BODY

Pursuant to Section 7103.5 of the California Public Contract Code, in entering into a public works contract, the CONTRACTOR or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body (i.e., OWNER) tenders final payment to the CONTRACTOR, without further acknowledgement by the parties.

16.16 PAYROLL RECORDS; RETENTION; INSPECTION; NONCOMPLIANCE PENALTIES; RULES AND REGULATIONS

A. In accordance with the Laws and Regulations and Section 1776 of the Labor Code, the CONTRACTOR and each Subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per them wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work.

B. The payroll records enumerated under Section 17.9.A. 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 Section 17.9.A. shall be made available for inspection or furnished upon request to the OWNER, 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 Section 17.9.A. shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the OWNER, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to Section 17.9.B.2. 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 office of the CONTRACTOR.

C. 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 Section 17.9.A. with the entity that requested the records within 10 days after receipt of a written request.

D. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, 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.

E. The CONTRACTOR shall inform the OWNER of the location of the records enumerated under Section 17.9.A. including the street address, city and county, and shall, within 5 working days, provide a notice of change of location and address.

F. The CONTRACTOR shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects the CONTRACTOR must comply with this Section. In the event that the CONTRACTOR fails to comply within the 10-day period, he or she shall, as a penalty to be paid to the OWNER, forfeit twenty-five dollars ($25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is

effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from any payments then due.

16.17 CULTURAL RESOURCES

The CONTRACTOR's attention is directed to the provisions of the Clean Water Grant Program Bulletin 76A which augments the National Historic Preservation Act of 1966 (16 U.S.C. 470) as specified in the Section on Temporary Environmental Controls in the Contract Documents. The CONTRACTOR shall comply with all requirements therein.

16.18 PROTECTION OF WORKERS IN TRENCH EXCAVATIONS

A. As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the Contract Documents involves the excavation of any trench or trenches 5 feet or more in depth, the CONTRACTOR shall submit for acceptance by the OWNER or by a registered civil or structural engineer, employed by the OWNER, to whom authority to accept has been delegated, in advance of excavation, 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 Occupational Safety and Health, the plan shall be prepared by a registered civil or structural engineer employed by the CONTRACTOR, and all costs therefor shall have been included in the Contract Price, and CONTRACTOR shall not be entitled to an increase in the Contract Price or Contract Times. 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 OWNER, the ENGINEER, or any of their officers, agents, representatives, or employees.

B. Excavation shall not start until the CONTRACTOR has obtained all required permits therefor and has posted such at the site.

16.19 DIGGING TRENCHES OR EXCAVATIONS; NOTICE ON DISCOVERY OF HAZARDOUS WASTE OR OTHER UNUSUAL CONDITIONS

A. Pursuant to Public Contract Code, Section 7104, in digging trenches or other excavations that extend deeper than four feet below the surface CONTRACTOR shall promptly, and before the following conditions are disturbed, notify the OWNER, in writing, of any:

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

2. Subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids.

3. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

B. The OWNER shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR'S cost of, or the time required for, performance of any part of the

WORK shall issue a change order pursuant to the procedures described in the Contract Documents.

C. In the event that a dispute arises between the OWNER 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 Documents, but shall proceed with all WORK to be performed under the Contract Documents. 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.

16.20 TRAVEL AND SUBSISTENCE PAY

A. As required by Section 1773.8 of the California Labor Code, the CONTRACTOR shall pay travel and subsistence payments to each workman needed to perform the WORK, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with Section 1773.8.

B. To establish such travel and subsistence payments, the representative of any craft, classification or type of workman needed to execute the agreements 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 10 days after their execution and thereafter shall establish such travel and subsistence payments whenever filed 30 days prior to the call for bids.

16.21 REMOVAL, RELOCATION, OR PROTECTION OF EXISTING UTILITIES

A. In accordance with Section 4215 of the California Government Code, OWNER shall assume the responsibility, between the parties to the contract, for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Site of the WORK, if such utilities are not identified by the OWNER in the plans and specifications made a part of the invitation for bids. The OWNER will compensate CONTRACTOR for the costs of locating, repairing damage not due to the failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the Project necessarily idled during such work.

B. The CONTRACTOR shall not be assessed liquidated damages for delay in completion of the WORK, when such delay was caused by the failure of the OWNER or the owner of the utility to provide for removal or relocation of such utility facilities.

C. Nothing herein shall be deemed to require the OWNER to indicate the presence of existing service laterals or appurtenances when the presence of such utilities on the Site of the WORK can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of construction; provided, however, nothing herein shall relieve the OWNER from identifying main or trunk lines in the plans and specifications.

D. If the CONTRACTOR while performing the Contract discovers utility facilities not identified by the public agency in the Contract Documents it shall immediately notify the OWNER and utility in writing.

E. Notwithstanding the foregoing, CONTRACTOR shall strictly comply with all Laws and Regulations including Sections 4216, et seq. of the Government Code governing excavations and subsurface installations and utilities.

CERTIFICATE OF INSURANCE
TO
SANTA ANA WATERSHED PROJECT AUTHORITY

This certifies to Santa Ana Watershed Project Authority, (SAWPA) that the following described policies have been issued to the insured named below and are in force at this time.

Insured: _____

Address _____

These policies provide insurance coverage for all elements of the work required for the Contact awarded to the Insured which is titled: _____

POLICIES AND INSURERS

WORKERS' COMPENSATION

_____ Policy No. _____ Best's Rating _____
(Name of Insurer)

Employer's Liability $ _____ Expiration Date: _____

_____ COMPREHENSIVE GENERAL LIABILITY

_____ Policy No. _____ Best's Rating _____
(Name of Insurer)

Each Occurrence	$ _____	Personal Injury	$ _____
General Aggregate (If Applicable)	$ _____	Fire Damage (per fire)	$ _____
Products/Comp Opr Aggregate	$ _____	Self-insured Retention	$ _____
Medical Expense (per person)	$ _____		

_____ Premises - Operations

_____ Contractual for Specific Contract

_____ Broad Form P.D.

_____ Personal Injury with Employee Exclusion Removed

_____ Owner's & Contractor's Protective

_____ XCU Hazards

_____ Severability of Interest Clause

or

_____ Commercial General Liability Expiration Date: _____

POLICIES AND INSURERS

AUTOMOTIVE / VEHICLE LIABILITY Commercial Form Liability Coverage

_____ Policy No. _____ Best's Rating _____
(Name of Insurer)

BODILY INJURY PROPERTY DAMAGE

Each Person $ _____ Each Accident $ _____

Each Accident $ _____

or

Combined Single Limit $ _____ Expiration Date: _____

EXCESS LIABILITY

_____ Policy No. _____ Best's Rating _____
(Name of Insurer)

_____ Umbrella Form _____ Other Than Umbrella Form

Each Occurrence $ _____

Aggregate $ _____

Self-Insured Retention $ _____

Expiration Date _____

BUILDER'S ALL RISK Face Amount Equal to Contract Amount

$ _____

_____
(Name of Insurer)

Policy No. _____ Best's Rating _____ Expiration Date _____
(Not sooner than Contract completion date)

Self-Insured Retention $ _____
(Not more than 5$ of the Contract amount)

The following provisions and types of coverage are included in said policies (indicated by "X") in the appropriate space:

1. [ ] SAWPA, its Commissioners, the Engineer, and Consultants, and each of their Directors, Officers, Employees and Agents, for this contract, and all public agencies from whom permits will be obtained and their Directors, Officers, Employees and Agents are Additional Insureds as to work being performed under this Agreement.

2. [ ] The coverage is Primary, and no other insurance carried by SAWPA will be called upon to contribute to a loss under the coverage.

3. [ ] The Policy(ies) limits are provided on an (occurrence/claims made) basis. (Strike out inapplicable)

4. [ ] Coverage for Broad Form property damage liability, including completed operations.

5. [ ] The policy(ies) cover personal injury liability, as well as bodily injury liability.

6. [ ] Coverage for products and completed operations.

7. [ ] The policy(ies) shall not be cancelled or materially altered without thirty (30) days' prior written notice to SAWPA at the address listed.

8. [ ] The policy(ies) cover the use of all autos when owned by the Insured.

9. [ ] The policy(ies) cover the use of all autos hired by the Insured.

10. [ ] The policy(ies) cover the use of all non-owned autos.

11. [ ] The insurance afforded by the policy for Contractual Liability Insurance (subject to the terms, conditions and exclusions applicable to such insurance) includes liability assumed by the named insured under the indemnification or hold harmless provision contained in the written contract between the named insured and SAWPA.

_____
Agent's Initials

A copy of all Endorsements to the policy(ies) which in any way limit the above listed types of coverage are attached to this Certificate of Insurance.

This Certificate or Verification of Insurance is not an insurance policy and does not amend, extend or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term, or condition of any contract or any other document with respect to which this Certificate or Verification of Insurance may be issued or may pertain, the insurance afforded by the policies described herein is subject to all terms, exclusions and conditions of such policies.

IT IS HEREBY CERTIFIED that the above policy(ies) provide liability insurance as required by the Agreement between the Santa Ana Watershed Project Authority and the Insured.

NOTICE

No substitution or revision to the above certificate form will be accepted. If the insurance called for is provided by more than one insurance company, a separate Certificate in the exact above form shall be provided for each insurance company.

(LIABILITY)
(WORKERS' COMPENSATION)
(AUTOMOTIVE)
(EXCESS LIABILITY)
(BUILDER'S ALL RISK)

Insurers must be admitted in and regulated by the State of California. The Insurers must also have an "A" policyholder's rating and a financial rating of at least Class VI in accordance with the most current Best's Guide Rating.

Insurer: _____ Agent: _____

Address: _____ Address: _____

_____ _____

Telephone: _____ Telephone: _____

Fax: _____ Fax: _____

_____

SIGNATURE OF INSURER OR AUTHORIZED REPRESENTATIVE OF THE INSURER

I, _____ (print/type name), warrant that I have authority to bind the issuing insurance company and by my signature hereon do so bind said company.

_____

(Signature of Authorized Representative)

Organization: _____ Title: _____

Address: _____ Telephone: _____

_____

Original signature also required on all Endorsements furnished to SAWPA.

Note: This page four must be separately completed for each policy of insurance.

COMPREHENSIVE GENERAL LIABILITY

COMMERCIAL GENERAL LIABILITY

****

ENDORSEMENT AGGREGATE LIMITS OF INSURANCE PER PROJECT

In consideration of the policy premium and notwithstanding any inconsistent statement in the policy to which this Endorsement is attached or any other Endorsement attached thereto, it is agreed as follows:

This Endorsement modifies the insurance provided under the General Liability Coverage part of the policy of insurance referenced below, as follows:

The general aggregate limit under LIMITS OF INSURANCE applies separately to the project described by

Contract: _____

POLICY INFORMATION

1. Insurance Company: _____
("the Company"); Policy No. _____
2. Effective Date of this Endorsement: _____
3. Named Insured: _____
4. Contract: _____

All notices herein provided to be given by the Company to the Owner in connection with this policy and this Aggregate Limits of Insurance Per Project Endorsement, shall be mailed to SAWPA at P.O. Box 7729, Riverside, California 92513-7729 or delivered to SAWPA at its main office, 11615 Sterling Avenue, Riverside, California 92503.

I, _____ (print/type name), warrant that I have authority to bind the above listed insurance company and by my signature hereon do so bind this company.

_____
(Signature of Authorized Representative)
(Original signature required on all Endorsements furnished to SAWPA)

Name of Agent/Agency: _____

Title: _____ Telephone: _____ Fax: _____

Address: _____

_____

WAIVER OF SUBROGATION ENDORSEMENT

(LIABILITY)

(AUTOMOTIVE)

(EXCESS LIABILITY)

(BUILDER'S ALL RISK)

In consideration of the policy premium and notwithstanding any inconsistent statement in the policy to which this Endorsement is attached or any other Endorsement attached thereto, it is agreed as follows:

The Insurance Company waives any right to subrogation it may acquire against SAWPA, its Commissioners, the engineer and consultants, and each of their Directors, Officers, Agents, and Employees for this contract, and all public agencies from whom permits will be obtained and their Directors, Officers, Employees and Agents by reason of any payment made on account of injury, including death of persons resulting therefrom, sustained by any employee of any insured, arising out of the performance of the contract referenced below .

POLICY INFORMATION

1. Insurance Company: _____
("the Company"); Policy No. _____
2. Effective Date of this Endorsement: _____
3. Named Insured: _____
4. Contract: _____

All notices herein provided to be given by the Company to the Owner in connection with this policy and this Aggregate Limits of Insurance Per Project Endorsement, shall be mailed to SAWPA at P.O. Box 7729, Riverside, California 92513-7729 or delivered to SAWPA at its main office, 11615 Sterling Avenue, Riverside, California 92503.

I, _____ (print/type name), warrant that I have authority to bind the above listed insurance company and by my signature hereon do so bind this company.

_____
(Signature of Authorized Representative)
(Original signature required on all Endorsements furnished to SAWPA)

Name of Agent/Agency: _____

Title: _____ Telephone: _____ Fax: _____

Address: _____

_____

ADDITIONAL INSURED ENDORSEMENT

(LIABILITY)

(AUTOMOTIVE)

(EXCESS LIABILITY)

(BUILDER'S ALL RISK)

In consideration of the policy premium and notwithstanding any inconsistent statement in the policy to which this Endorsement is attached or any other Endorsement attached thereto, it is agreed as follows:

The Santa Ana Watershed Project Authority, California, its Commissioners, the Engineer, Consultants and each of their Directors, Officers, Employees and Agents, and all Public Agencies from whom permits will be obtained and their Directors, Officers, Employees and Agents are hereby declared to be additional insureds under the terms of this policy, but only with respect to the operations of the Contractor at or from any of the premises of SAWPA in connection with the contract with SAWPA designated below, or acts and omissions of the additional insureds in connection with its general supervision or inspection of said operations.

POLICY INFORMATION

1. Insurance Company: _____
("the Company"); Policy No. _____

2. Effective Date of this Endorsement: _____

3. Named Insured: _____

4. Contract: _____

All notices herein provided to be given by the Company to the Owner in connection with this policy and this Aggregate Limits of Insurance Per Project Endorsement, shall be mailed to SAWPA at P.O. Box 7729, Riverside, California 92513-7729 or delivered to SAWPA at its main office, 11615 Sterling Avenue, Riverside, California 92503.

I, _____ (print/type name), warrant that I have authority to bind the above listed insurance company and by my signature hereon do so bind this company.

_____
(Signature of Authorized Representative)
(Original signature required on all Endorsements furnished to SAWPA)

Name of Agent/Agency: _____

Title: _____ Telephone: _____ Fax: _____

Address: _____

_____

NOTICE OF POLICY TERMINATION

OR CANCELLATION ENDORSEMENT

(LIABILITY)

(AUTOMOTIVE)

(EXCESS LIABILITY)

(BUILDER'S ALL RISK)

(WORKERS' COMPENSATION)

In consideration of the policy premium and notwithstanding any inconsistent statement in the policy to which this Endorsement is attached or any other Endorsement attached thereto, it is agreed as follows:

Cancellation Notice. The insurance afforded by this policy shall not be suspended, voided, cancelled, reduced in coverage or in its limits except after thirty(30) days' prior written notice by certified mail, return receipt requested, has been given to SAWPA, with copy to the Engineer. Such notice shall be addressed to SAWPA as indicated below.

1. Insurance Company: _____
("the Company"); Policy No. _____
2. Effective Date of this Endorsement: _____
3. Named Insured: _____
4. Contract: _____

All notices herein provided to be given by the Company to the Owner in connection with this policy and this Aggregate Limits of Insurance Per Project Endorsement, shall be mailed to SAWPA at P.O. Box 7729, Riverside, California 92513-7729 or delivered to SAWPA at its main office, 11615 Sterling Avenue, Riverside, California 92503.

I, _____ (print/type name), warrant that I have authority to bind the above listed insurance company and by my signature hereon do so bind this company.

_____
(Signature of Authorized Representative)
(Original signature required on all Endorsements furnished to SAWPA)

Name of Agent/Agency: _____

Title: _____ Telephone: _____ Fax: _____

Address: _____

_____

SECTION 5

SUPPLEMENTARY GENERAL PROVISIONS

Section 5, "Supplementary General Provisions," is included as an integral part of the AGREEMENT, and shall be considered in the order of precedence as shown in the Section 3.4 of the General Conditions.

5.1 DESCRIPTION OF WORK

The work to be done consists, in general, of sewer pipeline rehabilitation using slip-lining installation techniques. The work shall include clearing and grubbing of vegetation, excavation, demolition, shoring, dewatering, concrete and masonry construction, pipeline insertion, grouting, installation of maintenance access structures, CCTV sewer video inspection, environmental mitigation, site preparation and restoration, and incidental related work.

Other items of work or details not mentioned above that are required by the Plans, Standard Specifications, or these Special Provisions, shall be performed, placed, constructed, or installed.

5.2 SITE VISITATIONS

Prior to the submission of the bid, the CONTRACTOR shall visit the job site and make a thorough examination and evaluation of the existing site conditions and surrounding area.

Full compensation for SITE VISITATIONS shall be considered as included in the prices paid for various contract items of work and no additional compensation will be allowed therefore.

5.3 PROGRESS SCHEDULE

The requirements in Subsection 6-1, "Construction Schedule and Commencement of Work," of the Standard Specifications are amended as follows:

> The CONTRACTOR shall submit to the ENGINEER a progress schedule, on a form provided by the COUNTY, within five (5) working days after issuance of Notice to Proceed, and within five (5) working days of the ENGINEER's written request at any other time.
>
> Subsequent to the time that submittal of a progress schedule is required in accordance with these Special Provisions, no progress payments will be made for any work until a satisfactory schedule has been submitted to the ENGINEER.

A PRELIMINARY PROGRESS SCHEDULE

The Contractor, and at his option, may submit a Preliminary Progress Schedule in accordance with these Special Provisions. The use of a Preliminary Progress Schedule will only be permitted for the first thirty (30) working days of the CONTRACTOR's construction operations for this PROJECT. After the first thirty (30) working days, the CONTRACTOR shall be expected to operate from an approved Progress Schedule as described below in Section F-3.2, "PROGRESS SCHEDULE," of these Special Provisions. Failure to provide an approved Progress schedule after the first thirty (30) working days will suspend the disbursement of monthly progress payments to the CONTRACTOR until an approved Progress Schedule is received by the ENGINEER.

Within ten (10) working days after receipt of the Notice to Proceed, the CONTRACTOR shall submit for the ENGINEER's review, two (2) copies of a Preliminary Progress Schedule, which shall include the following PROJECT phases and/or activities:

1) The dates by which the CONTRACTOR shall deliver to the ENGINEER all required submittals for proposed construction materials, techniques (including any shop drawings), and plans required by the CONTRACTOR for the ENGINEER's review (such as: shoring, dewatering, construction access, erosion control plan, SWPPP, etc.). The Preliminary Schedule should reflect the time required for review by the ENGINEER and revision or resubmittal by the CONTRACTOR if required.

2) The approximate delivery dates to the jobsite of all construction materials and key and long-lead time procurement items.

3) The activities to be accomplished within the first thirty (30) working days of the CONTRACT.

4) The approach to scheduling the remaining work areas or phases of the work. The work for each phase or area must be represented by at least one (summary) activity such that they cumulatively indicate the entire PROJECT duration.

5) Approximate cost for each bid item or activities within bid items, which when totaled, represents the total CONTRACT price bid for the PROJECT.

6) The Preliminary Progress Schedule shall describe the activities to be accomplished and their dependency subject to all requirements of the other paragraphs of this clause. The Preliminary Progress Schedule will be temporarily used to record and monitor the progress of work and shall be the basis of determining the progress payment to the CONTRACTOR until the Progress Schedule is finalized with restrictions as stated above. All recorded data on the Preliminary Progress Schedule will be incorporated into the first schedule update.

7) The CONTRACTOR shall within five (5) working days from receipt of the ENGINEER's comments, either revise and resubmit the Preliminary Progress Schedule in accordance with the ENGINEER's comments, or formally (in writing) request a joint meeting to be held within five (5) working days to resolve any objections to the ENGINEER's comments. If the aforementioned meeting is held, the CONTRACTOR shall revise and resubmit the Preliminary Progress Schedule within five (5) working days following the meeting.

B PROGRESS SCHEDULE

Within thirty (30) calendar days after receipt of the Notice to Proceed, the CONTRACTOR shall provide three (3) copies of his proposed Progress Schedule to the ENGINEER. The Progress Schedule shall cover the entire CONTRACT duration and shall consist of, but not limited to, the following:

1) The Progress Schedule shall include all proposed construction activities including major procurement items and shop drawing submittals, including shop drawing reviews. See paragraph (1) of the Preliminary Progress Schedule for reference.

2) The Progress Schedule shall include the duration and sequencing of each bid item or construction activity, and major milestones as approved by the County.

3) The Progress Schedule shall include a tabulated activity report which shall include the following minimum data for each bid item or construction activity:

   A. Activity beginning and ending event numbers or activity number preference

   B. Estimated duration

   C. Activity description

   D. Early and latest allowable start date (calendar dated)

   E. Early and latest allowable finish date (calendar dated)

   F. Status of each activity (critical)

   G. Total float of each activity

   H. Cost value of each activity

4) The Progress Schedule shall include the proposed sequencing of all subcontractors, trade crews, and major construction equipment. In developing the Progress Schedule and tabulated activities report, the CONTRACTOR shall be responsible for assuring that all subcontractor work, as well as his own work, is included in the schedule, that work sequences are logical, and that the diagram shows a coordinated plan of work.

5) The Progress Schedule and tabulated activities report shall show the sequence and interdependence of activities required for complete performance of the work. The work shall be divided into activities with a maximum duration of fifteen (15) working days each but not less than one (1) working day, unless otherwise directed by the ENGINEER, except for non-construction activities such as procurement of construction materials, fabrication of materials, delivery of equipment, etc.

6) Within five (5) working days from receipt of the ENGINEER's comments, the CONTRACTOR shall revise and resubmit the Progress Schedule and tabulated activity report in accordance with the ENGINEER's comments, or formally (in writing) request a joint meeting to resolve any objections to the ENGINEER's comments. The joint meeting must be held within ten (10) working days from receipt of the ENGINEER's comments unless otherwise specified by the ENGINEER. If the aforementioned meeting is held, the CONTRACTOR shall revise the Progress Schedule and tabulated activities report to the satisfaction of both parties and resubmit three (3) copies of the Progress Schedule and tabulated activity report within (5) working days following the meeting.

C REVISIONS TO THE SCHEDULE

At least once a month the CONTRACTOR shall meet with the ENGINEER to jointly review the CONTRACTOR's activities and progress as they relate to the approved Progress Schedule. If it

appears the schedule does not accurately represent the CONTRACTOR's prosecution and progress of the work, the ENGINEER shall request, and the CONTRACTOR shall furnish, two (2) copies of a revised Progress Schedule within five (5) working days of the meeting which, to the ENGINEER's satisfaction, accurately represents the CONTRACTOR's activities. If a revised Progress Schedule is deemed necessary, no progress payments will be disbursed to the CONTRACTOR until a revised Progress Schedule is approved by the ENGINEER.

If the CONTRACTOR desires to make changes in the Progress Schedule or tabulated activity report to reflect revisions in his method of operating and scheduling of work, the CONTRACTOR shall notify the ENGINEER in writing, stating the reasons for the proposed revision(s). The CONTRACTOR shall furnish the ENGINEER with two (2) copies of the proposed-revised schedule and tabulated activity report. If the CONTRACTOR changes the approved Progress Schedule or tabulated activity report without consent of the ENGINEER, no progress payments will be disbursed to the CONTRACTOR until the revised schedule and report is approved by the ENGINEER.

D REVISED PROGRESS SCHEDULE FOR CHANGES, DELAYS, TIME EXTENSIONS, AND CONTRACTOR REQUESTS

When change orders are initiated, delays are experienced, or the CONTRACTOR desires to revise the Progress Schedule, the CONTRACTOR shall submit to the ENGINEER a Time Impact Analysis incorporating the change, delay, or revision. Activity time delays will not automatically guarantee the CONTRACTOR an extension of CONTRACT time. An extension in CONTRACT time will only be allowed when the CONTRACTOR can demonstrate that the duration of the activity, affected by the delay, affects the critical path of the PROJECT and all available float has been exhausted.

The CONTRACTOR shall submit two (2) copies of the revised schedule for the approval of the ENGINEER. No CONTRACT time extensions or extra payments will be applied toward monthly progress payments until the revised schedule is approved by the ENGINEER.

E PAYMENT FOR PROGRESS SCHEDULE

Full compensation for conforming to the requirements of PROGRESS SCHEDULE including all submittals, revisions, coordinating, scheduling, labor, materials, tools, equipment, and incidentals necessary shall be included in the various CONTRACT items of work and no additional compensation will be allowed therefore.

5.4 ORDER OF WORK

The CONTRACTOR shall follow the sequence of operations as set forth herein.

The order of work shall be as follows:

1) Class A Field Office.

2) All other CONTRACT work required.

See also Section 5.7, “PROJECT PHASING”.

Full compensation for conforming with such requirements will be considered as included in the prices paid for the various CONTRACT items of work, and no additional compensation will be allowed therefore.

5.5 COOPERATION

The requirements of Subsection 5-6, "Cooperation," and 7-7, "Cooperation and Collateral Work," of the Standard Specifications, are amended as follows:

> The CONTRACTOR shall cooperate with all private property owners affected by the PROJECT, notifying them at least 15 days before commencement of any work on/or adjacent to their property.

Full compensation for COOPERATION shall be considered as included in the various CONTRACT items of work involved and no additional compensation will be allowed therefore.

5.6 DUST CONTROL

To Subsection 7.8.1, "Cleanup and Dust Control," of the Standard Specifications add the following:

> Dust control shall hereby be defined as the elimination and/or control of dirt, dust, mud and debris from propagating or spreading onto properties, private or public, adjacent to the PROJECT and CONTRACTOR's work areas.
>
> No separate payment will be made for any work performed or material used to control dust resulting from the CONTRACTOR's performance of the work, or by public traffic, either inside or outside the right-of-way.
>
> Construction activity will take place in a highly developed residential neighborhood. Dust Control shall be strictly enforced. CONTRACTOR shall at all times keep a water truck or other equipment at the job site in working order capable of performing dust control for the duration of the CONTRACT period. Subject to paragraph two of Subsection 7.8.1, "Cleanup and Dust Control," of the Standard Specifications, the CONTRACTOR is required to furnish and operate a self loading motor sweeper with spray nozzles a minimum of once each work day, when and where required for proper dust control, and as directed by the ENGINEER. Cost for furnishing and operating sweeper (including those instances in addition to the minimum requirements) shall be included in the unit price bid for DUST CONTROL and no additional compensation will be allowed therefore.
>
> Dust control shall be performed a minimum of four times a day for the duration of the CONTRACT period: twice in the morning and twice in the afternoon (time periods to be equally spaced), and as directed by the ENGINEER. Dust control performed by the CONTRACTOR in addition to the minimum daily requirement and at the direction of the ENGINEER, shall be considered as included in the CONTRACT unit price bid and no additional compensation will be allowed therefore.
>
> Performing the minimum dust control required by the CONTRACT will in no way relieve the CONTRACTOR from his responsibility for providing adequate dust control measures.

Full compensation for conforming to the requirements of DUST CONTROL including all labor, equipment, tools, materials, and incidentals shall be considered as included in the price paid for the various related proposal items and no additional compensation will be allowed therefore.

5.7 PROJECT PHASING

The Contractor shall prepare a detailed phasing plan that will describe the sequence of work and the time frame for each mobilization with respect to the restricted work periods within the environmentally sensitive areas identified below. The phasing plan shall include areas where vegetation is to be cleared and the limits of slip-liner installation. The phasing plan shall be consistent with the project schedule and include drawings, as necessary, and shall be submitted to the Owner for approval within 30 calendar days of the Notice to Proceed.

Work Restrictions

1) Clearing of Vegetation is prohibited between March 15 and September 25.

2) Sound Mitigation Barriers shall be installed along the limits of cleared vegetation when work is being performed between March 15 and September 25.

Full compensation for conforming to the requirements of PROJECT PHASING including:

3) Furnishing all labor, tools, equipment, and materials necessary for preparing the plan and implementing and accomplishing the work established therein, complete and in place.

shall be considered as included in the LUMP SUM CONTRACT price for MOBILIZATION and no additional compensation will be allowed therefore.

5.8 DEVELOP WATER SUPPLY

Work shall consist of developing a temporary water supply, as required by the CONTRACTOR, with the appropriate water agency and for furnishing all materials, labor and equipment to implement the temporary water supply system, including meters, backflow devices, piping and storage tanks. The CONTRACTOR shall be responsible for all permit fees, water usage charges and all other related expenses for the installation and removal of the temporary water system.

Full compensation for developing a temporary water supply and for furnishing and placing all water required for work done in the contract, shall be considered as included in the various Contract items and no additional compensation will be allowed therefore.

5.9 UTILITIES

The OWNER has endeavored to locate and show on the plans the approximate locations of all private and public utilities and facilities to be encountered during construction. However, it is possible that, during the work, unknown substructures requiring relocation or protection may be encountered. The CONTRACTOR shall immediately notify the OWNER if an unknown utility is encountered in accordance with Section 5 of the Standard Specifications.

Prior to the commencement of work, the CONTRACTOR shall verify the location and depth of all utilities, including service laterals and service connections, which have been indicated on the plans or marked by the respective owners and which may affect or be affected by its operations.

The CONTRACTOR's attention is directed to the utility notification service provided by UNDERGROUND SERVICE ALERT (USA). USA member utilities will provide the CONTRACTOR with the locations of their substructures in the construction area when the CONTRACTOR gives at least two working days notice to the Underground Service Alert by

calling 1-800-422-4133. The CONTRACTOR shall call USA prior to any work (such as filling, resurfacing, paving) over substructures to allow owners to locate and/or obtain accurate "ties" on their manholes, valve covers, meter boxes, etc.

Full compensation for conforming to the requirements of UTILITIES shall be considered as included in the various items of work involved and no additional compensation will be allowed therefore.

5.10 MAINTAIN TRAFFIC AND DETOURS

Add to Subsection 7-10.1, "Traffic and Access," of the Standard Specifications the following:

> When entering or leaving roadways carrying public traffic, the CONTRACTOR's equipment, whether empty or loaded shall in all cases yield to public traffic. No excavation within five feet of the traveled way shall remain open longer than is necessary to perform the work, and in no case shall remain unfenced or unplated overnight or on weekends. Means and Methods shall comply with current County and Statewide guidelines and requirements.

Add to Subsection 7-10.3, "Street Closures, Detours, Barricades," of the

Standard Specifications the following:

> The CONTRACTOR shall provide and maintain all signs, barricades, pedestals, flashers, delineators and other necessary facilities for the protection of the motoring public within the limits of the construction area and all its approaches, including advanced signing and barricades. CONTRACTOR shall also post proper signs to notify the public regarding the conditions of the roadway, all in accordance with the provisions of the Vehicle Code, and the "Manual of Traffic Controls for Construction and Maintenance Work Zones," as published by the State of California, Business, Transportation and Housing Agency, Department of Transportation, 1990.

Access to private properties shall be maintained at all times during the construction where practical. Prior to restricting normal access to private properties CONTRACTOR shall provide notification as required in Section F-5, "COOPERATION," of these Special Provisions. In no case shall access to private property be restricted longer than 24 hours unless otherwise approved by the ENGINEER.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the CONTRACTOR, at CONTRACTOR's expense.

Should the CONTRACTOR furnish insufficient warning and protective measures as above provided, the ENGINEER may direct that the necessary warning and protective measures be furnished and installed by the CONTRACTOR, at CONTRACTOR's expense. However, the ENGINEER shall not be responsible for detecting the inadequacies of the CONTRACTOR's warnings and protective measures. Public safety by furnishing proper warning and protective devices shall be the sole responsibility of the CONTRACTOR.

The CONTRACTOR may be required to obtained city permit(s) or approvals regarding hauling and traffic control.

CONTRACTOR shall be responsible for coordinating all approvals and acquiring all permits from Cities.

See Section D, "Permits," of these Special Provisions for City of _____ permit and for name and phone number contact person for acquiring all permits and coordinating traffic detours and hauling routes.

Full compensation for conforming to the requirements of MAINTAIN TRAFFIC AND DETOURS including:

1) Furnishing all labor, tools, equipment and materials necessary to do the work.

MAINTAIN TRAFFIC AND DETOURS shall be considered as included in the various CONTRACT items of work involved and no additional compensation will be allowed therefore.

5.11 MOBILIZATION

The lump sum price paid for MOBILIZATION shall include full compensation for providing bonds, insurance, financing, and moving equipment to the job site and no additional payment will be made therefore.

The lump sum price bid in the Proposal, shall be paid with the first monthly progress payment. The total price bid for Mobilization shall include the cost of all mobilization and administration for the entire CONTRACT period and shall not exceed two (2) percent of the total price bid.

Full compensation for conforming to the requirements in MOBILIZATION shall be included in the LUMP SUM contract price bid and no additional compensation will be allowed therefore.

5.12 CLASS "A" FIELD OFFICE

The CONTRACTOR shall furnish and maintain a Class A Field Office for the exclusive use of the ENGINEER and his staff in accordance with the provisions of Section 8-2.1, "Class "A" Field Office," of the Standard Specifications. The sanitary facility provided by the CONTRACTOR shall be maintained in a clean, neat and sanitary fashion at all times and shall be for the exclusive use of the ENGINEER and his staff. All sanitary paper products required for the sanitary facility shall be supplied by the CONTRACTOR and shall be considered as included in the CONTRACT unit price bid.

In addition, the Field Office shall be provided with air conditioning and a facsimile machine with a separate phone line and a copying machine capable of photocopying 11"x17" size paper for the exclusive use of the ENGINEER and his staff for the entire duration of the PROJECT.

CONTRACTOR shall be aware that theft and vandalism at the job site may be a problem. CONTRACTOR shall be responsible for the security of the Class A Field Office and all project equipment and facilities.

If for any reason the air conditioning, phone, copier, facsimile machine, any office furniture, and/or sanitary facility is vandalized, stolen, or in need of repair, the CONTRACTOR, upon receipt of written notice by ENGINEER, shall have a maximum of five (5) working days to replace or repair the above items to full working order. If CONTRACTOR fails to comply within the five (5) working days specified, the COUNTY may at its option withhold monthly progress payments until Class A Field Office is returned to full and complete working order.

CONTRACTOR shall meet with the ENGINEER prior to construction (and at any other time circumstances warrant), and together, shall mutually agree to a location for the field office.

Full compensation for conforming with the requirements of CLASS A FIELD OFFICE shall include, but no limited to, the following:

1) Supply office, air conditioning, and sanitary facility.

2) Furnish office.

3) Service office.

4) Supply utilities for office (electricity and phone).

5) Service and maintain sanitary facility.

6) Facsimile machine (separate phone line).

7) Copying machine (11" x 17").

8) Remove office from job site at the completion of the PROJECT.

9) Security.

10) All labor, tools, equipment, materials, and incidentals necessary to furnish facility complete and in place.

and shall be included in the CONTRACT LUMP SUM price bid for CLASS A FIELD OFFICE and no additional compensation will be allowed therefore.

NOTE: No monthly progress payments will be due to the CONTRACTOR until all provisions and requirements of CLASS A FIELD OFFICE are complete and in place.

5.13 TEMPORARY FENCE

TEMPORARY FENCE shall be provided to secure the work site(s) and field office complex. Fencing shall be a minimum of 6 feet in height and provided with fabric screening. Secure fencing to the ground with steel posts or rods to prevent manual removal.

Full compensation for TEMPORARY FENCE shall be considered as included in the Lump Sum price bid for MOBILIZATION which shall constitute full compensation for furnishing all labor, materials including placing, removal and salvage of temporary fencing, tools, equipment, incidentals and for accomplishing all work involved and no additional compensation will be allowed therefore.

5.14 EARTHWORK

Earthwork shall conform to the provisions of Section 300, "Earthwork," of the Standard Specifications, these Special Provisions and Soils Report.

To Section 300, "Earthwork," of the Standard Specifications, add the following:

Whenever reference to finished grade is made, it shall be considered to be the finished surface of the completed facility.

Trenches, holes, depressions and pits caused by the removal of facilities shall be backfilled with embankment material as provided in Section 300, "Earthwork," of the Standard Specifications. Such trenches, holes, depressions and pits that are in surfaced

areas, otherwise to remain undisturbed, shall be backfilled with material equal to or better in quality and to the same thickness as the surrounding materials.

When hauling is done over public highways, and when directed by the ENGINEER, loads shall be trimmed and all material removed from shelf area of vehicles in order to eliminate spilling of material. If directed by the ENGINEER, loads shall be watered after trimming to eliminate dust.

Operations shall be conducted in such a manner that existing highway facilities, utilities, and other upon-highway facilities, which are to remain in place will not be damaged.

Surplus excavated material shall become the property of CONTRACTOR. CONTRACTOR shall be responsible to dispose surplus material outside of PROJECT right-of-way in accordance with all applicable ordinances.

5.15 UNSUITABLE MATERIAL EXCAVATION

Material that is poorly consolidated or otherwise unsuitable in place shall be removed from foundation and other areas as shown on the plans or as directed by the ENGINEER. This unsuitable material includes but is not limited to alluvium, colluvium and other unsuitable materials. The unsuitable material shall be completely removed from its original location and recompacted in other areas as approved by the ENGINEER. All material not suitable shall be disposed of outside of the project limits at CONTRACTOR's expense.

Should CONTRACTOR choose to stockpile material, no additional compensation will be made for excavating and hauling from stockpile. Limits of removal of unsuitable material shall be established in the field by the OWNER’s representative.

Quantities of unsuitable material removed shall be measured by means of average end areas and distances between the areas determined from existing ground contours as shown on plans and survey of the site after removal of material. CONTRACTOR shall conduct his operations in a manner to allow OWNER's survey party access to the areas to be measured before CONTRACTOR begins replacing material. No idle or down time compensation shall be made for compliance with this provision.

Full compensation for conforming to the requirements of UNSUITABLE MATERIAL EXCAVATION including:

1) Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

2) Disposal of surplus or unsuitable excavated material.

3) Import and placement of foundation rock (1” crushed rock) replacement material.

shall be considered as included in the CONTRACT unit price bid per CUBIC YARD and no additional compensation will be allowed therefore.

5.16 STRUCTURE EXCAVATION

Structure Excavation shall conform to Subsections 300-3 and 300-7 of the Standard Specifications. All surplus excavated shall become the property of the CONTRACTOR and shall be disposed of outside of PROJECT limits in accordance with all applicable ordinances.

The soil borings are included on Sheet SB-1 of the Plans. Copies of the Soils Report are available at the OWNER's office for review by the CONTRACTOR upon request.

Full compensation for conforming to the requirements of Structure Excavation including:

1) Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

2) Disposal of surplus excavated material.

shall be considered as included in the CONTRACT and no additional compensation will be allowed therefore.

Full compensation for conforming to the requirements of STRUCTURE EXCAVATION shall be considered as included in the price paid for the various CONTRACT items and no additional compensation will be allowed therefore.

5.17 SHORING AND TRENCH SHORING

Shoring and Trench Shoring for the PROJECT shall conform to the provisions in Subsection 306-1.1.6, "Bracing Excavation," of the Standard Specifications and these Special Provisions.

CONTRACTOR SHALL OBTAIN A CAL-OSHA PERMIT PRIOR TO ANY TRENCH EXCAVATION.

The CONTRACTOR's attention is directed to the provisions in Subsection 7-10.4.1, "Safety Orders," which require submitting a shoring/bracing plan for COUNTY review and approval.

Approval by the ENGINEER of the shoring drawings or shoring inspection performed by the ENGINEER will in no way relieve CONTRACTOR of full responsibility for adequacy of the shoring.

Construction is taking place in a developed residential area; the CONTRACTOR shall take all necessary precautions to protect the public, especially children, from the hazards of open excavation. Trenches shall be covered at night and on weekends and during non-working hours.

Full compensation for conforming to the requirements of SHORING AND TRENCH SHORING shall be considered as included in the price paid for the various CONTRACT items and no additional compensation will be allowed therefore.

5.18 CONCRETE STRUCTURES

All Concrete Structures shall conform to the provisions in Subsection 303, "Concrete and Masonry Construction," of the Standard Specifications, these Special Provisions, and the details shown on the plans.

Materials comprising construction shown on the plans and referenced to in these Special Provisions shall conform to Section 201, "Concrete, Mortar and Related Materials," and Section 201-2, "Steel Reinforcement for Concrete," of the Standard Specifications.

All concrete used in non-precast structures shall be Class 560-C-3250 as specified by Section 201-1.1.2, "Concrete Specified by Class," of the Standard Specifications.

All precast units shall be made of concrete having a minimum compressive strength (f'c) of 5000 psi at 28 days (6-1/2 sack mix).

All cement shall be Type II or approved equal.

All reinforcing steel shall be ASTM A-615 Grade 60.

A FORMS

All to Section 303-1.3, “Forms,” of the STANDARD SPECIFICATIONS, the following:

Forms shall be braced to withstand the pressures developed and shall be tight to prevent the loss of PCC or mortar. Formed wall surface shall be free of any unevenness greater than 1/4 inch when checked with a 10-foot straight edge.

If “snap-ties” are to be used for bracing of forms, only non-metallic snap-ties shall be used. In addition, after removal of forms, all snap-ties, and all portions thereof, protruding or exposed on the concrete surface shall be removed to 1 inch below the surface and all holes patched with epoxy mortar.

A clear, non-staining form release agent, which will neither discolor nor affect the surface texture of the concrete and which does not react with the ingredients of the concrete, shall be used. The cost of furnishing and placing form release agent shall be included in the cost of the concrete.

B TRANSPORTING MIXED CONCRETE

Each load of ready-mixed concrete delivered at the job site shall be accompanied by a ticket showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water (gallons) added to the load and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This ticket shall also show the actual scale masses (pounds) for the ingredients batched or the calculated portland cement concrete volume (cubic yard). Theoretical or target batch masses shall not be used as a substitute for actual scale masses.

When showing a calculated portland cement concrete volume (cubic yards) on the delivery ticket, the CONTRACTOR shall maintain and have available a record of the following information for each load:

1) Mix identification number (specific to the contract)

2) Load number (shall match the load number on the delivery ticket)

3) Date and time the load was batched

4) Actual batch mass (pounds) for each ingredient

5) Any water (gallons) added at the plant, in addition to the water proportioned for the batch.

When requested, the CONTRACTOR shall submit the recorded information for calculated portland cement concrete volumes to the ENGINEER.

C WATERSTOP

Rubber or polyvinyl chloride waterstops shall be furnished and installed in the joints at the locations indicated on the drawings. The CONTRACTOR shall take suitable precautions to support and protect the waterstops during the progress of the work, and shall repair or replace all damaged waterstops as directed by the ENGINEER. All waterstops shall be stored in as cool a place as recommended by the manufacturer. Waterstops shall not be stored in the open, or where it will be exposed to the direct rays of the sun. All waterstops shall be subject to the approval of the ENGINEER.

D PAYMENT FOR STRUCTURAL CONCRETE

Full compensation for conforming to the requirements in STRUCTURAL CONCRETE, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved in STRUCTURAL CONCRETE, as indicated on the plans and as specified in the STANDARD SPECIFICATIONS and these Special Provisions shall be included in the contract price paid per each access pit and no additional compensation shall be allowed therefore.

5.19 BAR REINFORCING STEEL

Reinforcing steel shall be Grade 60, hot rolled from new billet steel, conforming to ASTM A615 Standard for soft metric reinforcing steel. Where welding of reinforcing is required, reinforcing bars shall conform to the provisions in ASTM A 706. All reinforcing shall be deformed.

Reinforcing steel shall conform to the requirements of Section 201-2, “Reinforcement for Concrete,” of the STANDARD SPECIFICATIONS, and these Special Provisions.

All reinforcing steel shall be placed on supports to maintain the distance between the rebar and the subgrade, as required by the plans and specifications. Under no circumstances shall the rebar be placed on the subgrade and pulled during placement of concrete. The CONTRACTOR shall not place concrete until the Engineer has inspected the rebar placement and integrity of the reinforcement.

No splices in transverse steel reinforcement will be permitted other than shown on the plans. No lapped splices will be permitted at locations where the concrete section is not sufficient to provide a minimum clear distance of 2 inches between the splice and the nearest adjacent bar.

No more than one splice will be permitted in any longitudinal bar between transverse joints and the splices shall be staggered.

A PAYMENT FOR BAR REINFORCING STEEL

Full compensation for conforming to the requirements in BAR REINFORCING STEEL, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved in BAR REINFORCING STEEL, as indicated on the plans and as specified in the STANDARD SPECIFICATIONS and these Special Provisions shall be included in the contract price paid per access pit and no additional compensation shall be allowed therefore.

5.20 REINFORCED MASONRY BLOCK CONSTRUCTION

A GENERAL

Masonry block construction shall conform to the plans, Sections 202, “Masonry Materials,” and 3.3-4, “Masonry Construction” of the STANDARD SPECIFICATIONS, and these Special Provisions.

B MASONRY UNITS

Masonry units shall be the nominal sizes indicated on the plans. Masonry units shall conform to the provisions of ASTM C90 and the following:

Units 8-inches wide shall be constructed with medium weight aggregate as specified in ASTM C 331.

All concrete masonry units shall achieve a 28-day strength of 1,500 psi.

All concrete masonry unit manufactured shall be in conformance with the “Quality Control Standards of the Concrete Masonry Association of California and Nevada”.

C MORTAR

Mortar shall be Class “E” as specified in Section 201-5.1, “General,” of the STANDARD SPECIFICATIONS. The quantity of water to be used in the preparation of mortar shall be only that required to produce a mixture sufficiently workable for the purpose intended.

Mortar shall be used as soon as possible after mixing and shall show no visible signs of setting prior to use. Retempering of mortar will not be permitted. Mortar droppings shall be kept out of the grout space.

If it is necessary to move a block so as to open a joint, the block shall be removed from the wall, cleaned, and set in fresh mortar.

D GROUT

Grout for pouring shall be of fluid consistency and mixed in the ratio by volume of 1 part portland cement to 2.25 parts minimum to 3 parts maximum damp loose sand. Grout shall conform to the requirements of Section 202-2.2.2, “Grout” of the STANDARD SPECIFICATIONS and these Special Provisions.

Grout for pumping shall be of fluid consistency and shall have a cement content not less than 660 pounds per cubic yard. The mix design shall be approved by the ENGINEER.

E PAYMENT FOR REINFORCED MASONRY BLOCK CONSTRUCTION

Full compensation for conforming to the requirements in REINFORCED MASONRY BLOCK CONSTRUCTION, including furnishing all labor, materials (including accent tile), tools, equipment, and incidentals and doing all the work involved in REINFORCED MASONRY BLOCK CONSTRUCTION, including accent tile as indicated on the plans and as specified in the STANDARD SPECIFICATIONS and these Special Provisions shall be included in the contract price paid per access pit listed in the proposal and no additional compensation shall be allowed therefore.

5.21 FILTER FABRIC

Filter fabric shall be composed of a non-woven geotextile, Type 180N in accordance with Section 213-2 of the Standard Specifications. The CONTRACTOR shall use filter fabric to encase all crushed rock material.

Storage and handling of the filter fabric shall conform to Subsection 213-1.4, "Storage and Handling," of the Standard Specifications.

Once the subgrade along a particular segment has been prepared to the satisfaction of the ENGINEER, the geotextile shall be unrolled along the prepared surface. The fabric shall not be dragged across any surface, and the entire fabric shall be rolled out as smoothly as possible. All filter fabric exposed to ultraviolet radiation (the sunlight) for more than three days shall be rejected by the ENGINEER and replaced with new filter fabric.

Parallel rolls of fabric shall be overlapped a minimum of 18 inches, under concrete structures and roadway sections, 30 inches, under riprap material, or sewn if required or as specified by the manufacturer's specifications. All overlaps shall not be included in the quantity of filter fabric paid to the CONTRACTOR, and the CONTRACTOR's bid should be adjusted accordingly.

The fabric shall be secured in place where required with pins placed on six (6) foot centers, at the midpoints of all overlaps, and at the edges to maintain them during construction activities. Before covering the fabric, the condition of the fabric shall be inspected by the ENGINEER to determine that no holes exists in the fabric. All such occurrences shall be repaired by placing a new layer of fabric extending beyond the defect in all directions a distance equal to the minimum overlap requirement.

Crushed rock shall not be placed or dropped on the fabric in any way that may damage or displace the fabric and shall not be dropped onto the fabric from a height greater than three feet, nor shall the CONTRACTOR drive or operate any machinery on or across the fabric that will damage or displace the fabric.

Full compensation for conforming to the requirements of FILTER FABRIC shall include furnishing all labor, tools, equipment, materials, and incidentals necessary for completing the work and shall be considered as included in the CONTRACT unit price paid for the construction or installation of the item to which such filter fabric is incidental or appurtenant to and no additional compensation will be allowed therefore.

(1)

SECTION 02110

SITE CLEARING

PART 1 - GENERAL

1.01 SECTION INCLUDES

The work of the contractor covered by these specifications consists of furnishing labor equipment and materials to perform all operations necessary to remove existing vegetation, trees, stumps and other materials to the limits shown on the plans or as directed in writing by the Engineer and to re-establish the maintenance access road.

1.02 SPECIFICATIONS, CODES, AND STANDARDS

Standard Specifications for Public Works Construction, 2006 edition (Greenbook) is referenced and made a part of this section.

1.03 SUBMITTALS

A. Work Plan – Provide a work plan to describe the equipment and procedures to be used to establish the access road centerline and the limits of clearing, include the location of material and equipment staging and storage areas. No fuels, solvents or other hazardous and/or flammable chemicals shall be stored within the project limits. Such materials shall be contained within vehicles approved to store and transport hazardous materials.

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION

3.01 PROTECTION

A. Contractor shall locate, identify, and protect utilities that are intended to remain from damage.

B. Contractor shall protect any trees, plant growth, and features designated and intended to remain.

C. Contractor shall protect benchmarks and any existing structures from damage or displacement. If damaged or removed, contractor shall replace and restore the item at the Contractor's expense.

3.02 PREPARATORY WORK

A. The CONTRACTOR shall provide and install temporary bridges to span existing drainage channels along the pipeline alignment. Drainage channels are seasonal and may mitigate between rainy seasons. The channels vary in width from 10 feet to 30 feet and in height from 12 inches to 36 inches. Grading or placing imported fill in these areas is prohibited. The CONTRACTOR shall be responsible for the design and installation of the temporary bridges to accommodate the anticipated construction traffic.

B. Clearing limits shall be clearly indicated in the field by means of colored flagging or stakes and shall not exceed the limits shown on the plans. The limits shall be approved by the OWNER's representative prior to performing the work.

3.03 CLEARING AND GRUBBING

A. Clearing and grubbing shall be in accordance with Section 300-1 of the Greenbook.

B. Clearing and grubbing shall stay within the limits flagged by the surveyors. Clear branches of trees that overhang the limits to be cleared to height of 15 feet.

C. Tree trunks and branches in excess of 4-inches in diameter shall be disposed of off-site at an approved disposal/recycling facility. All other grubbed material and branches smaller than 4-inches in diameter shall be mulched and deposited uniformly to the south of the limits to be cleared. Removal of the grubbed material (smaller than 4-inches in diameter) beyond the work area is not required.

D. Existing trees and branches that have fallen across the limits of clearing shall be removed as described herein.

E. Remove tree stumps within the clearing limits to a depth of 12-inches below grade.

F. Perform minor grading and compaction of the cleared area to create level driving surface as directed by the Engineer. Moisture condition and compact the road surface to remove any soft soil conditions as directed by the Engineer. Construction vehicle traffic along the road surface will be considered sufficient compaction effort.

3.04 CLOSE-OUT WORK

A. Remove all materials used to create passable construction access through the project corridor. Perform minor grading to fill in ruts and other small depressions along the access road.

3.05 PAYMENT

A. Full compensation for performing site clearing shall be included in the LUMP SUM contract price bid and no additional compensation will be allowed therefore.

B. Full compensation for the installation and removal of temporary bridges shall be included in the unit price bid for Temporary Bridges in the contract price bid and no additional compensation will be allowed therefore.

END OF SECTION

SECTION 02300

DEWATERING

PART 1 - GENERAL

1.01 REQUIREMENTS:

A. Work Specified. This section provides for the design, all applicable discharge permits, installation, maintenance, and removal of dewatering systems which are compatible with ground support and construction methods as necessary to safely conduct shaft, jacking, boring, micro-tunneling and tunnel excavations without causing dewatering-induced surface settlements and perform backfill grouting without allowing washout, segregation, or degradation of the low-density cellular concrete.

B. Work Inclusions. The Work includes all labor, materials, permits, installation, maintenance, operation and removal of temporary dewatering systems, for the control and disposal of surface and ground waters.

1.02 REFERENCE STANDARDS, CODES AND STANDARDS:

A. Copies of the Industrial Waste Discharge Requirements are included in Appendix “B”.

1.03 JOB CONDITIONS:

A. Methods of dewatering may include sump pumping, single or multiple stage well point systems, educator and ejector type systems, deep wells, and combinations thereof.

B. Locate dewatering facilities where they shall not interfere with utilities and construction work to be performed by others.

C. Modify dewatering procedures, which cause, or threaten to cause, damage to new or existing facilities, so as to prevent further damage. Control the rate of dewatering to avoid all objectionable settlement and subsidence.

1.04 CONTRACTOR SUBMITTALS:

A. Shop Drawings which, at a minimum, indicate the proposed type of dewatering system; all required permits, the arrangement, location, and depths of systems components; a complete description of equipment and instrumentation to be used, with installation, operation and maintenance procedures; and the methods of disposal of pumped water.

B. Monitoring Data: Results of all monitoring information required by permits and herein.

PART 2 - MATERIALS

2.01 GENERAL

A. Furnish and maintain all materials, tools, equipment, facilities and services as required for providing the necessary dewatering work and facilities.

B. Provide equipment for monitoring groundwater levels and other instruments and measuring devices as required.

C. Dewatering includes well points, sump pumps, temporary pipelines for water disposal, and rock or gravel placement, and other means including standby pumping equipment maintained on the jobsite continuously.

PART 3 - EXECUTION

3.01 GENERAL

A. Perform dewatering in accordance with approved Shop Drawings. Keep the Engineer advised of any changes made to accommodate field conditions and, on completion of the dewatering system installation, revise and resubmit Shop Drawings as necessary to indicate the installed configuration.

B. Organize dewatering operations to lower the groundwater level in excavations as required for prosecution of the work, and to provide a stable, dry subgrade for the prosecution of construction operations.

C. Maintain water level at lower elevations, so that no danger to structures can occur because of buildup of excessive hydrostatic pressure, and provide for maintaining the water level a minimum of 2 feet below the subgrade, unless otherwise permitted by the Engineer.

D. The system shall be placed into operation prior to excavation below ground water level to lower the ground water level and shall be operated continuously 24 hours a day, 7 days a week until drains, sewers and structures have been constructed and fill materials have been placed and dewatering is no longer required.

E. Dispose of water in accordance with Industrial Waste Discharge permit requirements. Disposal shall be in such a manner as to cause no injury or nuisance to public or private property, or be a menace to the public health. Dispose of the water in accordance with applicable regulatory agency requirements. Do not drain trench water through the pipeline under construction. Cost of obtaining Industrial Waste Discharge permit shall be included in the lump sum price bid for dewatering. Provide water quality testing as required by the Industrial Waste Discharge Permit.

F. The dewatering operation will be continuous, so that the excavated areas shall be kept free from water during construction, while concrete is setting and achieves full strength, and until backfill has been placed to a sufficient height to anchor the work against possible flotation.

G. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sandpacked and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation. Prevent disposal of sediments from the dewatering effluent into the sanitary sewer by employing necessary methods, including settling basins. Design settling basins to meet the water quality requirements of the Industrial Waste Discharge permit.

H. Where excavations may obstruct the natural flow of a watercourse, implement measures to control and dispose of the surface water that will not adversely affect water quality or beneficial uses of the watercourse. Divert watercourse flows around excavation areas by constructing barriers, temporary culverts, new channels or other appropriate means.

I. Do not allow water containing mud, silt or other pollutants from aggregate washing or other construction activities to enter a watercourse or be placed in locations that may be subjected to high storm flows.

J. Provide filtration to prevent piping, removal of fines, and lost ground at all points where water is exiting the ground. Filtration shall be with a properly engineered and designed geotextile and filter rock.

K. Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent possible without causing damage to adjacent property.

L. The Contractor shall control groundwater seepage into excavations from all water sources above the final subgrade level such that the seepage waters do not cause disturbance to subgrade soils and do not adversely affect construction of the Work as specified.

3.02 RECORDS:

A. Maintain and provide a daily record of the average flow rate and water quality test results as required by the Industrial Waste Discharge permit.

3.03 PAYMENT

A. The lump sum price bid for dewatering shall include all materials, labor and equipment to install and continuous maintain the dewatering operation to meet the requirements specified herein and related discharge permits, including system removal and surface restoration once the dewatering system is no longer required. Payment of sewer discharge fees shall be paid by the Contractor as stipulated by the Industrial Waste Discharge permit. The allowance bid item included in the bid proposal shall be used as full compensation to reimburse the Contractor for discharge fees. The Contractor shall submit proof of payment to receive reimbursement under this bid item. No mark-up will be allowed on sewer discharge fee reimbursements.

(END OF SECTION)

SECTION 02431

ANNULAR SPACE GROUTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section specifies requirements for designing and testing grout mixes, and furnishing and placing annular space grout. The annular space (void between the host sewer and liner pipe) shall be completely grouted to support the liner and provide long-term stability.

B. Definitions:

1. Annular space: The void space between the outside of the liner pipe and the inside of the host sewer. Due to the varying methods of rehabilitation, not all requirements of this specification may be applicable.

2. Annular space grout: Cement-based grout injected into the annular space for the purpose of establishing complete and intimate contact between the host sewer and liner pipe and eliminating shunt flow. Grouting shall take place as soon as practical following liner inspection.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02446, Access Pit Excavation Support Systems.

B. Section 02955, Restoration of Underground Piping.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

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

1. ASTM C109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.

2. ASTM C138, Standard Test Method for Unit Weight, Yield, and Air Content of Concrete

3. ASTM C150, Standard Specification for Portland Cement.

4. ASTM C 403, Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance

5. ASTM C494, Specification for Chemical Admixtures for Concrete.

6. ASTM C495, Standard Test Method for Compressive Strength of Lightweight Insulating Concrete.

7. ASTM C567, Standard Test Method for Unit Weight of Structural Lightweight Concrete.

8. ASTM C827, Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.

9. ASTM C939, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete

10. ASTM C618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

11. ASTM C796, Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam.

12. ASTM C869, Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete.

1.04 SUBMITTALS

A. General: Make in accordance with Section 01330 and SSPWC 2-5.3.

B. Submittals and Required Calculations. The CONTRACTOR shall submit the following to the ENGINEER at least 30 working days prior to the start of the grouting operation.

1. The proposed grouting mix.

2. The proposed grout densities and viscosity.

3. Initial set time of the grout.

4. The 24-hour and 28-day minimum grout compressive strengths.

5. The grout working time before a 15 percent change in density or viscosity occurs.

6. The proposed grouting method and procedures.

7. The maximum injection pressures.

8. Proposed grout stage(s), limits, and volumes (e.g., Stage 1, to springline; Stage 2, fully grouted) as applicable.

9. Bulkhead designs and locations.

10. Description, method, and calculations used for determining the volume of the annular space to be groute

11. The total estimated volume of annular space grouting to be performed between construction pits or bulkheads.

12. Buoyant force calculations during grouting.

13. Flow control and depth of flow in liner pipe during grouting operation.

14. Provisions for re-establishment of service connections and/or laterals.

15. Pressure gauge, recorder, and field equipment certifications (e.g., calibration by an approved certified lab).

16. Vent location plans relative to liner pipe cross sectional are

17. Written confirmation that the CONTRACTOR has coordinated grouting procedures with the grout installer and the liner pipe manufacturer. Data for preceding Items 1 through 5 shall be derived from trial grout batches by an approved, independent testing laboratory and provided in writing.

C. Product Data:

1. Manufacturer's product data sheets indicating:

a. Mixing, handling, storage, and waste disposal requirements.

b. Personal safety equipment and first aid measures.

c. Source of supply for each grout ingredient.

2. For each type and source of material:

a. Cement: Standard physical and chemical analysis.

b. Admixtures: Documentation showing that the proposed admixtures have a history of demonstrable satisfactory performance and are compatible with adjacent materials.

3. Calibration procedures for gauges and meters to be used in grouting operations.

D. Working Drawings and Methods Statements:

1. Patterns and details for sequencing and performing grouting. Include the means and methods for collecting and disposing of excess and waste material, collecting and disposing of water resulting from grouting operations, and preparation ahead of grouting operations.

2. Layout and description of grouting equipment and facilities including:

a. Supply equipment.

b. Drilling equipment.

c. Agitators or holding tanks.

d. Mixers.

e. Pumps.

f. Grout delivery piping and manifolds.

g. Hookup details including valves, packers, and gauges.

3. Means and methods for:

a. Proportioning and mixing grout.

b. Measuring grout pressure, quantity, and injection rate.

c. Maintaining grout pressure below specified limits.

d. Sequencing grouting and establishing basis and threshold values for modifying mixes.

e. Furnishing, preparing, and plugging or patching grout holes.

f. Minimizing washout and migration of grout into the sliplined pipe.

4. Incorporate details for effecting concurrent performance of other work. Integrate the means and methods for performing this work with Sections 02446 and 02955 as related to liner installation and supplement with scaled and dimensioned cross sections and profiles depicting arrangements and clearances.

E. Mix Designs: Mix design data for each mix comprising type and proportions of each ingredient.

F. Quality Control:

1. Qualifications:

a. Grouting Manager.

b. Test laboratory proposed for calibrating and testing accuracy of master gauges and meters.

2. Certifications:

a. Certificates of compliance for materials listed under Part 2 of this Section.

b. Calibration certificates for gauges and meters to be used in grouting operations.

3. Quality Control Plans:

a. Methods for assuring uninterrupted grouting at pressures that do not exceed the maximum specifie

b. Methods for demonstrating that grout mixes meet design criteri

c. Methods for containing excess or waste grout, cleaning equipment and disposing of excess and wasted grout, water and debris.

d. Methods for preventing grout migration into the sliplined pipe.

e. The total estimated volume of annular space grouting to be performed between construction pits or bulkheads as constructed in the field prior to beginning grouting operations.

4. Daily Records:

a. Records of strength tests on grout samples as soon as practicable after performing tests.

b. Shift report for each grout crew and for each shift, regardless of actual progress, and submitted no later than the beginning of the following working day. Include:

(1) Crew size, employee classification and employee work assignment.

(2) Number and type of equipment use

(3) List of idle or inoperative equipment and reason for downtime.

(4) Grout injection records for each reach, bulkhead to bulkhead, or segment as applicable:

(a) Hole location within segment ring.

(b) Any drilling require

(c) Mix type and batch number.

(d) Detailed grout injection records for each hole, broken down by quantity injected, injection pressure and pumping rate.

5. Notifications:

a. Within 1 workday of any proposed addition, deletion, or change to the scheduling of shift work.

b. Within 1 workday of performing gauge and meter tests.

c. Immediately upon injection of less than 80 percent or more than the 120 percent of the theoretical volume of grout take.

6. Tests: Results of trial mixes and tests specified in Part 3.

1.05 QUALITY ASSURANCE

Retain a full-time, on site Grouting Manager with at least 10 years of related work experience on similar projects to manage the grouting program by designing, testing, and overseeing the injection of grout mixes of the type require Provide references and past projects.

1.06 DESIGN CRITERIA

A. General: Design grout mixes with the appropriate properties to fully serve their intended functions, as defined herein.

B. Strength:

1. Minimum penetration resistance of 100 psi in 24 hours (ASTM C403).

2. 28-day compressive strength: 300 psi.

C. Injection pressure: No more than 15 psi over any existing hydrostatic head measured at the downstream bulkhead or the collar of the hole being grouted

D. Maximum annular grouting pressure shall be pipe stiffness per ASTM D2412 divided by three (3).

E. SSPWC Table 500-1.3.7(A).

PART 2 - PRODUCTS

2.01 MATERIALS

The grout materials shall consist of Portland cement, Portland cement and fly ash, and/or additives, provide materials that are not biodegradable.

A. Mix Design. One or more mix design, signed and sealed by a Civil Engineer registered in the State of California, shall be developed to completely fill the annular space based on the following requirements:

1. Size of the annular void

2. Sufficient strength and durability to prevent movement of the liner pipe

3. No foaming agent shall be used

4. Provide adequate retardation

5. Produce less than 1 percent shrinkage by volume

B. Density and Viscosity: The CONTRACTOR shall design a grout mix with a density to meet the requirement of SSPWC 500-3 and to prevent floating of the liner pipe. The apparent viscosity shall not exceed 20 seconds in accordance with ASTM C 939 unless otherwise approved by the ENGINEER.

2.02 EQUIPMENT

A. Drilling Equipment:

1. Utilize a rotary-percussive drill for all drilling and cleaning out of grout holes.

2. Equip drills with bits of the same nominal diameter as that required for the grout hole.

B. Grouting Equipment:

1. General: Provide for continuous circulation of grout within the system.

2. Pumps:

a. Utilize helical screw rotor-type producing uniform flow without pulsation.

b. Equip with a water connection to facilitate flushing the system.

c. Equip with a pressure gage as specified herein.

3. Appurtenances:

a. Packers: Capable of sealing grout holes without leakage when grouting at the maximum permissible grouting pressure.

b. Hoses and Piping:

(1) Provide manifold system of valves and pressure gauge in the line at the collar of the hole to permit accurate control and monitoring of grouting pressure, bleeding, and regulation of flow.

(2) Size: 40mm I.D., minimum.

c. Volumetric Measuring Device: Accurate to 1 gallon.

C. Maintain an adequate supply of spare parts and equipment to assure uninterrupted grouting operations.

PART 3 - EXECUTION

3.01 GENERAL

A. Perform grouting in a progressive manner between bulkheads by injecting grout in such a way that the annular space is fully filled from downstream to upstream, or filled in controlled lifts, as determined by the CONTRACTOR and as approved by the ENGINEER.

B. Waste grout not placed within 2 hours of the time of initial mixing or a change in viscosity of 15%.

3.02 ANNULAR SPACE GROUT

A. Preparation. Upon completion of sliplining but prior to grouting, bulkheading of the ends and appropriate venting will be require This is to seal the annular space from sewer flow to permit the grout to set and withstand the loads imposed by the grout and groundwater. The CONTRACTOR shall test the integrity of the installed liner pipe and constructed bulkheads for any leaks by performing the following:

1. Dewater and inject dye water into the annular space (this alternative will not be permitted if the crown or any portion of the host sewer is severely deteriorated by the point where water may escape through the host sewer).

2. Pressurize the annular space to the maximum permissible grouting pressure per the manufacturer's recommendation with approval by the ENGINEER.

3. The CONTRACTOR shall submit a detailed plan to the ENGINEER to hold the liner pipe on the invert for a period of time long enough to allow the grout to set where buoyant uplift is a factor.

B. Injection Procedure and Pressure. The gauged pumping pressure shall not exceed the liner pipe manufacture's approved recommendations and as specific Pumping equipment shall be of a size sufficient to inject grout at a volume, velocity and pressure compatible with the size of the annular space and degree of host pipe corrosion.

The following rules shall apply when performing annular space grouting in such a manner that the annular space from bulkhead to bulkhead is continuously filled in one operation: Once grouting operations begin, grouting shall proceed uninterrupted from bulkhead to bulkhead Grout placement shall not be terminated until all of the following conditions are met, unless otherwise approved by the ENGINEER.

1. The estimated annular volume of grout has been injected;

2. The exhausted grout at each vent is not less than 85 percent of the density of freshly injected grout;

3. The exhausted grout at each vent is not less than 85 percent of the original viscosity of the freshly injected grout; and

4. When recommended by the grout installer.

The following rules shall apply when performing annular space grouting in lifts from bulkhead to bulkhead: Grout placement shall not be terminated until all these conditions are met, unless otherwise approved by the ENGINEER.

1. The estimated annular volume of grout for the lift has been injected;

2. The exhausted grout at each vent is not less than 85 percent of the density of freshly injected grout;

3. The exhausted grout at each vent is not less than 85 percent of the original viscosity of the freshly injected grout; and

4. When recommended by the grout installer.

C. Grout Pressure Gauge and Recorder: A grout pressure gauge and recorder shall be installed immediately adjacent to each injection port. During operations, the recorder shall continuously record the actual grouting pressure versus the time on paper with ink. The gauge shall conform to an accuracy of ±0.5 psi. The range of the gauge shall not be

more than 100 percent greater than the design and attached to a saddle-type diaphragm seal (gauge saver) to prevent clogging with grout. All gauges shall be certified and calibrated in accordance with ANSI B40, Grade 2 The grout pressure recordings shall be identified, as a minimum, with the date, batch, and time of day grouting was performed and shall be submitted to the ENGINEER at the end of the work day that grouting was performed

3.03 CLEAN-UP

A. Minimize waste and losses. Collect and dispose of excess grout and waste materials including water resulting from grouting operations using approved methods.

B. Promptly clean up grout spills and clean sliplined pipe.

3.04 FIELD QUALITY CONTROL

A. Onsite Test. For each batch, the CONTRACTOR shall provide all equipment and personnel necessary to perform the following tests in the presence of the ENGINEER.

1. Density per ASTM C 138 or by other methods as approved by the ENGINEER.

2. Viscosity per ASTM C 939

3. Grout that exceeds ±15% of the design density will be rejected

B. Strength Tests: Take three grout cube samples and test in accordance with ASTM C109 or ASTM C495 as required for every 500 cubic feet of each type of grout mixed

C. Gages and Meters:

1. Test field gages and meters in the presence of the ENGINEER no less often than weekly using master gauges and meters.

2. Verify accuracy of master gages and meters through the use of a test laboratory no less frequently than every 2 months.

(END OF SECTION)

SECTION 02446

ACCESS PIT EXCAVATION SUPPORT SYSTEMS

PART 1 - GENERAL

1.01 REQUIREMENTS:

A. Work Specified. The Work specified in this section includes requirements for excavation and support of access pits, shafts, shaft excavations, and jacking and receiving pits required for casing installation, micro-tunneling and tunneling operations and excavations related to structures and manholes that require shoring and bracing. The Contractor shall design, furnish, install, and maintain a system of supports, including all bracing and associated items, to retain excavations in a safe manner and to control ground movements. Upon completion of the required casing installation or tunnel construction, the system of supports shall be completely removed, unless otherwise specified herein, and the shaft and staging area sites restored.

B. Work Inclusions. The Work shall include site grading, traffic control, fencing, and signing construction staging areas; design and construction of shaft excavations and excavation support systems; material disposal; control and disposal of surface water, groundwater, and construction water; and site restoration.

C. Shaft Size. The Contractor shall have sole responsibility for sizing the shaft excavations within the construction limits indicated on the plans. The size of the shafts shall be adequate to construct all structures required.

1.02 STANDARDS, CODES, SPECIFICATIONS, AND REPORTS:

A. General: Unless otherwise stated in this specification or in related work section specifications, the Contractor shall comply with the following standards, codes, specifications and reports.

B. Commercial Standards:

1. ASTM A 36: Specification for Structural Steel.

2. ANSI/AWS D1.1: Structural Welding Code.

3. ACI 506.2: Specifications for Materials, Proportioning, and Application of Shotcrete.

4. AISC: Manual of Steel Construction.

C. Codes:

1. CAL/OSHA: State of California Administrative Code, Title 8, Industrial Relations, Chapter 4.

2. OSHA Regulations: 29 CFR Part 1926 Subpart P - Excavations.

3. California Labor Code, Section 6705, Shoring and Bracing Drawings.

D. Standard Specifications:

1. “Greenbook”, Standard Specifications for Public Works Construction (SSPWC), 2006 edition.

E. Geotechnical Reports:

1. Geotechnical Investigation, Repairs to Unlined RCP, Reaches IV-A and IV-B, November 2009

1.03 DESIGN CRITERIA:

A. General. Design shaft excavation support systems and working slabs to withstand earth pressures, unrelieved hydrostatic pressures, bottom heave, equipment loads, applicable traffic and construction loads, and other surcharge loads to allow the safe construction of the tunnel or jacked pipe without movement or settlement of the ground, and to prevent damage to or movement of adjacent structures, streets, and utilities. Design excavation support systems to be compatible with the geologic conditions described in the Geotechnical Reports including any adjacent slope support structures. Recommended lateral earth pressures are summarized in the Geotechnical Reports. The Contractor shall:

1. Design each member or support element to support the maximum loads that can occur during construction with appropriate factors of safety.

2. Design the support system to minimize horizontal and vertical movements, and to protect adjacent utilities from damage. Design support system to maintain the stability of the excavation and provide a factor of safety of at least 1.5 against sliding and against bottom heave.

3. Employ wales, struts, beams, and tiebacks for bracing and lateral support as required for excavation faces supported by soldier piles and lagging, liner plates, trench boxes, or sheeting systems. Provide struts with intermediate vertical and horizontal supports as required to prevent buckling. Provide timber lagging, precast lagging, shotcrete, liner plates, or steel sheeting as required to retain soil between supports.

4. Design a working slab for each shaft bottom to provide stable support for guide rails, thrust blocks, and other construction operations.

5. Design, install, operate, and maintain groundwater control system for excavations to control any groundwater inflows, prevent piping or loss of ground, and maintain stability of the excavation.

6. Provide temporary safety railing and fencing around all shaft excavations. Provide additional fencing as shown on the Drawings and as specified. Provide traffic control, including K-Rail barriers around working areas and shafts located within or adjacent to streets, roadways, freeways, driveways, or parking lots.

7. Design excavation support systems in accordance with all applicable CAL/OSHA and OSHA requirements.

8. Review of the Contractor's plans and methods of construction by the Engineer does not relieve the Contractor of his responsibility to provide and maintain an adequate support systems and traffic control to achieve the specified requirements.

1.04 CONTRACTOR SUBMITTALS:

A. Pre-Construction Submittals. Submit the following within one week from the Notice to Proceed. The Contractor shall allow at least three weeks from the date of the original

submittal to the mobilization of equipment or purchase of materials, as appropriate, to allow for review and at least one resubmittal.

1. Organization chart showing the Project Superintendent, tunnel equipment operators, and Site Safety Officer, and the Project Surveyor(s).

2. Brief description and sketches of the tunneling system illustrating the design, layout, and operation of each system component including: excavation methods, muck removal system, guidance and controls, personnel access, utilities, and initial support erection scheme. Address as a minimum all tunnels, shafts, and portals.

3. Brief descriptions and sketches describing and illustrating the proposed methods and equipment proposed to install the initial support.

B. Shop Drawings. Submit shop drawings for shaft excavations, excavation support systems, and other related information as requested by the Engineer. The shop drawings shall be prepared and sealed by an independent Civil or Structural Engineer registered in the State of California. Submit the following in accordance with the requirements of Subsection 2-5.3.3, Submittals.

C. All Shop Drawings and Submittals shall be submitted and approved by the Engineer before any Work specified in the respective Shop Drawing and/or Submittals takes place. If the Contractor chooses to perform the Work without such approval, then it will be done at risk of rejection, subject to approval by the Engineer.

1. Name and qualifications of person responsible for excavation support system design.

2. Construction method to be used for the installation for excavation support system design.

3. Shop drawings and design calculations indicating arrangement of supports and construction sequence for proposed support system(s). Show the elevation of struts, braces, or other supports as related to the depth of excavation at intermediate stages of construction. Provide details of working slab, drains, and sump construction. Indicate sizes, shapes, and material specifications for all support elements including lagging, if used. Calculations shall include estimates of likely deflections or deformations of the support system and maximum tolerable values.

4. Breakout plans indicating support installed to transfer loads and maintain excavation support and stability of the excavation when commencing jacking, boring or tunneling operations and when holing out in receiving shafts.

5. Thrust block design and details.

6. Quality control procedures. Address materials testing requirements, proof-test and performance test requirements for tiebacks, and excavation monitoring provisions.

7. A site plan for each excavation indicating the location, excavation dimensions, site grading, and site development details for the excavation and all work areas, and the proposed limits of disturbance surrounding each excavation.

8. Provisions for protecting adjacent facilities and utilities. All utilities within 40 feet of excavations and all structures within 50 feet of excavations shall be

addressed.

9. Site drainage and groundwater control details. Show details of the measures to control, treat, handle, and dispose of surface water runoff, groundwater, and construction water. Provide details of working slab, subdrains, and sump contraction.

10. Details of materials handling, stockpiling, and disposal sites for excavated materials.

11. Monitoring system to evaluate stability, safety, ground movements, and any nearby facilities and structures which could be affected by the work, as indicated in subsection 306-3.11 – Geotechnical Instrumentation and Monitoring.

12. Plans indicating removal of excavation supports and site restoration details.

13. Plans for environmental controls.

14. Copies of all documentation, releases, and permits required herein and necessary to complete the work. Documentation, releases, and permits shall include but not be limited to imported materials, material disposal, utility disturbances, and affected properties.

1.05 QUALITY ASSURANCE:

A. Regulations. Perform all work in accordance with current applicable regulations and codes of all federal, state, and local agencies.

B. Qualifications. Excavation support systems shall be designed by a Civil or Structural Engineer registered in the State of California who has a minimum of five years experience in the design of earth retaining structures.

C. Tolerances. Location of the excavation supports shall be within three inches of that shown on the shop drawings.

1.06 SAFETY:

A. Standards. All shaft excavations and support systems shall conform with applicable CAL/ OSHA provisions, CalTrans safety standards, and OSHA excavation, trenching, and shoring standards which are contained in the Code of Federal Regulations 29 (CFR) 1926.650-1926.653. In the event of a conflict, comply with the more restrictive applicable requirements.

1.07 EQUIPMENT:

A. Requirement. All timber and structural steel used for the supporting systems, whether new or used, shall be sound and free from defects, which may impair their strength.

B. Structural Steel. Conform to ASTM A 36 or higher strength unless approved by Engineer.

C. Timber: All timber shall be structural grade with a minimum allowable flexural strength of 1,100 pounds per square inch (psi).

D. Shotcrete. Conform to the requirements of ACI 506.2. Minimum design compressive strength shall be as required but not less than 3,000 psi.

1.08 GENERAL WORK REQUIREMENTS:

A. Start. Commence shaft excavations and site development only after submittals and shop drawings have been reviewed and approved by the Engineer.

B. Notify. Notify the Engineer not less than 15 days before beginning excavation. Excavations and construction for site development shall not extend beyond the property lines and limits of disturbance shown on the Drawings.

C. Methods. Methods of construction for shafts shall be such as to ensure the safety of the work, Contractor's employees, the Engineer's employees and inspectors, the public, and adjacent property and improvements, whether public or private.

D. Slab. Provide shaft excavations with a gravel pad or concrete working slab equipped with a sump to pump out construction water, storm water and ground water.

E. Protection. Before beginning construction at any location of this project, adequately protect existing structures, utilities, trees, shrubs, and other existing facilities. Design excavation support systems to limit deformations that could damage adjacent facilities including utilities and structures. The repair of or compensation for damage to existing facilities shall be at no additional cost to Owner.

F. Excavation. Perform shaft excavations using hand excavation or conventional mechanical excavation techniques.

G. Unsupported Height. The height of unsupported sidewall span shall be in accordance with OSHA regulations, 29 CFR Part 1926 Excavation Standards.

H. Welding. All welding shall conform to the applicable provisions of ANSI/AWS D1.1.

I. Support System Monitoring. Install support system monitoring provisions as necessary to assure proper performance of the work, to monitor the support system and the excavation, and as indicated in subsection 306-3.11 – Geotechnical Instrumentation and Monitoring.

J. Safety. Safety is the sole responsibility of the Contractor. As a minimum, place fencing, gates, lights, and signs as necessary around the shafts and staging areas to provide for public safety.

K. Settlement and Deflections. Install excavation support systems in accordance with Shop Drawings, which have been reviewed by the Engineer. If settlement or deflections of supports indicate that support system requires modification to prevent excessive movements, in the opinion of the Engineer, redesign and resubmit revised shop drawings and calculations to the Engineer at no additional cost.

L. Working Area. Conduct all shaft, jacking, boring and tunnel construction work, including excavation, shoring, temporary facilities, materials storage, and construction traffic within construction easements established for the project. All work shall be in accordance with the applicable permits.

M. Access. Provide and facilitate safe access to the instruments at all times for the Engineer. The Contractor shall allow and facilitate instrument installation and monitoring by the Instrumentation Specialist.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fabricated connections and accessories, WF shapes, and other structural steel shall conform to the requirements of ASTM A6, unless otherwise approved. Steel H piles shall be in accordance with Section 02458.

B. Concrete shall be as specified in SSPWC Section 201-1 and as modified in these special provisions.

C. Wood lagging shall be dimension lumber with minimum allowable stress of 1100 psi.

1. The stress grade of the lagging shall be in conformance with the allowable stresses of the CBC, Chapter 23.

2. Lumber shall be grade marked by WWPA or WCLIB with species and grade conforming with those shown on approved Shop Drawings.

PART 3 - EXECUTION

3.01 GENERAL

A. Preparation. Clear and grade the shaft sites in accordance with the Shop Drawings.

B. Performance. Excavations and Backfilling shall be performed in accordance with the requirements of the SSPWC Greenbook, Section 300 – Earthwork

3.02 DUST AND EROSION CONTROL

A. Precautions. Take all precautions necessary to prevent a dust nuisance to adjacent properties. Provide erosion and sediment control in accordance with the Standard Specifications. Correct and repair all damage resulting from dust or erosion at no additional cost to the Owner.

3.03 GROUNDWATER CONTROL:

A. Provide positive groundwater control as needed to keep excavations dry, stable and prevent damage to adjacent utilities and structures.

B. Pumping. Open pumping from sumps shall not result in boils, softening of the ground, or loss of fines. Sumps, sub-drains, drain blankets, wells, and well points shall be installed as necessary, using suitable filters or screens so that fines are not removed from the formation.

C. Surface Drainage. Maintain existing surface drainage conditions in all areas affected by shaft excavations.

D. Disposal. Dispose of all water removed for groundwater control and removed from shaft excavations in accordance with Subsection 306-3.3, Dewatering.

3.04 SOLDIER PILES AND LAGGING:

A. Predrilled Holes. Install by pre-boring or other pre-excavating methods to the tip elevation shown on the Shop Drawings. Provide casing, drilling mud, or other method of support to prevent caving of holes and loss of ground.

B. Concrete Encasement. After soldier pile has been seated plumb in the pre-bored hole, encase it with concrete from the tip to the bottom level of the final excavation. Concrete

strength shall be in accordance with Shop Drawings and shall be placed by means of a tremie system. Apply vibration through the pile.

C. Lagging. Provide timber, steel, or precast concrete lagging of sufficient thickness to withstand lateral earth pressures.

D. Lagging Installation. Install lagging with no gap between adjacent boards. As installation progresses, backfill the voids between the excavation face and the lagging with sand or pea gravel packed into place. Pack with materials such as hay, burlap, or geotextile fabric where necessary to allow drainage of incidental groundwater without loss of ground due to piping.

E. Shotcrete. Shotcrete, if used, shall be applied in accordance with ACI 506.2.

3.05 INTERNAL BRACING SUPPORT SYSTEM:

A. Internal Bracing. The internal bracing support system shall include wales, struts, and/or shores.

B. Struts. Provide struts with intermediate bracing as needed to enable them to carry maximum design load without distortion or buckling.

C. Web Stiffeners, Plates, and Angles. Include web stiffeners, plates, or angles as needed to prevent rotation, crippling, or buckling of connections and points of bearing between structural steel members. Allow for eccentricities caused by field fabrication and assembly.

D. Bracing Supports. Install and maintain all bracing support members in tight contact with each other and with the surface being supported.

E. Pre-loading. Pre-load bracing members by jacking struts to 50 percent of the design load if necessary to control shoring movement. Pre-load bracing members in accordance with methods, procedures, and sequence as described on the Shop Drawings. Coordinate excavation work with installation of bracing and pre-loading. Use steel shims and steel wedges welded or bolted in place to maintain the pre-loading force in the bracing after release of the jacking equipment pressure. Install support and pre-load immediately after installation and prior to continuing excavation.

F. Procedures. Use procedures that produce uniform loading of bracing members without eccentricities or over stressing and distortion of members of system.

(END OF SECTION)

SECTION 02601

CLEANING OF HOST PIPE

PART 1 - GENERAL

1.01 DESCRIPTIONS

A. The CONTRACTOR shall perform cleaning of the existing sewer (herein referred to as the host pipe) to prepare it for the selected rehabilitation method(s). This Section includes equipment, operation, procedures, methods and acceptance criteria to provide a thorough cleaning operation of the host pipe and remove all sewer debris along the perimeters of all reaches of the project.

B. Sewer Debris:

1. Sewage Wastes - The consistency of the sewage wastes at the invert varies. It is organic in nature and can appear either in dry solid form, in suspension in the waste stream or can appear in a sludge-like consistency or mixed in with other debris at the invert. Handling of the sewage wastes shall be performed with extreme care since medical wastes and syringes and hazardous materials may be embedded in the sewage sludge.

2. Invert Debris - Invert debris consists of sewage wastes, grease, roots, sand to gravel sized sediments, bricks, materials removed from the sewer wall, and other solid or semi solid materials.

3. Wall Debris – Wall debris consists of sewage wastes, grease, roots, latency, mineral deposits, and other solid or semi solid foreign materials loosely or firmly fixated to the perimeter of the wall, which will have to be removed by mechanical means (scaling) or low pressure washing. Cleaning of the wall is particularly critical to remove all deleterious materials that may contaminate the annular cementations grout.

C. The CONTRACTOR shall perform a thorough cleaning operation to remove all sewer debris from the host pipe, and to ensure the integrity, thickness, and alignment of the finished lining.

1.02 REFERENCE STANDARDS

A. Except as otherwise indicated, the CONTRACTOR shall comply with the latest adopted edition of the Standard Specifications for Public Works Construction (SSPWC) “Greenbook”.

1.03 SUBMITTAL

A. The following shall be submitted for review and acceptance in compliance with SSPWC Section 2-5.3 prior to commencement of cleaning the host pipe:

1. Proposed personnel, materials and equipment to be used, a detailed plan and schedule with description, man-entry points (if used), methods of conducting cleaning, scaling and chemical coating operations, temporary support as required to ensure the safety and stability of the host pipe.

2. Administrative and physical controls to demonstrate sufficient cleaning of the host pipe.

3. Neutralizing Chemical Application

a. Qualification, experience and certification for individuals and contractors in the use and application of the required chemicals and agents.

4. Daily Report:

a. Start and stop times of cleaning and scaling operations, equipment used, and beginning and end stations of the operations and approximate volume of material removed. If chemical coating operation is required, the report shall also include volume of chemical used and actual application rates.

b. Time and reasons for any down time due to equipment or difficulty/adverse conditions in conducting cleaning operations.

5. Procedure and equipment for measuring water pressure for washing, and collection and disposal of the wasted water.

6. Permit for CONTRACTOR to discharge wash water downstream into SARI pipeline.

7. Other submittal requirements as described in Section 500-1 of the Green Book.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. Equipment utilized for cleaning the invert and the wall of the host pipe may include, but is not limited to, hot or cold pressure washers, water jets, hydro flushers, root cutters, grinders, steam sprayers, scaling bars, shoring and associated equipment, buckets, shovels, and miscellaneous equipment which may or may not be maintained on the jobsite continuously.

B. Neutralizing Chemical Equipment – per manufacturer's recommendations.

2.02 MATERIALS

A. Water: Use potable non alkaline water.

B. Neutralizing Chemical: 50 to 55 percent concentration of magnesium hydroxide slurry, trade name Thioguard, or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Host Pipe cleaning shall be performed in compliance with the requirements described in Section 500-1.1 of the Green Book, and shall also include the following procedures:

1. For all pipe cleaning operations

a. The CONTRACTOR shall perform cleaning operations with appropriate safety and technical personnel overseeing the operation as well as proper safety equipment available to all personnel. This shall include the use of a moveable overhead protection system regardless of the condition of the sewer or the method of cleaning that is used. The moveable overhead protection system shall be suitable for use by both

the CONTRACTOR and Owner personnel, and shall be designed specifically for this project by a California Registered Civil Engineer, subject to approval by the ENGINEER.

2. For sliplining of RPMP liner operation:

   a. Cleaning shall be performed per Green Book requirements or as recommended by the manufacturers, whichever method is more stringent, and as amended by this Section.

   b. Proofing shall be performed as follows: The CONTRACTOR shall use a mandrel with dimensions that are 1 inch greater than the outside profile of the approved liner pipe, measured at its widest portion.

B. The CONTRACTOR shall erect barrier at the downstream terminus of the project limit to prevent washing of sand size or larger size debris downstream into the SARI pipeline.

C. The cost of repairing any damage to the host pipe due to overly aggressive cleaning shall be the responsibility of the CONTRACTOR.

D. Field Quality Control

1. The CONTRACTOR shall exercise extreme caution when conducting man-entry work and shall bear the sole responsibility for the installation and operation of the cleaning equipment, performance of scaling operations, and performance of point repairs to comply with the requirements of this Section.

2. Adequate control shall be maintained to ensure that the stability of the host pipe is not adversely affected by the cleaning method(s) and that damage to the host pipe does not occur.

3. Stop cleaning and scaling activities immediate when concrete or steel reinforcement is exposed from inside the host pipe.

4. Cleaning Test Sections:

   a. One test section is required for each selected rehabilitation methods to demonstrate the equipment, personnel, procedure and production rates meet the project requirements.

   b. Clean a minimum 20 feet of the sewer alignment in a location to be determined jointly by the CONTRACTOR and the ENGINEER. The CONTRACTOR shall use the same efforts and equipment as is planned for actual production. The cleaned section shall be included in the demonstration testing for the final lining rehabilitation.

   c. Complete test cleaning in the presence of the ENGINEER.

(END OF SECTION)

SECTION 02625

REINFORCED POLYMER MORTAR PIPE (RPMP)

PART 1 - GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to complete the work as indicated in the Contract Documents.

B. This Section covers the use of Reinforced Polymer Mortar Pipe (RPMP) for slipline installations.

1.02 REFERENCE STANDARDS

A. ASTM Standards:

1. ASTM C1103 – Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.

2. ASTM D256 – Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

3. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.

4. ASTM D695 – Standard Test Method for Compressive Properties of Rigid Plastics.

5. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

6. ASTM D2412 – Standard Test Method for Determination of External Loading Characteristic of Plastic Pipe by Parallel Plate Loading.

7. ASTM D2240 – Standard Test Method for Rubber Property – Durometer Hardness.

8. ASTM D2290 - Standard Test Method for Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe by Split Disk Method.

9. ASTM D2583 – Standard Test Method for Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

10. ASTM D3262 – Standard Specifications for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipes.

11. ASTM D3567 – Standard Specification for Determining Dimensions of Fiberglass (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.

12. ASTM D4161 – Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Elastomeric Seals.

B. American Water Works Association (AWWA)

1. AWWA M45 – Fiberglass Pipe Design.

C. Others

1. Standard Specification For Public Works Construction (SSPWC, or Green Book)

1.03 DEFINITIONS

A. Lot – all pipes having the same production marking number, but shall not exceed 50 pipes or 1,000 feet of pipe.

1.04 RPMP PIPE SYSTEM DESCRIPTION

A. The pipe shall be manufactured using a mandrel process utilizing continuous glass fiber reinforcements in the circumferential direction. Both continuous glass fiber roving and chopped roving may be incorporated to achieve hoop strength and axial reinforcement but consistent with the approved product. A reinforced polymer mortar layer shall be used to provide increased stiffness with placement near the neutral axis in the core.

B. The pipe shall be manufactured in accordance with ASTM D3262 and meet the cell characteristics approved under the individual product qualification testing.

C. The pipe shall be field connected using product approved joint systems that utilize compressed elastomeric sealing gaskets as the sole means to maintain joint water tightness.

D. Fittings shall be fabricated from pipe meeting the requirements of these specifications.

E. The CONTRACTOR shall perform a line test in accordance with the SSPWC. The pipe shall not fail, leak, or weep when tested at ambient temperature.

1.05 SUBMITTALS

A. General:

1. Product Data: Manufacturer's product information, including handling and storage recommendations, and material safety data sheets for all materials making up the pipe.

2. Verification test data, including material certification and testing data.

3. Certifications indicating compliance with reference standards.

4. Provide individual submittals for each pipe size.

B. Shop Drawings:

1. Product Data Information:

a. Planned Application.

b. Planned Installation.

c. Product Description and Composition.

d. Dimensions (external, internal along pipe barrel and at joint).

e. Pipe Stiffness.

f. Joint Type.

g. Section Lengths.

h. Weight & density.

i. Certification of Compliance.

j. Joint Details.

k. Pipe handling recommendations

l. Pipe jointing recommendations

m. Laying Schedule using project specific coordinate system.

n. Not Used.

2. Verification Data (Quality Assurance/Quality Control Submittals):

a. Material Certification.

b. Documentation showing proposed laboratory is approved by the Owner's Engineer of Design to conduct the proposed tests.

c. General Testing & Dimension Data

(1) Provide the required testing data as stipulated under SSPWC 207-20, 207-22, and Section 500 for pipe acceptance and 1.07 C.3. of this specification.

(2) Required pipe acceptance tests and dimension results per 207-20.7 except as modified in 1.07 C.4. of this specification.

(3) Provide gasket rubber testing per SSPWC 208.

(4) Provide compression testing results per ASTM D695 – for information only.

(5) Provide joint test results consistent with D4161 for each shape.

3. Fittings and specials

a. Provide detailed dimensioned shop drawings, manufacturing method, and product information. Include special handling and installation requirements.

4. Details of Joints

5. Pipe production and laying schedule

6. Field coating kit contents with application procedure for use in coating exposed/cut surfaces of pipes at non-solid polyester sections.

C. Reports:

1. All reports shall be prepared, signed and sealed by a California Registered Civil or Structural Engineer.

2. Initial Flexural Modulus Investigation Report.

3. Axial Thrust Analysis Report for slipline/jacked pipe installations

D. Written Notifications

1. Start of prototype construction

2. Start of prototype testing

3. Start of production run

E. Not Used.

1.06 QUALITY ASSURANCE

A. Qualifications

1. Testing Laboratory: Approved by the Owner's Engineer of Design to conduct the required tests under this specification. The approval shall have been made in writing within 12 months from the start of this contract.

2. Laboratory Plastic Pipe Testing Technician: Two (2) years minimum experience in conducting all the required plastic pipe lab tests or similar tests.

3. Third Party Inspection: Five years minimum experience in conducting all the specified inspection when required by the INSPECTOR.

B. Workmanship shall conform to that required per SSPWC 207-20 and D3262. The following imperfections in the barrel or socket of a pipe or fitting will be considered injurious and cause for rejection:

1. Defects including indentations, bubbles, pinholes, cracks, pits, blisters, foreign inclusions and resin starved areas that, due to their nature, degree of extent, detrimentally affect the strength and serviceability of the pipe. The pipe shall be as uniform as commercially practical in color, ovality, density, and other physical properties.

2. Bulges, dents, ridges, and other defects that result in a variation of inside diameter of more than 1/8 inch from that obtained on adjacent unaffected portions of the surface. No glass fiber reinforcement shall penetrate the interior surface of the pipe wall.

3. A pre-approved comparator tablet may be used as reference when evaluating these conditions.

C. Verification & Project Qualification Tests

1. All tests shall be conducted at a pre-approved laboratory and witnessed by the INSPECTOR, with individual sets for each pipe size required.

2. These tests and associated reports shall be completed to the satisfaction of the INSPECTOR and ENGINEER prior to starting production run. However, production run shall not deviate in any way from the sections qualified under these tests.

3. The required pipe tests will be conducted in accordance with SSPWC 207-20 and Section 500 and the following modifications:

a. Testing Data shall be for the particular pipe being provided and not archived data up to 24 months old.

b. Results from parallel plate test to compute pipe stiffness per D2412 as modified by D3262, may be used to fulfill item 2), "Initial Flexural Modulus (D790)", of the Testing Data requirements of 207-20, 207-22 per the Brown Book. For non-round sections, information obtained

through D2412 testing shall be provided for information only and not to establish flexural modulus

c. Results from Barcol Impressor per D2583 may be used to fulfill item 4), “Impact Strength (ASTM D256) or Shore D Hardness (ASTM D2240)”, of the Testing Data requirements of 207-20.

4. Required pipe acceptance tests and dimensions will be performed per SSPWC 207-20.7 for each lot except that the variation limit of Section 6.2.3 of D3262 shall be 92%.

D. Additional Verification & Project Qualification Tests for Non-round Section

1. Conduct a minimum of two (2) instrumented Parallel Plate Tests per D2412 of prototypes of the proposed pipe section for evaluating the strains of the cross-section at “points of interest” as well as to observe if any undesirable failure modes occur. Test shall conform to the following requirements:

a. Commence by preparing a testing and instrumentation protocol detailing the configuration of the “points-of-interest” being instrumented with strain gages, load rate, strain tracking equipment to be used, means of recording the data, steps that will be followed to initially verify the accuracy of the test data, and date of proposed test.

(1) A minimum of ten (10) “points-of-interest” shall be used for semi-elliptical sections. As least five (5) shall be located at the bottom and at least three (3) at the top.

(2) A minimum of eight (8) “points-of-interest” shall be used for oval/egg-shaped sections. At least three (3) shall be located at the bottom and three (3) at the top.

b. Notify the INSPECTOR and ENGINEER at least 15 working days, in writing, prior to conducting the test.

c. Two days prior to test, review protocol with the INSPECTOR and confirm conformance to D2412, equipment functionality and accuracy, and conduct a pretest not to exceed 1% deflection. Address all corrections and comments by the INSPECTOR and prepare for actual test.

d. Conduct tests in the presence of both the INSPECTOR and the ENGINEER.

2. Conduct three-point loading tests in conformance with D790 Procedure A, using twice the minimum number required under Section 8.2 of the Standard. Record displacement as the test progresses. However, ensure to establish data points for the following three displacement targets: 1.88%, 3%, and 5%. Test all specimens to rupture. Specimens shall be taken from prototypes of the proposed pipe at location which contains the least curvature in both lengthwise and cross-wise direction per Section 8.2. Load half of the specimens in the concave direction and the other half in the convex direction.

3. Hoop tensile testing per D638 or D2290. When only D2290 is possible, CONTRACTOR may fabricate representative circular pipe section provided thickness, composition and number of layers, roving orientation, etc, is the same as that of the project pipe.

E. Initial Flexural Modulus Investigation Report:

1. Prepare a report showing the comparison between the initial equivalent flexural modulus, $E_{f,equiv}$, from measured pipe stiffness results (round shapes only) as well as from the three-point load testing of the proposed pipe specimens and the calculated flexural modulus, $E_{f,calc}$. For the calculated flexural modulus, use both Classical Laminate Theory (CLT) method as well as Manufacturer's modified transformed section method. The equivalent flexural modulus obtained from tests shall be shown to meet or exceed the required minimum value.

F. Axial Thrust Analysis Report:

1. Prepare a report showing the maximum jacking forces planned by the Contractor do not exceed the allowable material properties of the pipe when the required safety factor is applied nor lead to any damage or loss of joint quality.

G. Additional Non-round Shapes Analysis Reports:

1. Stiffness Factor Report:

a. Prepare a report showing the predicted elastic properties of the proposed cross-section meet the required stiffness factor listed on the contract drawings. Perform both Classical Laminate Theory analysis as well as manufacturer's modified transformed section method.

b. Results from the above computation shall be used as the initial values for subsequent Finite Element Analysis efforts.

2. Finite Element Analysis Qualification Report:

a. Prepare a report that contains the computational efforts of the manufacturer in calibrating a finite element analysis (FEA) model using the results obtained from the parallel-plate instrumented test, on the basis of stress, strain, and deflection, with the target difference of 15% maximum. The pre-qualified software, including version used, shall be commercially available to the City for purchase, if desired. Loading and boundary conditions used shall be consistent with those of the required parallel-plate instrumented test, using the same loading rate as planned for that test. As a minimum, the report shall include the following items:

(1) A complete software input file, including all associated libraries, links, batch files, open source modifications, etc., that would allow the City to re-run and reproduce the output results being submitted by the pipe manufacturer should the City decide to verify the analysis when the same version of the software is purchased and used.

(2) Legal copy of pertinent software manual necessary to review the output file submitted in both hard copy and electronic version.

(3) Output file, in English units, listing principal stresses and strains, and global deformation results.

(4) Graphical representation of model, including loading, imposed boundary conditions, undeformed and deformed shape, color coded strain results, color coded stress results, and color coded deformation results.

(5) Graphs depicting strain vs loading, stress vs loading, load vs deformation of “points-of-interest”. A separate graph shall be provided for each “point~~s~~-of-interest” to be instrumented under full scale testing. As minimum, track the above conditions at the highest point on crown, lowest point on invert, at 10:30 and 1:30 o’clock, and one lower corner where the arch portion meets the invert.

3. Analytical Model Qualification Report:

a. Prepare a report showing that the cross-sectional EI of the proposed section is able to meet all of the required “Contractor-responsible element design” without exceeding any of the allowable strains, stresses, or generate any damage to the pipe.

H. Remanufacturing

1. When sections do not meet the design criteria, the CONTRACTOR shall instruct the manufacturer to redesign the sections until all the criteria are met.

I. Acceptance Criteria

1. All required submittals, including reports, have been provided and accepted by the ENGINEER.

2. The proposed pipe is configured and manufactured consistent with the approved product under the City’s product qualification testing program.

3. The product’s workmanship is acceptable to the INSPECTOR.

4. All required testing has been performed to the satisfaction of the INSPECTOR.

5. The Analytical Model Qualification report confirms that the difference between the mean stresses, strain, and maximum vertical deflection obtained from the Instrumented Parallel-Plate Tests and the Finite Element Analysis results are within a target difference of 15% maximum.

1.07 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer’s recommendations.

PART 2 - PRODUCTS

2.01 GENERAL

A. The Reinforced Polymer Mortar Pipe (RPMP), joints, and fittings shall be manufactured in conformance with AWWA M45, Manual of Water Supply Practices, ASTM D3262, Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced-Thermosetting-Resin) Sewer Pipe, and SSPWC in general, including applicable portions of Sections 207-20, and 500.. The most stringent shall govern.

B. Only RPMP pipe products, as approved by the Owner, shall be used. Composition, including type of inner and outer lining, polymer core makeup, continuous roving layering location, etc., shall match the composition of the tested pipes qualified during the product approval process. Material that does not conform to the approved physical properties shall be removed and replaced at no additional cost to the Owner. A time extension will not be granted to rectify the non-compliance.

C. The size, type, and stiffness factor of the pipe to be furnished shall be as shown on the Plans and/or in the Specifications.

D. The stiffness factor of the pipe shown on the plans or the specifications represents minimum requirements for an in-place condition under this project. The CONTRACTOR shall supplement minimum requirements as necessary to ensure the stresses, strains, and deflections resulting from the CONTRACTOR's handling, installation, and construction loads leading up to the final in-place condition can be adequately sustained by the actual pipes provided. Slip lined pipes must be capable of withstanding all forces that will be imposed upon it by the process of installation. All pipe used by the CONTRACTOR shall withstand the jacking load expected on the job with a safety factor of 2.5. The CONTRACTOR shall be fully responsible for the sufficiency of the pipe provided and may select a greater thickness or stiffness for the method of work, loading characteristics, site conditions, or other possible interferences at no additional cost to the Owner, provided it does not impact the installation or serviceability requirements.

E. Fittings shall be deemed to be non-structural except for ability to maintain its shape under self-weight, handling, encasement and bedding, and transportation loads without damage to the required inside vinylester liner nor shall result in any measurable deflection.

F. All pipes will be subject to inspection and acceptance by the INSPECTOR before and after delivery to the job site.

G. All pipe and fitting shall be clearly marked in accordance with SSPWC Section 207-20.6, or 207-20.7, 207-22.6, depending on method of installation.

H. All material needed for transitioning between dissimilar materials shall be AISI Type 316 stainless steel.

I. Liner thickness measurements shall be made in accordance with D3567, except no measurement shall be less than 92% of the required mean value as approved under the product's qualification testing.

2.02 MATERIALS

A. Resin Systems: The manufacturer shall use only approved polyester and vinylester resin systems approved under the product's qualification testing.

B. Glass Reinforcement: The reinforcing glass fiber shall be commercial grade E-type glass with a finish compatible with the resin used.

C. Internal Liner: Function as the corrosion liner. The manufacturer shall use only approved liners meeting the corrosion resistance testing requirements as part of the product's qualification testing, including composition, makeup, and veil requirements.

D. Exterior Liner: The manufacturer shall use only approved liners meeting the system's approved under the product's qualification testing.

E. Silica Sand: Sand shall be a minimum of ninety-eight percent (98%) silica with a maximum moisture content of 0.2%.

F. Elastomeric Gaskets: Gaskets shall be suitable for the service intended and conform to the requirements of SSPWC 208 and D3262.

2.03 APPROVED PRODUCTS

A. RPMP Pipe as manufactured by Hobas, Inc. or Ameron International.

PART 3 - EXECUTION

3.01 RPMP MANUFACTURING

A. General

1. All required pre-manufacturing and pre-testing submittals must be submitted and accepted by the Owner prior to commencing any manufacturing.

B. Prototype Testing

1. Provide notification of intent to commence testing effort at least 15 working days prior to start.

2. Make ready and secure Owner acceptance of testing protocol.

3. Conduct pre-testing requirements are required.

4. Conduct all required tests in the presence of the INSPECTOR and secure acceptance of results. For non-compliant testing/results, redesign and retest.

5. Complete all required reports and secure acceptance.

6. Prepare for production pipe manufacturing.

C. Production Pipe

1. Provide notification of intent to commence production at least 15 calendar days prior to start, including proposed pipe composition and thickness of the pipes based on the following:

a. Predicted flexural modulus using CLT method and modified transformed section approach.

b. Increased strength as required due to Contractor's efforts

2. Complete general testing and dimension data in the presence of the INSPECTOR per the prescribed quantity including required reports.

3. Prepare for product installation.

3.02 INSTALLATION OF RPMP

A. Complete all required testing and reporting as required.

B. For slipline installations, the CONTRACTOR shall conform to Section 500.

1. The actual sustained pressure used during grouting shall not result in the stress, strain, deflection, and joint capacity limits being exceeded. In addition, it shall not result in damage to the existing host pipe, compromise any approved temporary plugs of laterals, bulkheads, etc.

(END OF SECTION)

SECTION 02630

GLASS-FIBER REINFORCED POLYESTER (FRP) MANHOLES

PART 1 - GENERAL

1.01 SCOPE OF WORK

This specification shall govern for the furnishing of all work necessary to accomplish and complete the installation of glass-fiber reinforced polyester manholes. Glass-Fiber Reinforced Polyester Manholes shall be a one-piece monolithic designed unit constructed of glass-fiber reinforced, supplier certified, unsaturated commercial grade polyester resin containing chemically enhanced silica to improve corrosion resistance, strength and overall performance. FRP manholes shall be manufactured in strict accordance with ASTM D-3753.

1.02 GOVERNING STANDARDS

A. ASTM D-3753: Standard Specification for Glass-Fiber Reinforced Polyester Manholes.

B. ASTM C-581: Practice for Determining Chemical Resistance of Chemical Thermosetting Resins Used in Glass-Fiber Reinforced Structures Intended for Liquid Service.

C. ASTM D-2412: Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading.

D. ASTM D-695: Test Methods for Compressive Properties of Rigid Plastics.

E. ASTM D-2584: Test Method for Ignition Loss of Cured Reinforced Resins.

F. ASTM D-790: Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and electrical Insulating Materials.

G. ASTM D-2583: Test Method for Indentation Hardness of Rigid Plastics by means of a Barcol Impressor.

H. AASHTO H-20: Axle Loading.

1.03 SUBMITTALS

A. General:

1. Product Data: Manufacturer's product information, including handling and storage recommendations, and material safety data sheets for all materials making up the pipe.

2. Verification test data, including material certification and testing data.

3. Certifications indicating compliance with reference standards.

4. Provide individual submittals for each pipe size.

B. Shop Drawings:

1. Product Data Information:

a. Individual Manhole Installations.

b. Planned Installation.

c. Product Description and Composition.

d. Dimensions.

e. Pipe Stiffness.

f. Joint Type.

g. Weight and Density.

h. Certification of Compliance.

i. Joint Details and Dimensions.

j. Handling Recommendations.

k. Jointing Recommendations.

2. Verification Data (Quality Assurance / Quality Control Submittals):

a. Material Certification.

b. Documentation showing proposed laboratory is approved by the Owner's Engineer of Design to conduct the proposed tests.

C. Calculations:

1. All calculations shall be prepared, signed and sealed by a California Registered Civil or Structural Engineer.

2. Wall Stiffness and Wall Thickness

a. Design Parameters

(1) Maximum external water head over manhole cover: 125 feet.

(2) Maximum soil load over invert of pipe: 35 feet.

(3) Adjacent vehicular loading: H20 wheel loads (no vehicular loads directly over a manhole cover is anticipated).

1.04 MARKING AND IDENTIFICATION

A. All manholes shall be marked with the following information:

1. Manufacturers Identification

2. Manufacturers Serial Number

3. Manhole Length

4. ASTM Designation

5. Installation assist marks (vertical lines 90^0 apart at base of manhole).

1.05 QUALITY ASSURANCE/QUALITY CONTROL

A. Examination: Each manhole component part shall be examined for dimensional requirements, hardness, and workmanship.

B. Composition Control: Controls on glass and resin content shall be maintained for all manufacturing processes and for each portion of manhole fabrication. Records shall be maintained for these control checks. Proper glass content may be shown by glass usage checks or glass and resin application rate checks, in accordance with the material composition test in ASTM 8.8.1.

C. All required ASTM 3753 testing shall be completed and records of all testing shall be kept and copies of test results shall be presented to customer upon written request within a reasonable time period.

PART 2 - MATERIALS

2.01 RESIN

A. The resins used shall be unsaturated, supplier certified, commercial grade polyester resins. Mixing lots of resin from different manufacturers, or “odd-lotting” of resins shall not be permitted. Quality-assurance records on the resin shall be maintained. Non-pigmented Resin is required to allow for light or “sand” color of manhole surface in order to facilitate easy from grade interior inspection. UV Inhibitors shall be added directly to resins to prevent photodegradation.

2.02 REINFORCING MATERIALS

A. The reinforcing materials shall be commercial grade “E” type glass in the form of mat, continuous roving, chopped roving, roving fabric, or both, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.

2.03 SURFACING MATERIAL

A. If reinforcing material is used on the surface exposed to the contained substance, it shall be a commercial grade chemical-resistant glass or organic surfacing mat having a coupling agent that will provide a suitable bond with the resin.

2.04 FILLERS AND ADDITIVES

A. Fillers, when used, shall be inert to the environment and manhole construction. Additives, such as thixotropic agents, catalysts, promoters, etc., may be added as required by the specific manufacturing process to be used to meet the requirements of this standard. However, calcium carbonate mixed by the fabricator shall not be permitted. The resulting reinforced plastic material must meet the requirement of this specification.

2.05 LAMINATE

A. The laminate shall consist of multiple layers of glass matting and resin. The surface exposed to the sewer/chemical environment shall be resin rich and shall have no exposed fibers.

2.06 MANHOLE BOTTOM

A. Resin and glass fiber reinforced manhole bottoms may be provided, upon engineer’s request. Upon that request, manholes shall be provided with glass reinforced bottom section designed to withstand the hydrostatic head pressure, empty and water to grade, 25-ft. burial depth.

(Units deeper than 25-ft. may require additional reinforcement as required). Fiberglass ribs or fiberglass structural members may be utilized to meet the design criteria. Stiffeners shall be of non-corrosive materials encapsulated in fiberglass. FRP encapsulated wood or lumber will not be permitted. Bottom sections shall be furnished with an integral 3" wide anchoring flange. Invert and bench may be field installed utilizing concrete to the requirements of Division 3. Invert and bench may be factory installed utilizing non-corrosive materials encapsulated in fiberglass minimum 1/4" thick.

PART 3 - EXECUTION

3.01 REQUIREMENTS

A. Exterior Surface: The exterior surface shall be relatively smooth with no sharp projections. Hand-work finish is acceptable if enough resin is present to *eliminate* fiber show. The exterior surface shall be *free of blisters* larger than 0.5" in diameter, delamination and fiber show. Gel-coat or paint or other coatings are not allowed.

B. Interior Surface: The interior surfaces shall be resin rich with no exposed fibers. Interior surface shall be smooth for improved corrosion resistance and reduced sludge build-up. The surface shall be free of crazing, delamination, blisters larger than 0.5" in diameter, and wrinkles of 0.125" or greater in depth. Surface pits shall be permitted up to 6/ft^2 if they are less than 0.75" in diameter and less than 0.0625" deep. Voids that cannot be broken with finger pressure and that are entirely below the resin surface shall be permitted up to 4/ft^2 if they are less than 0.5" in diameter and less than 0.0625" thick. Gel-coat or paint or other coatings are not allowed.

C. Repairs: Any manhole repair is required to meet all requirements of this specification.

D. Load Rating: The complete manhole shall have a minimum dynamic load rating of 16,000 lbs. when tested in accordance with ASTM 3753, 8.4 (note 1). To establish this rating the complete manhole shall not leak, crack, or suffer other damage when load tested to 40,000 lbs. and shall not deflect vertically downward more than 0.25" at the point of load application when loaded to 24,000 lb.

E. Stiffness: The cylindrical portion of the manhole is to be tested in accordance with ASTM Method D 2412. The manhole cylinder shall have the *minimum* pipe-stiffness values shown in the table below, when tested in accordance with ASTM 3753, Section 8.5, (note 1). The stiffness shall be confirmed with the resin calculations submitted in Section 1.03. Minimum wall thickness shall be 1/2 inch.

Manhole Length (ft)	PSI
3 - 6	0.72
7 - 12	1.26
3 - 20	2.01
21 - 25	3.02
26 - 35	5.24

F. Soundness: In order to determine soundness, an air or water test is to be applied to the manhole test sample. While holding the pressure between 3-5 psi, the entire manhole must be inspected for leaks. Any leakage through the laminate is cause for failure of the test. Refer to ASTM 3753, Sec. 8.6.

G. Chemical Resistance: Per ASTM C 581; (see ASTM 3753, Section 8.7), Flexural strength, flexural modulus, and barcol hardness are plotted versus time on log-log coordinates. The line defined by these points is extrapolated to 100,000 hours. The minimum extrapolation retention allowed for any of these properties is 50%. Test samples

used are actual pieces of manhole or samples manufactured in a manner consistent in every way with the manhole component construction.

H. Physical Properties:

Flexural Strength (cone):	Hoop: 15.4 x 103 psi Axial: 17.2 x 103 psi
Flexural Strength (pipe)	Hoop: 22.5 x 103 psi Axial: 14.3 x 103 psi
Compressive Strength:	8.9 x 103 psi

I. Test Methods: All tests shall be performed as specified in ASTM 3753, Section 8, Titled "Test Methods". See ASTM 3753, Section 8, Note 5, for Test method D-790 and test method D-695.

3.02 HANDLING AND STORAGE

A. Do not drop or impact the fiberglass manhole. Lift manhole with two slings on spreader bar in horizontal position or an appropriately sized timer or steel beam, 8" longer than the cone top opening, inserted crosswise inside the manhole to the underside of the collar with a rope or chain attached to backhoe or other lifting device. Manhole may be rolled, however, insure that ground is smooth and free of rocks, debris, etc. Use of chains or cables in contact with manhole surface is prohibited.

3.03 INSTALLATION METHODS

A. General: The manhole installation should strictly follow the manufacturers recommended installation procedures and the details shown on the plans.

B. Set Manhole: To lift manhole, insert an appropriately sized timber or steel beam, 8" longer than the cone top opening, crosswise inside the manhole to the underside of the collar with a rope or chain attached to backhoe or other lifting device. Set manhole and concrete support ????? to achieve the invert level matching adjoining pipe sections. Plumb manhole using standard bubble level and by moving manhole with hands. Work concrete around manhole base and 6 inch minimum over incoming lines. Inverts and laterals are made following standard procedures.

C. Backfill: Backfilling is done just as soon as the concrete base has hardened enough to provide sufficient support for manhole and fill. Native soil (or sand, in unstable areas), free of large stones, debris, or concrete chunks may be used for backfill. Backfill should be place evenly around manhole in 12" maximum lifts and should thoroughly tamped to 90% standard proctor density before the next layer is installed. Backfill material shall be subject to approval by the engineer.

3.04 INSPECTION

A. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other representative of the owner. Such inspections shall be made at the place of manufacture, or at site of delivery, and the sections shall be subject to rejection on account of failure to meet any of the specification requirements. Sections rejected after delivery to the job site shall be marked for identification and shall be removed from the job at once. All sections which have been damaged after delivery will be rejected, and if already installed shall be acceptable if repaired or removed and replaced at the contractor's expense.

B. At the time of inspection the material will be examined for compliance with the requirements of this specification and the approved drawings.

3.05 CERTIFICATION

A. When requested by the purchaser on his order, a certification shall be made the basis of acceptance. This shall consist of a copy of the manufacturer's test report or a statement by the supplier, accompanied by a copy of the test results, that the manhole has been sampled, tested, and inspected in accordance with the provisions of ASTM 3753 and this specification, and meets all requirements. An authorized agent of the supplier or manufacturer shall sign each certification so furnished.

3.06 PAYMENT

A. This item will be paid for at the contract unit price per bid per each structure for the various sizes, types, and various depths of structures complete in place and will be full compensation for all materials required, operations, labor, tools, equipment, and all other incidentals necessary to complete the work as shown on the drawings and specified herein.

SECTION 02955

RESTORATION OF UNDERGROUND PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Cleaning, Preparation, and Sliplining

The CONTRACTOR is advised that CCTV video of this pipeline within the project limits is available from the Owner and may be downloaded off the Owner's ftp site.

This specification requires the CONTRACTOR to restore the integrity of the existing sewer by installing a new liner into an active sewer. This will include sewer cleaning, sewer debris removal and disposal, CCTV inspection services, pit construction, shoring, liner installation, annular grouting, reinstatement of all existing tie-ins, laterals, and construction of maintenance access structures. The result is a new, watertight sewer that is fully and solidly secured in place inside the existing sewer.

B. The existing sewer flows vary seasonally between 4 and 8 million gallons per day (MGD), 7 days per week. There is limited variation in flow over a 24 hour period. Historic flow data is available from the Owner.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. CCTV Inspection, Inspect pipelines per SSPWC Section 500-1.1.5.

B. 02431 Annular Space Grouting

C. 02446 Access Pit Excavation Support Systems

D. 02601 Cleaning of Host Pipe

E. 02625 Reinforced Polymer Mortar Pipe (RPMP)

1.03 REFERENCES AND DEFINITIONS

A. References

1. "SSPWC":

a. Standard Specifications for Public Works Construction, the latest edition and supplement adopted by the Board of Public Works.

B. Definitions

1. "Pipe liner", "slipline", "slipline pipe", "liner", and "pipe lining":

a. For the purposes of this Section, "pipe liner", "slipline", "slipline pipe", "liner" and "pipe lining" are synonymous. Due to the varying methods of rehabilitation, not all requirements of this specification may be applicable.

2. "Host pipe":

a. For the purposes of this section, "host pipe" refers to the existing, deteriorated sanitary sewer conduit.

3. “Pipe proofing” or “proofing”:

a. The process of winching or jacking a test section or mandrel through the host pipe to verify that it has the clearance to accept the intended liner.

4. “Service and tributary connections”:

a. Service connections, house connections, intercepts with other pipes, tie-ins, intercepts with structures, maintenance shaft openings, laterals, access openings, etc.

1.04 SUBMITTALS AND SHOP DRAWINGS

A. Except as noted, submit for review and approval. Technical Shop Drawings with plans and calculations shall be prepared by a California Registered Civil or Structural Engineer.

1. Project layout: Show locations, reference maintenance holes, laydown area and the method(s) of rehabilitation

2. Liner Installation: This submittal will be “Rejected—Incomplete” if any of the following elements are not included:

a. Installation Procedure and Sequencing

b. Pipe layout: Number each pipe, show each pipe joint, joint coupling, fittings, lateral, maintenance hole, junction structure, lateral reconnection details, etc, as applicable to the rehabilitation system.

c. Description of each Constituent Used: Detailed description of each constituent used in manufacturing the liner (include resin manufacturers, resin numbers, material sources, material suppliers, cured thickness, liner color, etc).

d. Liner joint description: Identify all materials such as the gasket compound, couplers, rings and any reinforcement. Provide a scale drawing of the joint with dimensions. Include a copy of the laboratory test showing the successful performance of the proposed joint system in the pressure/vacuum tests as applicable to the rehabilitation system.

e. Pipe ends and joint protection during jacking as applicable to the rehabilitation system

f. Liner strength calculations

g. Test section/mandrel: Provide description and proposed handling information. A properly designed mandrel or test section may be used alone or in combination with muck sleds.

h. Liner buoyancy calculations during grouting: Include procedure to maintain proper grade and alignment until the grout sets.

i. Reinstatement of service and tributary connections: Provide information describing methods, materials and procedure to reinstate each service and tributary connection.

j. Annular grout mix design and trial batch – See technical specification section 02431 Annular Space Grouting for annular grout mix design and trial batch.

k. Annular grouting: Safe grouting pressure, grouting equipment, anticipated grout injection pressure, monitoring program for grout densities and viscosity, estimated volume of annular space within each reach, method of verifying completeness of grouting the annular space, bulkheads, vents, grout ports, proposed grout port locations, etc (see technical specification section 02431 Annular Space Grouting or 03318 Coiled Profile Strip Lined Grout Lining).

l. Material Safety Data Sheets

m. Liner handling/transporting procedures:

n. Proposed emergency sewer procedures: Procedures and preparedness to stabilize the site and restore sewer service during events such as the mandrel/cleaning bucket/slipliner becoming lodged or if the sewer collapses during cleaning or sliplining.

o. Coordination: Written confirmation from the CONTRACTOR, liner installer, grout mix designer, grout installer and pipe manufacturer that each has reviewed and concurs with the “Liner Installation” submittal.

p. Liner Pipe Insertion Machine Details

3. Construction procedure: Describe flow management, maintaining service connections, sequencing, proposed pipe cleaning methods, point repairs, installation methods, etc.

4. Describe all proposed materials and identify material manufacturing sources.

5. Material certifications.

6. Manufacturer-recommended construction details not shown on the plans.

7. Odor control

8. Traffic control

9. Description of closed circuit television (CCTV) inspection equipment along with a sample of the log sheets.

10. Material Safety Data sheets and work site safety plan: Submit for information only.

11. Emergency Spill Response Plan (sewer overflows): Identify standby equipment and procedures.

12. Shoring, backfill and other necessary submittals required by the contract documents.

13. Procedure to remove rejected material per Section 3.04-I of this specification.

1.05 QUALITY ASSURANCE

A. Approved pipeline rehabilitation: Only the rehabilitation systems and methods described in this Section or shown on the Contract Drawings may be used. CONTRACTOR proposals for alternates, substitutions or using other systems and methods are not acceptable.

B. Approved sanitary sewer materials: Only the materials described in this Section may be used. CONTRACTOR proposals for material alternates and substitutions that do not appear on the Approved List are not equal and are not acceptable.

C. Protection of materials: Store and handle to prevent environmental degradation (temperature extremes, ultraviolet exposure, etc) and physical damage.

D. Rehabilitation pipe, linings, liners and other materials: New and manufactured within six months prior to installation. When the six-month period has lapsed, the CONTRACTOR may submit test data from an approved, independent laboratory verifying that the material has no degradation. The ENGINEER may allow up to two six-month extensions to the manufacturing age requirement. Thermosetting and thermoplastic materials older than eighteen months are considered degraded and rejected without recourse.

E. Damaged, degraded or otherwise rejected materials: Following written notification of rejected materials by the Inspector, segregate the rejected material immediately and remove from the job-site within 72 hours.

F. Sewer rehabilitation, rehabilitation pipe, pipe liner, liner pipe, slip-line, slip-line pipe, liner, lining, and pipe lining are interchangeable terms that refer to Work in this Section.

PART 2 - PRODUCTS

2.01 APPROVED LINER SYSTEMS, PER S-DRAWINGS.

2.02 SEALANTS FOR END SEALS (PIPE TERMINATIONS AT MAINTENANCE HOLES AND STRUCTURES)

A. Approved Sealants: Sika Sikadur 51NS Moisture-insensitive Elastomeric Epoxy for rehabilitation work and Sika Sikaflex 1A moisture-cured Polyurethane for new work, Mameco Vulkem 116 polyurethane, or equal.

PART 3 - EXECUTION

3.01 CLEANING PIPELINES

A. Perform cleaning of existing sewer and surface preparation per Specification 02601, and the Green Book.

B. Pipe proofing: In conjunction with or following cleaning operations, proof the host pipe using a mandrel or test section. Outfit the mandrel to travel upstream or downstream several times and with baffles to collect any remaining debris. The mandrel must pass through the entire length of host pipe. If the mandrel encounters unexpected difficulty, retrieve the mandrel, re-clean the host pipe and resume proofing. If the mandrel becomes lodged, excavate to retrieve, apply a remedial Point Repair, provide mandrel modification, if necessary and resume proofing. CONTRACTOR shall note that surface excavation to retrieve a lodged mandrel may not be possible in all sections along the length of the project and shall prepare alternate recovery methods for these sections.

C. Mandrel design: Shall be of substantial construction, capable of rigidly maintaining its shape during cleaning and/or proofing operations. Should there be operational problems due to offset joints of the existing sewer, the CONTRACTOR shall be responsible for necessary design modifications of all mandrels and all associated cost should be included in the bid amount.

D. Mandrel dimensions:

1. The mandrels to be used shall have an outside diameter that is 1-inch greater than the outside profile of the approved liner pipe or pipe coupling, whichever the larger. The length of each mandrel shall be 20% longer than the longest slipline pipe section. The test section/mandrel shall be constructed of steel, sufficient to withstand excessive handling. The test section/mandrel shall be stiffened at each end with a minimum of four welded cross-braces, intersecting at the center of the mandrel cross-sectional circle at intervals of 45 degrees.

3.02 TELEVISION INSPECTION (CCTV DOCUMENTATION BY CONTRACTOR)

A. The CONTRACTOR shall in the presence of the ENGINEER and the INSPECTOR take video and still pictures of the job site and the location of the field office, material staging and storage areas, all access pit sites, all maintenance hole sites and any location where work will be performed, as directed by the ENGINEER and INSPECTOR before any construction work begins. The CONTRACTOR shall make a copy of this information and give one copy to the ENGINEER and shall keep the other copy.

B. The host pipe shall be CCTV inspected prior to cleaning to determine the existing condition of the host pipe. A second CCTV inspection shall be performed after successful completion of cleaning and prior to liner pipe installation to verify that the host pipe is prepared for the liner pipe installation. A third CCTV inspection shall be performed following the successful completion of liner pipe installation and the reconnection of all laterals prior to grouting the annular space. A final CCTV inspection shall be performed after successful completion of grouting of the annular space, as applicable.

1. CCTV Equipment:

2. Camera: Remote-controlled, focus from 6” to infinity. Resolution at 350 lines per inch, minimum. During the reinstatement of laterals, only use “rotating lens” or “pan and tilt” cameras.

3. Footage counter: Accurate within plus or minus 1%. Include the real time counter measurement as a caption on the recorded tape. Use maintenance hole stations and maintenance hole numbers as references.

4. Television monitor: Color, minimum 350 lines per inch resolution.

5. Lighting: Adequate to fully illuminate the pipeline and positioned to not produce glare.

6. Mobility: Capable of steadily traveling with or against the flow. The maximum speed while inspecting and recording is 30 feet per minute.

7. Quality of Inspection Record of Final CCTV Inspection (per Article 3.03B above): The recorded video image must clearly show the full circumference of the pipeline, in focus, with adequate lighting to see detail, with uniform and steady travel, and depicting the date and time of inspection, footage of travel, street, project title and pipe size. At laterals, service connections and pipe defects, provide a closer, more detailed examination and document the orientation, location and size. The written records must further describe those laterals, service connections and pipe defects and index them to their location on the video record.

8. If debris is encountered, retrieve the CCTV unit, re-clean the pipeline and resume CCTV inspection.

9. For any CCTV inspection which shows that the CONTRACTOR has not successfully completed any portion of the work performed prior to the CCTV inspection, such CCTV inspection shall be performed again after the CONTRACTOR makes the necessary corrections. The CONTRACTOR shall perform both the corrections and the additional CCTV at the CONTRACTOR's expense.

10. Results for CCTV inspections shall be submitted as color DVDs. All CCTV inspection DVDs shall clearly show the entire periphery of the pipeline above the water surface without any visual obstructions due to a submerged camera, steam in the pipe, water on the lens or any other conditions as determined by the ENGINEER. Those portions of any CCTV inspection that are visually obstructed will be rejected by the ENGINEER and shall be televised again by the CONTRACTOR as directed by the ENGINEER at no additional cost to the City of Los Angeles.

11. After completion of the work, all CCTV inspection videos and records shall become the property of the ENGINEER. All costs associated with the CCTV inspections of the host pipe including all other appurtenant work shall be included in the appropriate bid item in the Schedule of Work and Prices.

12. Within twenty-four (24) hours after the pre-liner installation CCTV inspection of the host pipe is complete, the CONTRACTOR shall deliver the pre-liner installation DVDs to the ENGINEER for review.

13. Locations of laterals are approximate only. The CONTRACTOR shall determine exact locations prior to installation of the pipe liner.

14. Immediately following cleaning or pipe proofing or pipe installation, inspect the pipe by CCTV at the next expected low flow. Verify the host pipe condition and effectiveness of cleaning, proofing or installation operations. Record the inspection using a DVD recorder. Deliver the original DVDs, audio commentary, log sheets, and reports to the ENGINEER at the close of each working day. As desired, the CONTRACTOR may produce duplicates for its own use.

3.03 PIPE REHABILITATION

After the CONTRACTOR has verified the condition of the host pipe and the ENGINEER has made his observations of cleanliness of the host pipe, use approved methods and materials to rehabilitate the host pipe.

If pipe rehabilitation does not commence within twenty-four hours after cleaning, the pipeline must be re-cleaned and prepared per Sections 02601. Re-cleaning will not be necessary if the CONTRACTOR installs and maintains an approved method to capture debris and prevent debris from entering the cleaned reach of pipe. The proposed debris collection method must be submitted to ENGINEER for approval prior to cleaning pipelines. Should the debris collection method fail and allow debris to contaminate the cleaned pipe, the CONTRACTOR must re-clean the pipe at no additional cost to the CITY.

A. Service connections: Provide each affected user with 72 hours advance notice prior to restricting flow. Provide temporary sanitary collection services during flow restrictions. Immediately following pipe rehabilitation, the service connections must be restored as quickly as possible and within 24 hours. The circumference of the restored service connection must be smooth and fully open. Service connections that are overcut must be repaired by remedial Point Repair.

B. Rehabilitation operations: Protect the existing host pipe, maintenance holes and other improvements from damage. In particular, metallic parts of rehabilitation equipment may not come in direct contact with pipe or maintenance hole shafts. Rehabilitation operations may not surcharge laterals or otherwise cause flow or gasses to enter service connections.

C. Pipe Terminations at Maintenance Holes and Structures: To accept end seals, extend pipes into the maintenance hole or structure for a distance of 1/2" to 1-1/2". Where the pipe is installed through an intermediate maintenance hole or structure, the CONTRACTOR may extend the crown section for 1" plus or minus 1/2" distance and grind off the pipe crown flush with the maintenance hole shelf.

D. End Seals: At each end of each pipe rehabilitation section, seal the annulus with approved rubber gaskets and/or sealants to withstand 5 psi positive and negative pressure. Tool sealants to form a smooth transition for flow. Where necessary to allow sealants to bond and cure, install a temporary internal bypass.

E. Sealing Service Connections: As specified or required on the Plans. Shore and excavate to expose the connection, use approved sealant to caulk the circumference of rehabilitation pipe to host pipe joint, seal the service connection to the host pipe with acid-resistant epoxy mortar and backfill.

F. Specified Liner Load Ratings: The load ratings are as specified on the drawings. The specified liner systems do not consider construction means and methods for installation, transportation or handling. Increase the liner load rating or stiffness as necessary for construction loading, buoyancy, jacking, grouting, friction, winching, and all other operations performed during construction process.

G. Quality assurance: All work is subject to inspections per General Requirements Section 01452. Provide the ENGINEER and INSPECTOR with full access to manufacturing plants, fabrication plants, assembly yards and the worksite for announced and unannounced inspections.

1. Manufacturing of pipe, pipe liner, pipe lining and other products for rehabilitation

a. Material certification: Prior to fabrication, submit a written certification that the proposed rehabilitation system continues to be the approved system and that no changes in formulation, compound or constituent has since occurred.

b. Fabrication and Manufacturing: For each lot of material, perform at least one series of quality control tests to verify that the intended cell classification is present.

c. Lot for Quality Control Tests: For each manufacturing line, a lot is each production crew shift or each change in material batch or completion of a coil (for strip and helical products), whichever occurs first. A lot cannot exceed 50 pieces for pipe.

2. Installation of pipe, pipe liner, pipe lining and other products for rehabilitation

a. Field verification: Each material shipment received at the jobsite must be accompanied with the Inspector's written release from the manufacturing plant.

b. Field sampling: After installation and processing of the pipe, pipe liner or pipe lining, retrieve the required samples and deliver to the INSPECTOR

as soon as the samples are washed with potable water and wiped dry. Mark with the location taken, pipe crown orientation, date, project and CONTRACTOR's name.

c. Tests: Test coupons will be fabricated from each pipe sample at the 10, 11, 12, 1 and 2 o'clock positions with the crown being 12 o'clock. The coupons are tested for minimum thicknesses and dimensions, initial flexural modulus (ASTM D 790), initial tensile strength and elongation (ASTM D638), specific gravity, impact strength/hardness (ASTM D256/D2240 Shore D) and cell classification (ASTM D1784/ D3262/ D3350) and compared to archived test reports for acceptance or rejection.

3. Post-installation: After restoring service connections, installing end seals and sealing required service connections, perform a post-installation television inspection per Section 3.03.

H. Markings for pipe and fittings: For every 5 lineal feet of pipe and for each fitting, provide product codes that identify manufacturer, SDR/load rating, size, material, cell classification, plant date and the manufacturing shift and machine as applicable.

I. Rejections: Submit procedures to remove the rejected material and install compliant materials immediately. Delays caused by Rejections are subject to liquidated damages. In addition, the CONTRACTOR is subject to costs for additional inspection and testing. Some causes for rejection are:

1. Material damaged during transit, handling or installation.

2. Thermoplastic compounds found to be altered, changed or modified from the approved assembly.

3. Material unable to achieve the required physical properties.

4. Installations that do not satisfy specifications.

3.04 REHABILITATION SYSTEMS

A. All rehabilitation of the host pipe shall be performed per Specification Sections 02625. Access pits construction per Section 02446.

B. Rehabilitation from two access pits to a common point: Provide coupling devices to join pipe internally. Method of joining shall be submitted to ENGINEER for review within 40 working days after Notice to Proceed with the work. Submittal shall include at a minimum the locations of access/jacking pits, details of joining system proposed, and proposed methods of construction.

C. Sewer liner protection: Use devices such as cushions, sleeves, sleeves at the lead piece of pipe, and any other devices as required to protect the liner during installation. If sliplining, the jacking force must be applied directly to the liner body without affecting the couplings, joints or gaskets.

(END OF SECTION)